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1 CRAIG A. MUELLER, ESQ.  
Nevada Bar No. 4703  
2 **MUELLER & ASSOCIATES, INC.**  
808 S. 7<sup>th</sup> Street  
Las Vegas, NV 89101  
3 Telephone: (702) 382-1200  
Facsimile: (702) 637-4817  
4 Email: [electronicservice@craigmuellerlaw.com](mailto:electronicservice@craigmuellerlaw.com)  
*Attorney for Contestant Joey Gilbert*

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AUDREY ROWLATT  
CLERK

BY ~~JOEY GILBERT~~ DEPUTY

6 **FIRST JUDICIAL DISTRICT COURT**  
7 **CARSON CITY, NEVADA**

8 JOEY GILBERT, an individual,  
9 Plaintiffs,

10 vs.

11 STEVE SISOLAK, in his official capacity as  
12 Governor of Nevada; BARBARA  
13 CEGAVSKE, in her official capacity as  
14 Secretary of State; and JOSEPH GLORIA in  
his official capacity as Clark County Registrar  
of Voters, JAMES B. GIBSON, in his official  
15 capacity as Chairman of the CLARK  
16 COUNTY BOARD OF COUNTY  
COMMISSIONERS, and DEANNA  
17 SPIKULA in her official capacity as Washoe  
County Registrar of Voters and VAUGHN  
18 HARTUNG in his official capacity as Chair  
of the WASHOE BOARD OF COUNTY  
COMMISSIONERS, and JOSEPH  
19 LOMBARDO, putative Republican  
candidate for Governor of Nevada. and DOES  
I-10 and ROES I-10,

20 Defendants

Case No.:

*2022 0085 17*

Dept No.:

*7*

**STATEMENT OF CONTEST OF THE  
JUNE 14, 2022, PRIMARY ELECTION  
PURSUANT TO NRS §293.407**

**HEARING DATE REQUESTED  
WITHIN FIVE (5) TO FOURTEEN (14)  
DAYS. NRS §293.413**


MUELLER & ASSOCIATES, INC.  
808 S. 7<sup>th</sup> Street, Las Vegas, Nevada 89101  
Telephone: (702) 382-1200 Facsimile: (702) 637-4817

22 COMES NOW, Contestant, Joey Gilbert, by and through his attorney CRAIG  
23 MUELLER, ESQ. of MUELLER & ASSOCIATES, INC., and hereby files his written statement  
24 of election contest, pursuant to NRS §293.407.

26 This Statement of Contest is made and based on the following Memorandum of Points  
27 and Authorities, and any documents and exhibits which may be attached hereto, and any oral  
28 argument this court may allow at time of hearing.

1 DATED this 15<sup>th</sup> day of July, 2022.

2 MUELLER & ASSOCIATES, INC.

3  
4   
5 CRAIG A. MUELLER, ESQ.,  
6 Nevada Bar No. 4703  
7 808 S. 7<sup>th</sup> Street  
8 Las Vegas, Nevada 89101  
9 *Attorney for Contestant, Joey Gilbert*

10 I.

11 **SUBJECT MATTER JURISDICTION**

12 1. Pursuant to NRS §293.407, Contestant Joey Gilbert hereby contests the election of  
13 Defendant Joseph Lombardo to the office of Republican Nominee for the gubernatorial  
14 election. The court possesses proper jurisdiction of this dispute over the winner of the  
15 primary election for the office of Republican Nominee for Governor of the State of  
16 Nevada.

17 **NRS §293.410 Statement of contest must not be dismissed for deficiencies of form;  
18 grounds for contest.**

19 1. A statement of contest shall not be dismissed by any court for want of form if the  
20 grounds of contest are alleged with sufficient certainty to inform the defendant of the  
21 charges the defendant is required to meet.

22 The instant Contest is presented in the proper form and the grounds of Contest are alleged  
23 with sufficient certainty to inform the defendant of the charges the defendant is required  
24 to meet.

25 **NRS §293.413 Time for filing statement of contest; precedence of election contest;  
26 referral to special master.**

27 1. The statement of contest provided for in NRS 293.407 shall be filed with the clerk of  
28 the district court no later than 5 days after a recount is completed, and no later than 14  
days after the election if no recount is demanded.

Recount in Storey County was completed on or about July 11, 2022. This Contest is  
timely filed.

1 2. Mr. Gilbert was a candidate in the primary election, held on June 14, 2022, for the  
2 Republican Nominee for the General Election for Governor of the State of Nevada to be  
3 held November 8, 2022. Defendant Joseph Lombardo was declared the winner of the  
4 Primary Election and is now the putative Republican Nominee for the General Election  
5 for Governor of Nevada.  
6

7 3. The unofficial declaration of the result of the Election and the body or board which  
8 canvassed the returns thereof in Clark County occurred on July 1, 2022. The returns of  
9 Storey County were canvassed, and the unofficial declaration of the result occurred on  
10 July 11, 2022.  
11

12 **II.**

13 **PARTIES**

- 14 4. Contestant realleges all preceding paragraphs as if fully set forth herein.
- 15 5. Plaintiff, Joey Gilbert is a registered voter who resides in Washoe County, Nevada. He  
16 has standing to bring this action pursuant to NRS 293.407(2).
- 17 6. The First Judicial District Court has jurisdiction in this matter pursuant to NRS  
18 293.407(2), which states, "[e]xcept where the contest involves the *general election* for the  
19 office of governor...a candidate...who wishes to contest an election...must...file with the  
20 clerk of the district court a written statement of contest..." The Primary Election for the  
21 gubernatorial candidate is a statewide election and it is impractical to bring the same  
22 contest in each of the Counties in Nevada.
- 23 7. Defendant, Steve Sisolak is the Governor of Nevada and its chief executive officer. He  
24 approved Barbara Cegavske's purchase of the vote counting equipment utilized in the  
25 2022 Nevada Primary Election.  
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28

- 1 8. Defendant, Barbara Cegavske is the Secretary of State of Nevada who authorized the  
2 purchase of the subject vote counting equipment (VCE) utilized in the 2022 Nevada  
3 Primary Election and is responsible for overseeing the execution of repairs or software  
4 patches and otherwise abiding by federal regulations governing the use of the subject  
5 equipment. She caused the "Rules and Regulations for the Conduct of Primary and  
6 General Elections Promulgated by the Secretary of State." She also oversees the county  
7 election departments and certifies the results of elections.  
8
- 9 9. Defendant, Joseph Gloria is the Registrar of Voters in Clark County, Nevada and Deanna  
10 Spikula are the Registrars of Voters in Washoe County, responsible, inter alia, for  
11 managing the respective County Elections Departments and the execution and  
12 management of elections in Clark County and Washoe County as well as implementing  
13 the mandates of Barbara Cegavske, Secretary of State of Nevada regarding the VCE.  
14
- 15 10. James B. Gibson, Chairman of the Clark County Board of County Commissioners and  
16 Vaughn Hartung, Chair of the Washoe Board of County Commissioners are responsible  
17 for oversight and management of the Elections Departments in their respective counties.  
18
- 19 11. Joseph Lombardo is the putative Republican candidate for Governor in the November  
20 2022 General Election.

### 21 III.

#### 22 OVERVIEW

- 23 12. The right to vote includes not just the right to cast a *legal* ballot, but also the right to have  
24 it *fairly* counted. Article 2, Sec. 1A, (10), (11) of the Constitution of the State of Nevada  
25 as ratified by the voters of the state assures us of this right:

26 Sec. 1A. Rights of voters. Each voter who is a qualified elector under this  
27 Constitution and is registered to vote in accordance with Section 6 of this Article and  
28 the laws enacted by the Legislature pursuant thereto has the right:



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I. To receive and cast a ballot that:

\* \* \*

(b) Accurately records the voter's preference in the selection of candidates.

\* \* \*

10. To a uniform, statewide standard for counting and recounting all votes accurately as provided by law.

11. To have complaints about elections and election contests resolved fairly, accurately and efficiently as provided by law.

13. In this pending Contest, the results of the 2022 Primary Election for the Republican candidate for Governor erroneously indicate that Defendant, Joseph Lombardo garnered the most votes amongst the Republican candidates for the office. Based on a geometric, mathematical analysis of the votes *as counted and announced* by the Counties in Nevada, Contestant, Joey Gilbert disputes this alleged result.

14. In the election contest before this Honorable Court, the Contestant for the Republican nomination for Governor of the State of Nevada, Joey Gilbert, (hereinafter variously, "Contestant," "Joey", or "Mr. Gilbert"), an individual duly registered to vote in Washoe County, Nevada alleges not a political question, but rather a mathematical issue.

15. Mr. Gilbert accepts the votes as counted. However, he will prove that the result as announced is a *mathematical impossibility*. When the votes as counted and announced, are statistically corrected, Mr. Gilbert will demonstrate with irrefutable geometric finality that he handily won the primary election for Republican gubernatorial nominee in the June 14, 2022, Primary Election in Nevada.

IV.

**CONTESTANT SETS FORTH SUFFICIENT GROUNDS FOR STATEMENT OF CONTEST AS PROVIDED IN NRS 293.410**

16. Contestant realleges all preceding paragraphs as if fully set forth herein.

1 17. This Contest is based upon NRS §293.410 sub. 2. As presented more fully, *infra*,  
2 Contestant alleges that the votes as counted and as announced produce a mathematical  
3 and geometrically impossible result. Therefore, on information and belief, that the  
4 Election Boards made errors sufficient to change the result of the election as to any  
5 person who has been declared elected. NRS §293.410 (2) (d).  
6

7 18. Contestant alleges, that the ability to generate a geometric and mathematically impossible  
8 outcome by reason of the VCE used in the 2022 Nevada Primary Election is sufficient to  
9 raise reasonable doubt as to the outcome of the Election. NRS §293.410 (2) (f).

10 **NRS §293.410 Statement of contest must not be dismissed for deficiencies**  
11 **of form; grounds for contest.**

- 12 1. A statement of contest shall not be dismissed by any court for want of form  
13 if the grounds of contest are alleged with sufficient certainty to inform the  
14 defendant of the charges the defendant is required to meet.
- 15 2. An election may be contested upon any of the following grounds:  
16 (a) That the election board or any member thereof was guilty of  
17 malfeasance.  
18 (b) That a person who has been declared elected to an office was not at the  
19 time of election eligible to that office.  
20 (c) That:  
21 (1) Illegal or improper votes were cast and counted;  
22 (2) Legal and proper votes were not counted; or  
23 (3) A combination of the circumstances described in subparagraphs (1)  
24 and (2) occurred, in an amount that is equal to or greater than the  
25 margin between the contestant and the defendant, or otherwise in an  
26 amount sufficient to raise reasonable doubt as to the outcome of the  
27 election.  
28 (d) That the election board, in conducting the election or in canvassing the  
returns, made errors sufficient to change the result of the election as to  
any person who has been declared elected.  
(e) That the defendant or any person acting, either directly or indirectly, on  
behalf of the defendant has given, or offered to give, to any person  
anything of value for the purpose of manipulating or altering the  
outcome of the election.  
*(f) That there was a malfunction of any voting device or electronic  
tabulator, counting device or computer in a manner sufficient to raise  
reasonable doubt as to the outcome of the election. (Emphasis added.)*

V.

**DEFENDANTS HAVE FAILED IN THEIR DUTY  
TO CAUSE AN ACCURATE REPORTING OF THE  
2022 PRIMARY ELECTION IN NEVADA**

- 1  
2  
3 19. Contestant realleges all preceding paragraphs as if fully set forth herein.
- 4  
5 20. Defendants, and each of them had a legal duty to the Contestant to cause the accurate  
6 reporting of the result of the election results in the statewide Nevada 2022 Primary  
7 Election. Defendants, and each of them, breached that duty by failing to provide a  
8 mathematical and geometrically correct result of the votes *as counted* and as  
9 demonstrated herein.
- 10 21. Contestant can prove with an irrefutable mathematical certainty that the actual vote result  
11 as counted was miscalculated, is a geometric, mathematical impossibility and that Joey  
12 Gilbert, in fact, won his party's nomination for Governor.

13  
14 **VI.**  
15 **THE ANNOUNCED 2022 PRIMARY ELECTION RESULTS ARE**  
16 **MATHEMATICALLY, GEOMETRICALLY IMPOSSIBLE**

- 17 22. Contestant realleges all preceding paragraphs as if fully set forth herein.
- 18 23. The Election results as counted and announced are mathematically incorrect.
- 19 24. A mathematical analysis can determine the difference between a fair and an unfair  
20 election and where the unfair election is an election for which the results are  
21 geometrically infeasible. Contestant, Joey Gilbert will demonstrate that the vote data  
22 reporting results need to be corrected and how it needs to be corrected.
- 23 25. In the attached Clark County, 2022, Governor Primary Precinct Analysis ("Precinct  
24 Analysis"), we see the effect of the defective vote count on all 2022 Nevada  
25 Gubernatorial candidates. The corrected results are *glaring: Joey Gilbert prevails*  
26 *dramatically in the Republican race over Joseph Lombardo by more than 50,000 votes.*  
27  
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1 See, Exhibit "A", "CLARK COUNTY, 2022, GOVERNOR PRIMARY PRECINCT  
2 ANALYSIS," by Edward Solomon, dated July 13, 2022.

3 VII.

4 TO DETERMINE THE CORRECT VOTE RESULTS,  
5 CONSIDER FIRST THE AGGREGATE  
6 PERCENTAGE --A CONCEPT THAT RELATES TWO THINGS

- 7 26. Contestant realleges all preceding paragraphs as if fully set forth herein.
- 8 27. Nevada elections provide for three modes of voting: Early Voting, Mail-in Voting and  
9 Election Day Voting; in the Governor's Race, Nevada provided a total of three significant  
10 candidates, two Republicans and one Democrat. By force of law, Republicans cannot  
11 vote in Democrat primaries, nor can Democrats vote in Republican Primaries; in  
12 mathematics we would say the set of ballots belonging to Republicans, and the set of  
13 ballots belonging to Democrats, are *Disjoint Sets*, that is, they do not share any ballots in  
14 common.
- 15 28. Let us consider only the two Republicans, Gilbert and Lombardo. Each candidate has an  
16 Early Vote (hereinafter, "EV"), a Mail-in Vote (hereinafter, "MiV"), and an Election Day  
17 Vote (hereinafter, "EDV") total in each precinct. In a fair election, we expect a strong  
18 linear correlation between Gilbert's Election Day, Mail-in and Early Vote percentages  
19 across the precincts. That is, whatever Gilbert's Election Day percentage is at a  
20 particular precinct, we expect both Gilbert's Mail-in percentage and Early Vote  
21 percentage to be **roughly** the same, not exactly, since that would imply causation...but  
22 **roughly**, which implies a strong correlation, which would be consistent with Clark  
23 County's Historical Election Results in all years prior to 2020, both in the Primaries and  
24 the General Elections.
- 25 29. However, this is not the case in Nevada's 2022 Republican Gubernatorial Primary. There  
26 is absolutely no correlation between Gilbert's Election Day, Early, and Mail-in  
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Percentages across the precincts. Although this observation is not proof of wrongdoing, this *irregularity* was probable cause to investigate the election results further.

30. This investigation revealed a mathematically-illegal geometric formula that governed the proportions between the Early, Mail-in and Election Day ballots across the precincts

31. In a fair election, if we know a candidate's Election Day percentage,  $x$ , and a candidate's Mail-in percentage,  $y$ , and the percentage of ballots cast that were Election Day ballots,  $z$ , then we can solve for that candidate's aggregate percentage share of the combined election day and mail-in vote. The equation that resolves the aggregate percentage is a simple weighted average formula. Let  $w$  be the candidate's aggregate percentage, then:  $w = zx + (1-z)y = (x+py)/(1+p)$ , where  $p$  is the proportion of Mail-in to Election Day Ballots cast in the precinct. Either formula remains true whether or not an election is fair or unfair. This law is universal to any four sets of data that share no elements in common, such as the ballot totals of two candidates with two modes of voting.

32. However, if there is an illegal formula that allows us to solve for  $w$ , with only

- knowledge of  $x$  and  $y$ , but without  $z$ , that is, any formula that allows us to solve for the candidate's aggregate percentage share of the combined election day and mail-in ballots,
- knowing only the candidate's election day percentage, and
- the candidate's mail-in percentage, and
- without any knowledge of the proportion of Mail-in to Election Day Ballots, and
- this formula fits all precincts in the County without any variation to such formula,

1 then, by mathematical definition, this formula allows us to solve the candidate's  
2 aggregate percentage share of the ballots in each precinct with no knowledge of the  
3 proportion of Mail-in to Election Day Votes, a *geometric impossibility* violating the *Laws*  
4 *Which Govern the Proportions of Elements Between Four Pairwise Disjoint Sets*, all of  
5 which are geometrically derived.

6  
7 **VIII.**

8 **PAIRWISE DISJOINT SETS**

9 33. Pairwise Disjoint Sets are defined in mathematics as any collection of sets, such that all  
10 pairings of any two sets from the collection of sets share no elements (ballots) in  
11 common.

12 34. For instance, Gilbert's Election Day, Lombardo's Election Day, Gilbert's Mail-in and  
13 Lombardo's Mail-in ballots are an example of four pairwise disjoint sets, because a  
14 registered voter may cast their ballot once, and only once, in accordance with Nevada  
15 State Law. Thus, State Law renders each candidate's Early, Mail-in and Election Day  
16 ballots *mathematically disjoint*.

17 35. All of the laws that govern the proportions between four disjoint sets are as follow.

- 18
- 19 ○ Let **A** be a set containing  $a$  objects.
  - 20 ○ Let **B** be a set containing  $b$  objects.
  - 21 ○ Let **C** be a set containing  $c$  objects;
  - 22 ○ Let **D** be a set containing  $d$  objects.
  - 23 ○ Let  $x = a/(a+b)$ ; let  $y = c/(c+d)$ ; let  $w = (1-y) = d/(c+d)$
  - 24 ○ Let  $\alpha = (a+c)/(a+c+b+d)$ ;  $\xi = (b+d)/(a+c)$
  - 25       \*  $\alpha = 1/(\xi + 1)$ ;  $\xi = (1 - \alpha)/\alpha$
  - 26 ○ Let  $\lambda = (a+d)/(a+d+c+b)$ ;  $\Gamma = (c+b)/(a+d)$
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- $\lambda = 1/(\Gamma+1); \Gamma = (1-\lambda)/\lambda$

- Let  $\Omega = (a+b)/(a+b+c+d); \zeta = (c+d)/(a+b)$

- $\Omega = 1/(\zeta+1); \zeta = (1-\Omega)/\Omega$

*From which follow the Twenty Laws, which demand that three of the above proportions be known to resolve either two of the remaining proportions:*

- Then  $x = \alpha + \zeta(\alpha - y) = (\alpha - (1 - \Omega)y)/\Omega$

- $x = \lambda + \zeta(\lambda - w) = (\lambda - (1 - \Omega)w)/\Omega$

- $x = (y(\lambda + \alpha) - \alpha)/(\lambda + 2y - \alpha - 1)$

- $x = (1/2)((\zeta + 1)(\alpha + \lambda) - \zeta)$

- Then  $y = \alpha + (1/\zeta)(\alpha - x) = (\alpha - \Omega x)/(1 - \Omega)$

- $w = \lambda + (1/\zeta)(\lambda - x) = (\lambda - \Omega x)/(1 - \Omega)$

- $y = (x(\lambda - \alpha - 1) + \alpha)/(\lambda + \alpha - 2x)$

- $w = (1/2\zeta)((\zeta + 1)(\lambda - \alpha) + \zeta)$

- Then  $\alpha = (x + \zeta y)/(\zeta + 1) = \Omega x + (1 - \Omega)y$

- $\alpha = (2x + \zeta)/(\zeta + 1) - \lambda$

- $\alpha = (\zeta(1 - 2w) + \lambda(\zeta + 1))/(\zeta + 1) = \lambda + (\zeta(1 - 2w))/(\zeta + 1)$

- $\alpha = (\lambda(y - x) - x(2y - 1))/(1 - y - x)$

- Then  $\lambda = (x + \zeta w)/(\zeta + 1) = \Omega x + (1 - \Omega)w$

- $\lambda = (2x + \zeta)/(\zeta + 1) - \alpha$

- $\lambda = (\alpha(1 - (x - y)) + x(2y - 1))/(y - x) = (\alpha w + x(2y - \alpha - 1))/(y - x)$

- $\lambda = (\zeta(2w + \alpha - 1) + \alpha)/(\zeta + 1)$

- Then  $\zeta = (x - \alpha)/(\alpha - y) = (1 - \Omega)/\Omega$  ;  $\Omega = (y - \alpha)/(y - x) = 1/(\zeta + 1)$

- $\zeta = (2x - (\alpha + \lambda))/(\alpha + \lambda - 1)$

- $\zeta = (x - \lambda)/(\lambda - w) = (1 - \Omega)/\Omega$  ;  $\Omega = (w - \lambda)/(w - x) = 1/(\zeta + 1)$

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▪  $\zeta = (\lambda - a) / (2w + a - \lambda - 1)$

From which follow the Forty Isometries:

- Let  $g = a / (a + d)$ ; let  $h = c / (c + b)$ ; let  $t = (1 - h) = b / (c + b)$ , then the proportions:  $x, y, w, \lambda, \Omega, \zeta$  can be exchanged for  $g, h, t, \Omega, \lambda, \Gamma$  respectively, yielding the first score of the Forty Isometries.
- Let  $m = a / (a + c)$ ; let  $n = b / (b + d)$ ; let  $q = (1 - n) = d / (b + d)$ , then the proportions:  $x, y, w, \alpha, \Omega, \zeta$  can be exchanged for  $m, n, q, \Omega, \alpha, \xi$  respectively, yielding the second score of the Forty Isometries.

36. After an illegal geometric formula has been detected to alter the election results (that is, any formula that allows one to resolve any proportion on the left-hand side of the above twenty equations, or any of the Forty Isometries, without any three of the remaining proportions), a remedy is applied to restore the election results in manner that would most reflect what the results would have been without geometric interference.

IX.

RESTORATION

37. Contestant realleges all preceding paragraphs as if fully set forth herein.

38. The remedy imports the statistical trends that are expected in a fair election, that is, the Early, Mail-in and Election Percentages of a candidate should be linearly correlated and roughly equal, that is the election day, early and mail-in percentages, when plotted for a candidate, across the precincts, should fall along the diagonal of a cube. That is, when the precincts are plotted in 3D space, the x-axis being the election day *percentage*, the y-axis being the mail-in *percentage*, the z-axis being the early *percentage*, of a particular candidate against any other candidate in the same race, should form an elliptical cloud (a blimp shape), whose length (major axis) runs along the straight line  $x = y = z$ .

- 1 39. In the instance of Clark County's Primary Elections, the Republican Gubernatorial  
2 election cannot be restored until the Sheriff's Primary has first been restored. This is  
3 because the illegal geometric formula that was invoked to alter the *proportions of ballots*  
4 *cast* between the Sheriff Candidates, also cemented the proportion of Election Day to  
5 Mail-in to Early Ballots cast in each precinct, to which all other races, down the entire  
6 ballot, had to be conformed.
- 7
- 8 40. Thus, one cannot restore any election in the 2022 Primaries, unless they first restore the  
9 Sheriff's Primary, to obtain the original proportion of Election Day to Mail-in to Early  
10 Ballots.
- 11 41. Since the illicit geometric formula used to alter the proportions of the Sheriff's Primary,  
12 contained Hyt's combined Early and Election Day Vote, as the first and natural input, we  
13 know that the true ratio of Early to Election Day Votes is therefore preserved in the ratio  
14 of Hyt's Early to Election Day Votes.
- 15
- 16 42. In a fair election, we expect that the proportion of Early Votes to Mail-in Votes to  
17 Election Day Votes, at any particular precinct, will be roughly the same for all  
18 candidates, in all races. Since Hyt's Election Day and Early Totals are preserved, we  
19 uniformly apply this ratio against the combined sum of election day and early votes in  
20 each precinct, to all candidates, in all races.
- 21
- 22 43. We then use a rotation matrix to restore the relationship of sheriff candidate Robert's  
23 Election Day Percentage, Mail-in Percentage, and Early Percentage, against Hyt, to the  
24 diagonal of the cube,  $x=y=z$ , whilst retaining the magnitude of the original vector from  
25 the origin to the coordinate of each precinct in this  $x, y, z$  space.
- 26 44. We also know that Robert's Mail-in Vote, was true and authentic in its proportion to  
27 Hyt's Election Day and Early Vote, as Robert's Mail-in Vote was the third and final  
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1 natural input in the illegal geometric equation used to alter the ballot ratios between Hyt,  
2 Roberts and McMahon. By compelling Robert's Early and Election Day turnout of  
3 registered voters to follow the concave down parabolic trend of his authentic mail-in  
4 vote, against the total percentage of all registered voters who cast a ballot in the Sheriff's  
5 Primary, we were able to obtain the correct proportion of Mail-in to combined Early and  
6 Election Day ballots.  
7

8 45. Furthermore, that the proportion of Robert's Early to Election Day ballots also then  
9 matched Hyt's proportion of Early to Election Day ballots, ensuring us that the  
10 restoration of Robert's Early and Election Days totals were undoubtedly accurately  
11 conformed to what they would have been without geometric interference. Thereby, we  
12 ascertain the correct proportion of Mail-in to the combined Early and Election Day Vote  
13 of all candidates, in all races, in each precinct.  
14

15 46. The ratio of Early to Mail-in to Election Day Ballots was then applied to McMahon in the  
16 Sheriff's race and to Gilbert, Sisolak and Lombardo in the Governor's race. From here,  
17 the Governor's race can be restored without any more assistance from the Sheriff's race.  
18

19 47. We make regular the election day, mail-in and early vote percentages, between Gilbert,  
20 Sisolak and Lombardo, such that each candidate's election day, mail-in and early  
21 percentage vote percentage, against any other candidate, or pair of candidates, is roughly  
22 equal, across the precincts, via geometric translation and rotation of the abnormally  
23 distributed percentages back to the diagonal of a cube.  $x = y = z$ .

24 48. It was *originally* reported in the 578 precincts that were analyzed (precincts that had less  
25 than 100 total ballots cast were excluded from the analysis) that Gilbert, Sisolak and  
26 Lombardo received 28304, 105816 and 55861 ballots respectively. After the restoration,  
27 we learn that Gilbert, Sisolak and Lombardo received 83812, 62102 and 44083 ballots  
28

1 respectively. In other words, the lion's share of Gilbert's Republican ballots were drawn  
2 illegally into Sisolak's ballot totals (primarily his Mail-in Total), upsetting the proportion  
3 of Democrat to Republican ballots in all partisan primaries down the entire ballot, which  
4 reveals that Republicans cast their ballots in a two to one (2 : 1) proportion with  
5 Democrats in the Nevada Primaries, yet the illegal geometrically-altered data transformed  
6 the ratio of Republican to Democrat ballots cast into a Four to Five Proportion (4 : 5),  
7 effectively diminishing all Republican votes to 4/10 of a vote per voter.  
8

9 X.

10 OPINION ON THE SUMMARY REPORT TITLED  
11 "CLARK COUNTY, 2022, GOVERNOR PRIMARY  
12 PRECINCT ANALYSIS

13 49. Contestant realleges  
14 all preceding  
15 paragraphs as if  
16 fully set forth  
17 herein.

18 50. Dr. Oliver A. Hemmers clarifies the Precinct Analysis which demonstrates the depth of  
19 the incorrect, mathematically impossible results arising from the statewide 2022 Nevada  
20 Primary Election. See, Exhibit "B", "Opinion on the Summary report titled "Clark  
21 County, 2022 Governor Primary Precinct Analysis, by Dr. Oliver A. Hemmers, dated  
22 July 2, 2022.

23  
24 51. Dr. Hemmers provides an explanation of the algorithm applied to restore the 2020 "Baker  
25 v. Hartung" Election in Washoe County as well as most vote count restorations, to the  
26 announced voter result in the counties in Nevada. We learn from this explanation how to  
27 measure the difference between a fair and an unfair election, where an unfair election is  
28

1 an election where the result is predetermined algorithmically--by geometrically  
2 impossible, mathematically-illegal formulae which unfairly reported the vote count in  
3 Nevada. Based on the irrefutable geometric equations of the vote as reported and  
4 successful use of restorative statistical formulae, properly applied in Nevada to the 2022  
5 Primary Election vote count the statewide count can be reported accurately.  
6

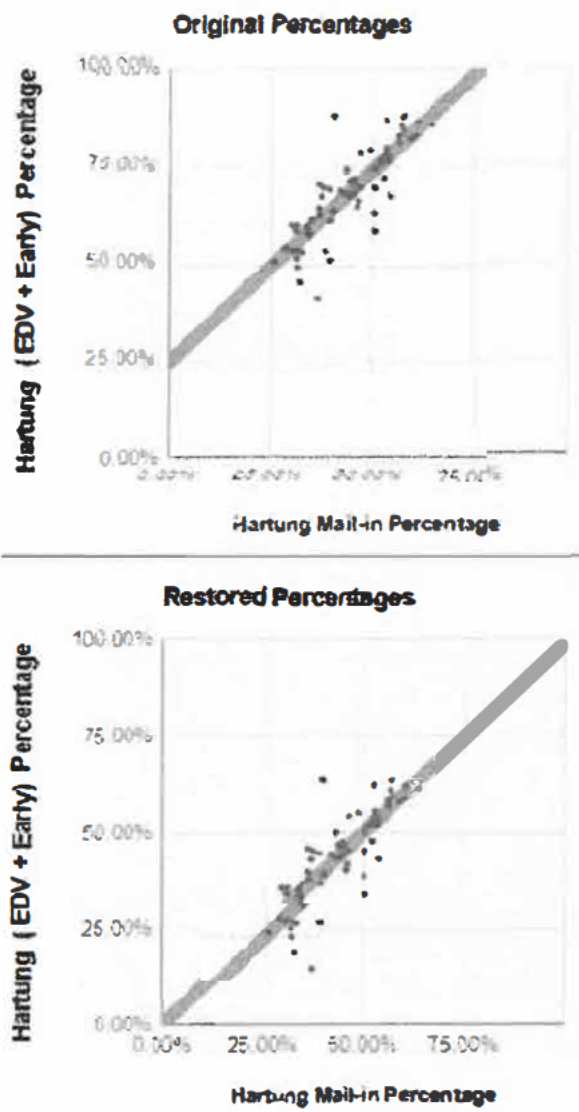
7 Dr. Hemmers, in his explanation of the Precinct Analysis, states in full:

- 8 **1)** The paper under review [ 1] claims that a mathematical analysis can determine the  
9 difference between a fair and an unfair election and where the unfair election is an  
10 election for which the results are predetermined algorithmically. It is assumed that  
11 causality is a valid assumption during an election where the effect cannot precede  
12 the cause, more specific that the *aggregate percentage of votes for a candidate  
cannot precede the election day and mail-in percentages*. This might seem to be  
13 a trivial assumption, but it lies at the very core of the analysis.
- 14 **2)** In the preface of the Clark County, 2022, Governor Primary Precinct Analysis,  
15 two examples are presented for a bivariate analysis [ 2] related to election results.
- 16 **3)** A bivariate (Two-Variables) is described as follows [2]: The analysis of two  
17 specific variables to determine the empirical relationship present between them is  
18 referred to as bivariate analysis and it is considered to be one of the simplest  
19 forms of quantitative analysis. It is of utmost help when it comes to testing simple  
20 hypotheses of association and determining the extent to which it becomes easier  
21 to predict the value of one particular variable, given [that] the value of the other  
22 variable is already known. There are three main types of bivariate analysis:
- 23 **a. Scatter Plots:** It makes use of dots to represent the values for two different  
24 numeric variables. In other words, it provides us with a visual idea of what  
25 pattern the variables are following.
  - 26 **b. Regression Analysis:** This involves a wide range of tools that can be utilized  
27 to determine just how the data points might be related. It tends to provide us  
28 with an equation for the curve/line along with giving us the correlation  
coefficient.
  - c. Correlation Coefficients:** This shows how one particular variable moves  
about with relation to another.
- 4)** In certain cases of bivariate data, one variable is said to determine or influence the  
other one. These two types of variables are distinguished as independent and  
dependent variables. The former refers to a situation wherein neither of the  
variables is considered to be dependent on each other.[2] A simple example is the



relationship that exists between teenagers reading (independent variable) and their scores in English (dependent variable). **Cause -> Effect**

- 5) The paper specifically uses the bivariate real number plane formula and the West vs. East paradigm to calculate the results as shown in [3,4].
- 6) The Preface concludes with a brief explanation how the election results were successfully restored for the 2020 Election of Hartung vs. Baker [4]. The data and calculations are shown in [4]. The data can be shown in form of two graphs, one is the original data (top), and one is the restored data (bottom).

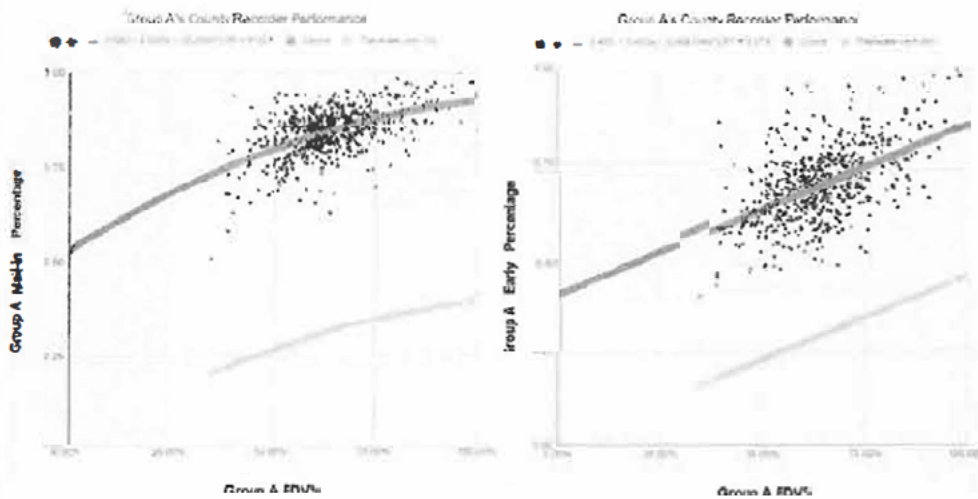


The blue dots represent the results of the individual election precincts, and the red curve is a polynomial (quartic) fit through the blue data cluster. The fact that *in the top graph the red line is not ending at 0%/0% as shown in the bottom graph, means that there is a problem with the election results.* (Emphasis added.) In a

1 fair election the sum of the Early Day and Election Day votes should produce  
2 very similar results to the Mail-in votes, meaning the x-values and the y-values  
3 should be similar (when x is 10% then y should be close to 10% as well) and not  
4 off by 25% [as demonstrated in the top graph].

- 5 a. Even when Hartung received 0% of the Mail-in votes, he would  
6 “magically” receive 25% of the combined Election Day and Early Votes.  
7 This is impossible. Also, should Hartung receive 100% of the Election  
8 Day and Early Votes then Baker would “magically” receive 25% of the  
9 Mail-in votes (100% minus his 75% =25%). Again, this is not possible in  
10 a fair election.
- 11 b. *Even though this discrepancy is not proof of fraud nor an explanation of*  
12 *what type of fraud rigged the election, but it is still possible to correct the*  
13 *numbers and restore the true values, so as if there was a fair election.*  
14 (Emphasis added.) The result is shown in the bottom picture and the  
15 calculated values can be found in [4].
- 16 c. This method of the applied Election Restoration Algorithm has been  
17 successfully used over the past two years not only on Hartung vs. Baker  
18 but also for Maricopa, Philadelphia, Atlanta, Dallas and Tarrant, Macomb  
19 and Oakland, as well as the last federal election.

20 7) The same methods [5] that have been honed and applied to various elections over  
21 the past two years, have been applied to the Group B vs Group A candidates in  
22 the 2022 Gubernatorial Primary [6].



- 26 a. As an example, the Group A data is shown in the two figures above. The blue  
27 dots are from [6], the red curve is a polynomial fit through the blue dots and  
28 the pink line is an extrapolation of the polynomial fit using the shown  
equation in the graph. Both have the Election Day vote percentages on the x-

1 axis. As for the y-axis, the left graph has the Mail-in percentages and the right  
2 graph the Early vote percentages. It can be seen that the y-intercepts and the  
3 polynomial spines between the two graphs are quite different. Reference [1]  
4 shows the restored positions of Group A's Election Day percentage which are  
5 virtually the same in both graphs [1].

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- b. In order to be able to restore the original data it is important to identify what part of the data is authentic in order to make the corrections to the illegal data. As written in [1], the illegal equations that govern the percentages of ballots cast between Group B vs Group A, the input percentage is  $h$  (as shown on page 3 in [1]), which is equal to Group B's Mail-in vote divided by Group A's combined Early and Election Day votes. From that we know that Group A's Mail-in vote and Group A's Early and Election Day votes are authentic.
  - c. Therefore, you can restore Group A's and Group B's totals and then multiply the individual vote totals of each candidate in each group by the net proportions of change between collectives of Group A and B in each precinct.

### Summary

- 1) Reference [1] and the included references therein describe how using a restoration algorithm that is based on the well-established mathematical Bivariate Analysis [2] in particular the Bivariate Real Number Plane Formula [5], which has been applied numerous times over the past two years for many US county elections can also be applied to the recent 2022 Gubernatorial Primary in Nevada.
- 2) For the mathematical restoration of the original data, it is not necessary to claim fraud nor to know any specifics of the fraud.
- 3) The applied restoration of the official election results shows a significant difference between original and restored election data for all candidates reviewed.

See, Report of Dr. Oliver A. Hemmers, attached hereto and made a part hereof as Exhibit "B". Dr. Hemmers C.V. is also attached hereto and made a part hereof as Exhibit "C".

52. Based on the "Clark County, 2022, Governor Primary Precinct Analysis" and the Analysis of Dr. Oliver A. Hemmers of that analysis, Contestant, Joey Gilbert herein demands enjoinder of certification of the 2022 Primary Election results and requests a mathematical recovery of the true vote cast by the voters in Nevada, and, further, that Defendant make the electronic voting machines utilized statewide available for forensic analysis.

XI.

THE 2022 PRIMARY ELECTION RESULTS  
WERE CONTRIVED.

- 1  
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3  
4 53. Contestant realleges all preceding paragraphs as if fully set forth herein.
- 5  
6 54. G Donald Allen states that the Clark County, 2022, Primary Precinct Analysis  
7 demonstrates clear and convincing evidence that the election results analyzed therein  
8 were not produced by accurate counting of the votes cast, but were instead artificially  
9 contrived according to a predetermined plan or algorithm. See, Declaration of Expert G.  
10 Donald Allen, attached hereto and made a part hereof as Exhibit "D". and Curriculum  
11 Vitae of Expert G. Donald Allen attached hereto and made a part hereof as Exhibit "E",  
12 Declaration of Expert Walter C. Daugherity attached hereto and made a part hereof as  
13 Exhibit "F", and Curriculum Vitae of Expert Walter C. Daugherity attached hereto and  
14 made a part hereof as Exhibit "G".
- 15  
16 55. Dr. Allen states that in his expert opinion, the Primary Precinct Analysis demonstrates  
17 clear and convincing evidence that the election results analyzed in these reports were not  
18 produced by accurate counting of the votes cast, but were instead artificially contrived  
19 according to a predetermined plan or algorithm.
- 20  
21 56. Dr. Allen summarizes the salient points of the Primary Precinct Analysis report by Mr.  
22 Solomon, simplifying his notation, and clarifying how relatively simple it is to  
23 manipulate election outcomes using voting algorithms. He finds that the erroneous  
24 tabulation of the vote has two parts. The first is to establish the election is incorrect, and  
25 the second is to estimate what the vote total should be. He considers the basic  
26 configuration for Candidate A and Candidate B where there are only mail-in and  
27 election-day votes. Assume the proportion of the mail-in votes for Candidate A is  $h$ .
- 28

1 Therefore, the proportion of mail-in votes for Candidate B is  $1 - h$ . The actual vote totals  
2 can be computed by multiplying the total number of mail-in votes. Similarly, the  
3 proportion of election day votes for Candidate A is  $k$  and the proportion of election-day  
4 votes for Candidate B is  $1 - k$ . Again, the total votes for each is obtained by multiplying  
5 by the total number of election-day votes.

6 Now, let  $M$  be the number of mail-in ballots and  $K$  be the number of votes on election  
7 day. Then, the proportion of votes for Candidate A is

$$\frac{hM + kK}{M + K}$$

8  
9  
10  
11 If voting has been algorithmized by adjusting the proportion of  $k$  to a new proportion  $r$   
12 the vote total will be the same but the net proportion can be made to whatever, say  $r <$   
13 0.5. it is only required to solve the equation

$$\frac{(1-h)M + (1-k)K}{M + K} = 1 - r$$

14  
15  
16 for  $k$ . This is done to favor Candidate B. A similar equation is to favor Candidate A. This  
17 new value is merely programmed to change votes to obtain the desired proportion.

18  
19 57. Programming this is remarkably simple. Going into any election, if the mail-in data is  
20 known, and a good estimate of  $K$  is known, the equation has a unique solution. If accurate  
21 poll data is known, and it generally is, then all we need is  $M$  and we can use the poll  
22 estimates to reflect the proportions and then estimate what value  $k$  should be to obtain the  
23 desired proportion  $r$  to be programmed in.

24  
25 58. All this is for just one voting station and literally could not be detected. However, if the  
26 same or similar proportion obtains over hundreds of precincts, then error is ascertained.  
27 That is, plotting the values of  $h$  and  $k$  of actual election results will reveal that  $k$  seems to  
28 be constant over all voting stations or precincts.

- 1 59. If there is some control over the total number of mail-in ballots, say by supplementing  
2 mail-in ballots after the election-day ballots are counted, then both  $h$  and  $k$  can be  
3 manipulated, to a value where the equation above is solved for  $h$  to determine the number  
4 of ballots that need to be added. In the absence of both proportions, then poll numbers  
5 must be used to fix  $h$  and then estimate  $k$  based on the desired proportion  $r$ .  
6
- 7 60. If all mail-in ballots total are known beforehand, and if algorithms are applied as above  
8 with differing values of  $k$ , massive evidence of error can be detected by noting the  
9 proportion of votes for Candidate B generally computes to the same total proportion over  
10 the spectrum of reporting stations.
- 11 61. In each of these cases, the algorithmic is clear and essentially proved. While a  
12 mathematical proof is desired, we are working with field data, and therefore must be  
13 replaced with statistical proof for example as applied to forensic psychology.  
14
- 15 62. Another, more complex example of algorithmic error, is absolutely clear and convincing  
16 when the computed proportions between Candidates A and B do not add up to one. These  
17 values we never see, as all reported numbers are lumped together for presentation. Even  
18 in the case of newly discovered ballots, we often see total vote proportions change as the  
19 count is reported, though this is less indicative of error.
- 20 63. How to estimate the votes Candidate A would have if the algorithm flaws did not occur?  
21 For this, we use a statistical argument and assume the mail-in proportions, which are  
22 assumed to be known and correct are the same as the election-day voting proportions.  
23 Alternatively, we know an established relationship between the two. From this, we can  
24 back-project to what the values of  $k$  should have been for each precinct. These in turn can  
25 be averaged in a weighted scheme (by numbers of voters) to gain the average value of  $k$ .  
26 Using the standard deviation, we estimate the range of all  $k$  values within two standard  
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deviations and compute the expected vote count. In this way, the number of votes lost to Candidate A can be estimated. Alternatively, precinct by precinct poll numbers could be used, thus canceling the effects of mail-in voters that are known to behave in different ways from election day voters. Such are standard methods in statistical analysis. In this particular case, they apply to the Gilbert and Sheriff's election results. Solomon uses a geometrical argument, rotating actual results to assumed slope one expectations.

64. Under all circumstances, the 2022 Primary Election results are mathematically incorrect, and can and should be restored.

XII.

**THE SECRETARY OF STATE OF NEVADA AND THE REGISTRARS OF VOTERS MADE ERRORS SUFFICIENT TO CHANGE THE RESULT OF THE 2022 PRIMARY ELECTION**

65. Contestant realleges all preceding paragraphs as if fully set forth herein.

66. Contestant, Joey Gilbert alleges that the State of Nevada, by and through its Governor, Steve Sisolak, Secretary of State, Barbara Cegavske, the county Election Boards and Boards of County Commission by their, and each of their failures to cause the vote count to be accurate by reason of the lack of accurate vote count equipment and application of illegal geometric and mathematical formulae, made errors sufficient to change the result of the Election. NRS §293.410(2)(d); that putative Republican gubernatorial candidate, Joseph Lombardo has been incorrectly denominated the winner of the Primary Election in that race and the result set aside in favor of Contestant Joey Gilbert.

67. Contestant alleges that the application of the contrived and illegal geometric formula as set forth herein allowed mathematically illegal and/or improper numbers of votes to be cast and erroneously counted, while legal and proper votes were counted improperly; that the geometric analysis of the error is irrefutable, and that a statistical application of

1 standard formula will restore the vote count accurately. NRS §293.410(2)(c).

2 Constitution of the State of Nevada, Article 2, Sec. 1A, (10), (11).

3 68. Nevada election law is to be liberally construed to the end that all voters have an  
4 opportunity to participate in elections and to cast their votes privately. *See* NRS  
5 §293.127. Further, the goal of Nevada election law is to ensure that the will of the voters  
6 is not defeated by any informality or by failure substantially to comply with its  
7 provisions. *Id.*

8  
9 69. The Republican Primary race must not be certified.

10 70. If the Court does not determine to vacate the results of the Republican Primary Election  
11 for Governor as requested without a hearing, Contestant prays that discovery may be  
12 adduced according to statutory provisions to present a full record to the Court, and  
13 thereafter a hearing be set in order to assess the claims made herein.

14  
15 **XIII.**

16 **CONCLUSION**

17 71. Contestant realleges all preceding paragraphs as if fully set forth herein.

18 72. The announced results of the 2022 Primary Election are not, and cannot be properly  
19 certified until mathematically corrected, the cost of which to the State is *de minimis*, and  
20 particularly so when it involves our most sacred Constitutional right to cast our vote and  
21 to have our vote accurately counted.

22  
23 73. The Nevada Revised Statutes 293 *et seq.* and Nevada Constitution, Article 1, Section 1A,  
24 *et seq.* provide for an accurate count of the votes to reflect the will of the people of  
25 Nevada. Here, the mathematics are pure and incontrovertible. The *report*, at minimum,  
26 of the vote as tabulated is incorrect. Contestant does not allege who caused this to  
27 happen, when it happened, or how it happened---only that is HAS HAPPENED. That is  
28

1 mathematically irrefutable. There is no need to either allege or prove fraud---illicit  
2 mathematics were applied to the vote count. As a result, the election results were  
3 overwhelmingly skewed against Contestant Joey Gilbert as demonstrated by the  
4 geometry set forth herein in support of his contentions.

5  
6 74. However---and without resorting to allegations of fraud---a manual hand count and/or a  
7 correct statistical application of the vote as announced to restore a recovered vote  
8 tabulation will prove that Mr. Gilbert actually won the Primary Election by more than  
9 55,000 votes. He must be certified as the proper Republican Primary winner to run for  
10 Governor of Nevada in the 2022 General Election.

11 75. The announced vote count in Clark County, at minimum, is permeated with anomalies so  
12 egregious as to render *the results as presented incapable of certification*.

13  
14 76. Setting aside an election in which the people have selected their candidate is a drastic  
15 remedy that should not be undertaken lightly, but should be reserved for cases in which a  
16 person challenging the election has clearly established a violation of election procedures  
17 and pure mathematics and has demonstrated by clear and convincing evidence that the  
18 errors have placed the result of the Primary Election in doubt.

19 77. Nevada law allows elections to be contested through litigation, both as a check on the  
20 integrity of the election process and as a means of ensuring the fundamental right of  
21 citizens to vote and to *have their votes counted accurately*.

22  
23 78. Mr. Gilbert, Contestant herein, fully understands and appreciates the manifold bases for  
24 the judiciary to remove itself from electoral politics. But in this instance, this Honorable  
25 Court does have the final authority to address this miscarriage of justice regarding the  
26 illicit and wrongful application of illegal mathematical formulae and geometric  
27  
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1 equations, and to *cause the recovery of the correct vote count*, and must do so, to restore  
2 the confidence Nevadans in their electoral process.

3 *Relief Requested*

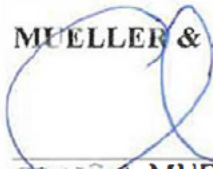
- 4
- 5 • In consideration of the foregoing, Contestant Joey Gilbert hereby prays for the following  
6 relief pursuant to NRS §293.417:
  - 7 • That the result of the Republican Primary Election on June 14, 2022 be annulled or set  
8 aside; and,
  - 9 • That certification of the Primary Election results be denied until the tabulation of the  
10 announced vote can be mathematically determined; and,
  - 11 • That the illegal-geometry utilized in the count and recount of the vote be mathematically  
12 corrected and the vote mathematically restored to its corrected; or,
  - 13 • That the Court set this matter for hearing not less than 5 days nor more than 10 days after  
14 the filing of the instant Statement of Contest (NRS §293.413); and,
  - 15 • The Court refer this Contest to a special master with all powers necessary for a proper  
16 determination of the Contest. (NRS §293.413); and
  - 17 • That Contestant be permitted to conduct discovery in the Contest. *See* NRS §293.415,  
18 and,
  - 19 • The Court order a state-wide investigation of the existing voting program pursuant to  
20 NRS §293B.135(3); and,
  - 21 • An inspection of all reports and all test material kept sealed by the clerk pursuant to NRS  
22 §293B.155; and,
  - 23 • An inspection of the logic and accuracy test ballots and the official ballots retained  
24 pursuant to NRS §293B.170.; and,
  - 25
  - 26
  - 27
  - 28

MUELLER & ASSOCIATES, INC.  
808 S. 7<sup>th</sup> Street, Las Vegas, Nevada 89101  
Telephone: (702) 382-1200 Fax: (702) 637-4817

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- That a record, printed on paper, of each ballot voted in the 2022 Primary Election be preserved and inspection by Contestant be provided pursuant to NRS §293B.400; and,
- An examination of the record maintained according to NRS §293.3625, and
- That Joseph Lombardo's ostensible "election" as the Republican candidate for Governor be set aside pending a corrected geometric application and restorative statistical analysis applied to the announced vote.

DATED this 15<sup>th</sup> day of July, 2022.

MUELLER & ASSOCIATES, INC  
  
CRAIG A. MUELLER, ESQ.,  
Nevada Bar No. 4703  
808 S. 7<sup>th</sup> Street  
Las Vegas, Nevada 89101  
*Attorney for Contestant, Joey Gilbert*

MUELLER & ASSOCIATES, INC.  
808 S. 7<sup>th</sup> Street, Las Vegas, Nevada 89101  
Telephone: (702) 382-1200 Facsimile: (702) 637-4817

**VERIFICATION**

1  
2 I, JOEY GILBERT, declare that I am the Plaintiff in the above-entitled action; that I have  
3 read the foregoing **STATEMENT OF CONTEST OF THE JUNE 14, 2020 PRIMARY**  
4 **ELECTION PURSUANT TO N.R.S. 293.407** and know the contents thereof; that the pleading  
5 is true of my own knowledge, except for those matters therein contained stated upon information  
6 and belief, and that as to those matters, I believe them to be true.  
7

8 I declare under penalty of perjury under the law of the State of Nevada that the  
9 foregoing is true and correct.

10 DATED this 14<sup>th</sup> day of July 2022.

11  
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13 JOEY GILBERT, Plaintiff  
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**EXHIBIT A**

**EXHIBIT A**

# Clark County, 2022, Primary Precinct Analysis

## Abstract

This paper will demonstrate how to measure the difference between a fair and an unfair election, where an unfair election is an election where the result is predetermined algorithmically.

At the very core of this article lay the assumption of Causality, that the Effect cannot precede the Cause; likewise, the Aggregate Percentage of a Candidate cannot precede the Election Day and the Mail in Percentages of that candidate. In a fair election, the aggregate cannot be known until after all ballots are cast; in an election that is unfair, where the aggregate was predetermined, the aggregate becomes the cause and the Mail in Vote (and/or the Election Day Vote) becomes the effect...and the laws of mathematics allow us to readily discern between which was the cause...and which was the effect.

To Paraphrase Immanuel Kant: *“The causation is the thing without which, is a condition of possibility of a thing, and so it is satisfied in the thing”*

The aggregate is not a condition of possibility for the Mail-in vote. The Aggregate is a Concept that relates two things. People vote by mail and people vote at the polls on election day, but no one, to my knowledge, has voted by aggregate.

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## Preface

Suppose at Lorraine High School, a precinct among many in a particular election, there were two candidates and two methods of voting. The first method of voting would be at the polls on election day; the second mode would be remotely by mail. An unscrupulous actor has already decided that the first candidate will receive exactly 50% of Lorraine High School's vote, regardless of the first candidate's share of the vote on election day. Using a simple equivalence relationship, the malicious actor can adjust the Mail-in percentage in order to achieve a predetermined aggregate result of 50% for the first candidate.

Let us suppose that 1000 persons voted on election day at Lorraine High School, and the first candidate received 750 votes on election day, then the first candidate had 75% of the election day vote at Lorraine.

An additional 1000 persons voted by mail in the Lorraine region; thus a total of 2000 persons voted at Lorraine overall. Since the malicious actor has pre-determined the aggregate percentage to be 50%, then the first candidate will end this election with 1000 votes out of the 2000 total; thus, since the first candidate already has 750 votes, the first candidate will receive an additional 250 votes in the mail, which is 25% of the mail in vote; such that the combined aggregate, 75% of the election day vote and 25% of the Mail in Vote results in a 50% Aggregate for the first candidate.

Now let us suppose instead that 2000 persons voted by mail, then the total number of votes at Lorraine would be 3000, and to achieve a 50% aggregate, the first candidate must receive 1500 of those 3000 votes. The first candidate already has 750 votes, and thus they require an additional 750 votes from the mail to sum to 1500. Since 750 divided by 2000 is equal to 37.5%, the first candidate now receives 37.5% of the Mail in Vote, such that 75% of the Election Day Vote and 37.5% of the Mail-in Vote combines to an aggregate of 50% of the aggregate vote.

We now define a simple parameter, *zeta*, where  $\zeta = \frac{\text{Total number of Mail in Votes}}{\text{Total Number of Election Day Votes}}$ , which is the proportion of Mail-in Votes to Election Day Votes; we state the following law that governs the relationship between the Election Day Vote, the Mail in Vote and the combined Aggregate vote, whether or not the election is fair or unfair:

Let  $M$  = Mail - in Percentage of the first candidate  
 Let  $E$  = Election Day Vote Percentage of the first candidate  
 Let  $A$  = Aggregate Percentage of the first candidate

$$M = A - \frac{E-A}{\zeta}$$

This Hyperbolic relationship between the modes of voting in respect to a particular candidate forms the foundation of this entire article, for it is this relationship that allows us to measure with absolute certainty whether or not an election was or was not engineered to achieve a predetermined outcome.

From an argument on social media I had with a confused citizen (paraphrased for more clarity):

Me: "If you were told that Kathy had 25% of the election day vote and 75% of the mail in vote in a precinct, can you tell me Kathy's Aggregate Percentage?"

Confused Citizen: After much thought... "No."

Me: "You need the proportion of mail-in to election day votes. If the proportion is 1 to 1, then Kathy gets a 50% aggregate. If the proportion is 3:1 then Biden gets a  $(25\% + 3 \cdot 75\%) / 4$  Aggregate which is 62.5% of the precinct's vote."

Confused Citizen: "Right, so you're saying that there's an illegal formula that can give us the aggregate for all precincts, without the proportion of Mail-in to Election Day Votes?"

Me: "Yes. The fact that Kathy's Mail-in Percentage is a continuous function of her aggregate and election day percentage across all the precincts proves that the election has been altered from its original state... thus they had to backsolve the proportion of mail-in to election day votes."

Manifolds In Action; County Recorder Data

<https://docs.google.com/spreadsheets/d/1Rk0QNzNuboir7pyY1UbGIIQyI5JtLxqcn0MmQpK3Xkw/edit?usp=sharing>

Preface Equation 0.1.1: The Bivariate Real Number Cubic Manifold, Candidate B vs Candidates A and C; Sheriff

Let Candidate A be Hyt; let Candidate B be McMahill; let Candidate C be Roberts.

Let  $A_1, A_2, A_3$  be Hyt's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $B_1, B_2, B_3$  be McMahill's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $C_1, C_2, C_3$  be Robert's Early Vote, Mail-in Vote and Election Day Vote respectively.

Let  $s_1 = B_1$

Let  $t_1 = C_1$

Let  $u_1 = B_3$

Let  $v_1 = A_1 + A_3 + C_2$ . The sum  $v_1$ , and its summands,  $A_1, A_3, C_2$  are true and authentic to the original data.

$$g_1 = \frac{s_1}{s_1+v_1}, h_1 = \frac{u_1}{u_1+t_1}, \alpha_1 = \frac{s_1+u_1}{(s_1+u_1)+(t_1+v_1)}, \Omega_1 = \frac{s_1+t_1}{(s_1+t_1)+(u_1+v_1)}, \lambda_1 = \frac{s_1+v_1}{(s_1+v_1)+(u_1+v_1)}$$

$$\Gamma_1 = \frac{u_1+t_1}{s_1+v_1} = \frac{1-\lambda_1}{\lambda_1}, \quad w_1 = (1 - h_1) = \frac{t_1}{u_1+t_1}$$

In a fair election:

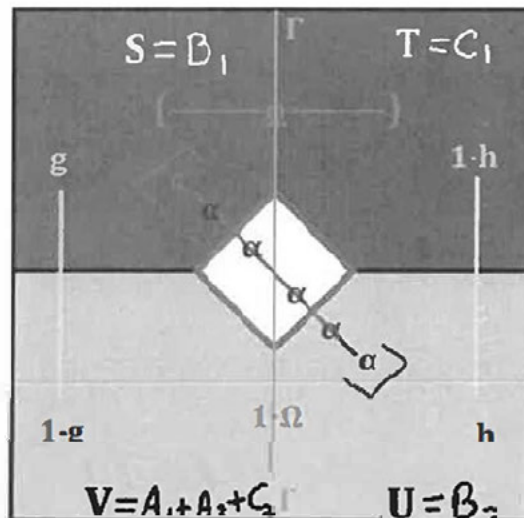
$$g = \alpha + \Gamma(\alpha - h) = \frac{\alpha - (1-\lambda)h}{\lambda} = \Omega + \Gamma(\Omega - w) = \frac{\Omega - (1-\lambda)w}{\lambda} = \frac{(\Gamma+1)(\Omega+\alpha) - \Gamma}{2}$$

In the above sequence of equalities, three of the five proportions must always be known to resolve  $g_1$ , however, in Clark County we obtain the illegal cubic manifold equations that yields  $g_1$  with only  $\alpha_1$  and  $\Omega_1$  (see next page).

What this means is that the total percentage of Early and Election Day ballots cast for McMahill, amongst the set of Hyt's Early and Election Day ballots, McMahill's Early and Election Day Ballots, and Robert's Early and Mail in Ballots, was predetermined before the election. This percentage is the Red Diagonal Aggregate,  $\alpha = \frac{s+u}{(s+u)+(t+v)}$ , in the below image.

It also tells us that the total percentage of Early Ballots cast for McMahill and Robert's, was also predetermined before the election, amongst the same ballot set. This percentage is the North Horizontal Aggregate  $\Omega = \frac{s+t}{(s+t)+(u+v)}$ .

#### West vs East



The bivariate cubic equation will have  $g$  isolated on the right hand side. In the diagram on the previous page,  $g$  is the West Side Percentage, that is the percentage share of ballots that belong to  $S$  amongst  $s$  and  $v$ ,  $g = \frac{s}{s+v-1}$  in other words, this is the share of Early ballots that McMahill shall receive against the number of Early and Election Day ballots for Nyt and Mail in Ballots for Roberts.

Once  $g$  is illegally resolved from the cubic surface of  $\alpha, \Omega$ , both  $h$  and  $\lambda$  are compelled into existence, since in any election, fair or unfair:

$$g = \frac{(\Gamma+1)(\Omega+\alpha)-\Gamma}{2} \Rightarrow \Gamma = \frac{2g-\Omega-\alpha}{(\Omega+\alpha-1)}, h = \alpha + \Gamma^{-1}(\alpha - g); w = 1 - h = \frac{t}{u+t}$$

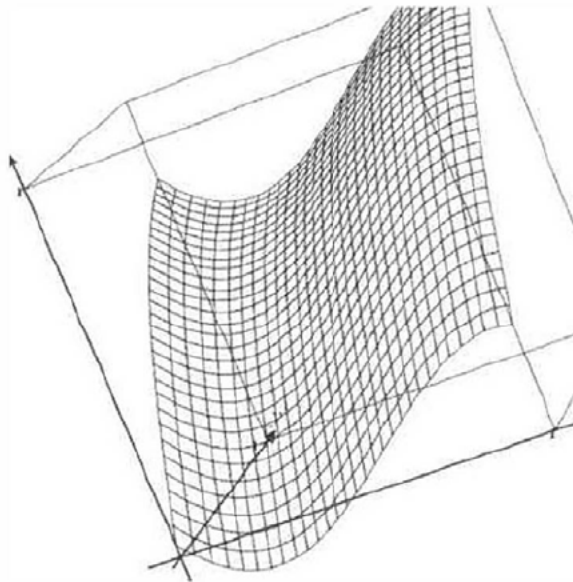
Since the proportions,  $g_1, \alpha_1, \Omega_1$  are known, it forces the value of  $\Gamma_1$ , which is proportion of East Side Ballots to West Side Ballots, that is  $\Gamma_1 = \frac{u_1+t_1}{s_1+v_1}$ , is now forced. Since  $s_1$  and  $v_1$  are both known at this stage, then so the sum of  $u_1$  and  $v_1$ .

Since  $\Gamma_1, \alpha_1, g_1$  are known, it forces the value of  $h_1$ , which is the percentage of  $u_1$  ballots amongst  $u_1$  and  $t_1$ . Since the sum of  $u_1$  and  $t_1$  is already known, and  $h_1$  tells us proportion of  $t_1$  to  $u_1$  ballots via the identity:  $\frac{t_1}{u_1} = \frac{1-h_1}{h_1}$ , then we know the values of  $u_1$  and  $t_1$ . Thus, after the execution of this algorithm, McMahill's Early and Election Day totals and Robert's Early Total have been illegally calculated and are now known and used as inputs for the second equation that will follow on the next page.

The illegal bivariate cubic equation is as follows, with an  $R^2 = 0.9945927405$  (image below is the 3D surface that the Clark County precincts rest upon when their  $\alpha, \Omega, g$  values are plotted in  $x, y, z$  space respectively. The residual values have a perfect normal distribution, and the residual errors come from, and only from, whether or not they rounded the illegally calculated vote totals up or down to the nearest integer.

$$g = k_0 + k_1\Omega + k_2\alpha + k_3\alpha\Omega + k_4\alpha^2 + k_5\alpha^3$$

$k_0$	$k_1$	$k_2$	$k_3$	$k_4$	$k_5$
0.06651190607	0.9682383708	1.329810827	-0.2934501699	3.856469812	2.198539769



After the execution of this formula, the following values are known:

Legitimate Inputs are:  $A_1, A_3, C_2$

Illegal Outputs are:  $B_1, B_3, C_1$

Preface Equation 0.1.2: The Second Bivariate Real Number Cubic Manifold. Candidate B vs Candidates A and C; Sheriff

Let Candidate A be Hyt; let Candidate B be McMahill; let Candidate C be Roberts.

Let  $A_1, A_2, A_3$  be Hyt's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $B_1, B_2, B_3$  be McMahill's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $C_1, C_2, C_3$  be Robert's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $s_2 = B_2$

Let  $t_2 = A_2$

Let  $u_2 = (B_1 + B_3)$

Let  $v_2 = (A_1 + A_3) + (C_1 + C_3)$ .

$$g_2 = \frac{s_2}{s_2+v_2}, h_2 = \frac{u_2}{u_2+t_2}, \alpha_2 = \frac{s_2+u_2}{(s_2+u_2)+(t_2+v_2)}, \Omega_2 = \frac{s_2+t_2}{(s_2+t_2)+(u_2+v_2)}, \lambda_2 = \frac{s_2+v_2}{(s_2+v_2)+(u_2+v_2)}$$

$$\Gamma_2 = \frac{u_2+t_2}{s_2+v_2} = \frac{1-\lambda_2}{\lambda_2}, \quad W_2 = (1 - h_2) = \frac{t_2}{u_2+t_2}$$

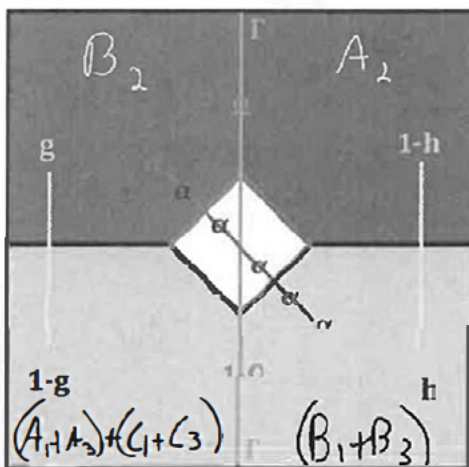
In a fair election:

$$g = \alpha + \Gamma(\alpha - h) = \frac{\alpha-(1-\lambda)h}{\lambda} = \Omega + \Gamma(\Omega - w) = \frac{\Omega-(1-\lambda)w}{\lambda} = \frac{(\Gamma+1)(\Omega+\alpha)-\Gamma}{2}$$

In the above sequence of equalities, three of the five proportions must always be known to resolve  $g_2$ , however, in Clark County we obtain the illegal cubic manifold equations that yields  $g_2$  with only  $\alpha_2$  and  $\Omega_2$  (see next page).

What this means is that the total percentage of ALL ballots cast for McMahill, amongst the set of ALL ballots cast for Hyt, McMahill's Early and Election Day Ballots, and Robert's Early and Election Day Ballots, was predetermined before the election. This percentage is the Red Diagonal Aggregate,  $\alpha = \frac{s+u}{(s+u)+(t+v)}$ , in the below image.

It also tells us that the total percentage of Mail in Ballots cast for McMahill and Hyt, was also predetermined before the election, amongst the same ballot set. This percentage is the North Horizontal Aggregate  $\Omega = \frac{s+t}{(s+t)+(u+v)}$





The bivariate cubic equation will have  $g_2$  isolated on the right-hand side. In the diagram on the previous page,  $g_2$  is the West Side Percentage, that is the percentage share of ballots that belong to  $s_2$  amongst  $s_2$  and  $v_2$ ,  $g_2 = \frac{s_2}{s_2+v_2}$ , in other words, this is the share of Mail in ballots that McMahill shall receive against the number of Early and Election Day ballots of both Hyt and Roberts.

Once the  $g_2$  proportion is illegally resolved from the cubic surface of  $\alpha_2$  and  $\Omega_2$ , both  $h_2$  and  $\lambda_2$  are compelled into existence, since in any election, fair or unfair:

$$g = \frac{(\Gamma+1)(\Omega+\alpha)-\Gamma}{2} \Rightarrow \Gamma = \frac{2g-\Omega-\alpha}{(\Omega+\alpha-1)}; h = \alpha + \Gamma^{-1}(\alpha - g); w = 1 - h = \frac{t}{u+t}$$

Since the proportions,  $g_1, \alpha_1, \Omega_1$  are known, it forces the value of  $\Gamma_1$ , which is proportion of East Side Ballots to West Side Ballots, that is  $\Gamma_2 = \frac{u_2+t_2}{s_2+v_2}$ , is now forced.

Since  $\Gamma_2, \alpha_2, g_2$  are known, it forces the value of  $h_2$ , which is the percentage of  $u_2$  ballots amongst  $u_2$  and  $t_2$  and tells us proportion of  $t_2$  to  $u_2$  ballots via the identity:  $\frac{t_2}{u_2} = \frac{1-h_2}{h_2}$ . Since the value of  $u_2$  is known, since  $B_1$  and  $B_3$  were illegally calculated in the previous equation, then the value of  $t_2$  is therefore known, which is Hyt's Mail in Vote.

Hence, now the sum of  $u_2$  and  $v_2$  is known, and the proportion of West Side to East Side Ballots is equal to  $(\Gamma_2)^{-1} = \frac{s_2+v_2}{u_2+t_2}$ , thus the of  $s_2$  and  $v_2$  is now known, and the value of  $g_2$  tells us the percentage of  $s_2$  ballots that belong to the sum  $s_2 + v_2$ , then we multiply that sum by  $g_2$  to yield  $s_2$ , and the remainder is  $v_2$ . Since  $s_2 = B_2$ , we have McMahill's Mail in Vote.

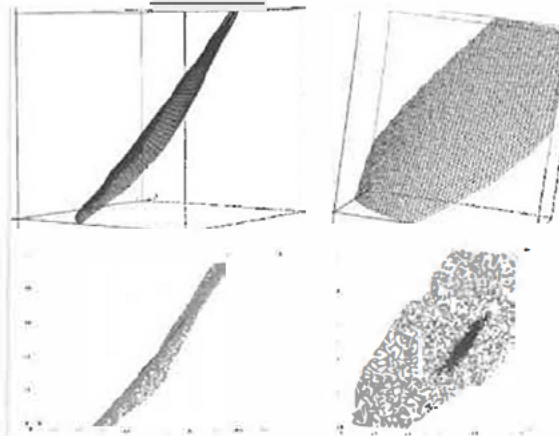
Since  $v_2$  is known, and  $v_2 = (A_1 + A_3) + (C_1 + C_3)$ , and  $A_1, A_3$  are natural and  $C_1$  was illegally calculated in the previous equation, we finally resolve  $C_3 = v_2 - (A_1 + A_3) - C_1$ , which is Robert's Election Day Vote, and now all of the precinct totals, for each candidate, in each mode of voting, is known across the entirety of Clark County, Nevada.

The illegal bivariate cubic equation is as follows, with an  $R^2 = 0.9945927405$  (image below is the 3D surface that the Clark County precincts rest upon when their  $\alpha, \Omega, g$  values are plotted in  $x, y, z$  space respectively. The residual values have a perfect normal distribution, and the residual errors come from, and only from, whether or not they rounded the illegally calculated vote totals up or down to the nearest integer.

$$g = k_0 + k_1\Omega + k_2\alpha + k_3\Omega^2 + k_4\alpha^2 + k_5\alpha^3$$

$k_0$	$k_1$	$k_2$	$k_3$	$k_4$	$k_5$
+0.03384844658	+1.162423939	-1.292166199	-0.418952775	+1545617525	2.003217744

In the image below is the ideal 3D surface (gray wireframe), from two perspectives. The images below them are the ideal surface in red, generated from random  $\alpha, \Omega$  coordinates, and the actual Clark County precincts in blue. They do not deviate from the red. The  $\alpha, \Omega, g$  bounds are all from 0 to 1 (that is from  $0^\circ$  to  $100^\circ$ , the entirety of the unit cube).





The next question is how we restore the election results back to their original state before they were altered.

In a fair election, according to both historical records of past elections prior to 2020, and tens of millions of simulations, the way in which people cast their ballot should not influence their choice of candidate; likewise, their choice of candidate should not influence the way in which they prefer to cast their ballot.

This implies, at particular precinct, each candidate's proportion of election day, to early, to mail-in ballots, should be roughly the same, as all other candidates, in all races. Again, this is confirmed by historical records of elections prior to 2020 and countless simulations.

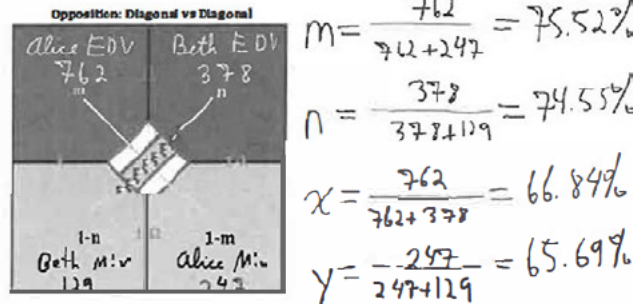
Thus if Alice receives 1000 votes, 750 on Election Day and 250 in the Mail, which is a 3:1 proportion of Election Day to Mail-in Votes, then Beth, regardless of how many votes she receives overall, should have roughly 3 election day votes for each mail in vote, in that same precinct, and so should all candidates at that precinct, in all races.

This is because it is expected that the electorate of this precinct prefers to cast their ballots by Election Day to Mail in at a 3:1 ratio, regardless of which candidate they choose. Therefore, if Beth receives 500 votes overall, then we expect her to have 375 Election Day Votes and 125 Mail-in Votes, give or take several votes in each category (that is, highly correlated, but not causated!).

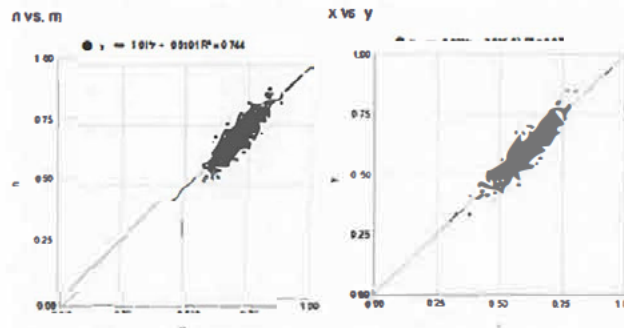
Also, if Alice receives 66% of the Election Day Vote at a particular precinct, then we also expect Alice to receive 66% of the Mail in Vote at that precinct.

This is because that since the way in which people cast their ballots does not influence their decision, then the percentage of those that cast their ballots on Election Day for Alice, should also be roughly the same for those that cast their ballots in Mail for Alice, again, give or take a point or two (highly correlated, but not causated!).

So we may see something like (and notice that the east and west side percentages,  $g$  and  $h$ , were not mentioned, because in a fair election, even though these percentages exist, and will have pronounced quadratic correlation, the curvature of that correlation depends on the average proportion of Mail in to Election Day ballots across the county and the difference in the mean performance of any two disjoint sets of candidates).



Although the values of  $m$  and  $n$  are not the same, they are roughly the same. And if the values of  $m$  and  $n$  are plotted across the precincts for the entire county, they should fall inside of an ellipse, whose center exists on the line  $m = n$  and whose major axis also exists on the line  $m = n$ ; likewise the same should be true for the relationship of  $x$  and  $y$ .



Please visit the following links for more information on Principal Component Analysis before you continue to the next page if you are not familiar with the topic: <https://www.youtube.com/watch?v=a-1Ib26g43Ez>

[https://www.youtube.com/watch?v=1\\_pOrGm3Y58](https://www.youtube.com/watch?v=1_pOrGm3Y58)

[https://www.cs.princeton.edu/picasso/mats/PCA/Tutorial-Intuition\\_jp.pdf](https://www.cs.princeton.edu/picasso/mats/PCA/Tutorial-Intuition_jp.pdf)

With the above page in mind, we must now assess how the algorithm itself operates in the Sheriff results. We know that  $A_1, A_3, C_2$  are legitimate inputs, that is, the proportion between  $A_1 : A_3 : C_2$  must be true and authentic to the original data.

However, that is only the relative values of  $A_1, A_3, C_2$ . There is undoubtedly a scale,  $z$ , which is being applied against  $A_1, A_3, C_2$ . This means if we wrote  $A_1, A_3, C_2$  as a vector, the orientation of this vector would remain the same in 3D space, but the magnitude itself may and shall vary from the original vector.

Although the algorithm itself is not beyond human understanding, it would be too difficult for any human to interact directly with the algorithm at a precinct level before and during the election.

Thus, we can surmise that the only human interaction with this algorithm is:

1. Selecting the First, Second and Third place candidates across Clark County for Sheriff.
2. That the turnout cannot exceed some constant percentage of the registered voters at any particular precinct.
3. That the total number of ballots generated must be the same as the original number of ballots cast.

The first point determines who wins and who loses... the true goal of the algorithm; the second point ensures that turnout remains below 100% of the registered voters (in a general election), or below some other percentage in a primary (low turnout); the third point ensures that the number of true ballots that are destroyed, or new ballots created, is minimized. Proper execution of the third point should also cover the second point.

The Neural Network is provided the original values of  $A_{1,0}, A_{2,0}, A_{3,0}, B_{1,0}, B_{2,0}, B_{3,0}, C_{1,0}, C_{2,0}, C_{3,0}$ , in each precinct, and thus knows the total sum of these ballots,  $\Psi_0$ , in each precinct. The Neural Network then accesses its database of several billions self-learning trials on how to alter an election with three candidates and three modes, with the true first place winner, Hyt, being repurposed to last place, as the human engineer commanded.

For reasons unknown to us mere humans, the Neural Network chose an algorithm that preserves the relative values of  $A_{1,0}, A_{3,0}, C_{2,0}$  and uses their sum as the baseline integer value of  $v_1$  to yield  $s_1, u_1, t_1$ , which are the new values of  $B_{1,1}, B_{3,1}, C_{1,1}$ , (which remain in decimal form) from a cubic manifold equation that allows it to manufacture and adjust the arbitrary aggregate inputs  $\alpha_1, \Omega_1$  on a whim, in any precinct, at any time.

It then recycles the general methodology of the first cubic, using  $u_2 = B_{1,1} + B_{3,1}$  as the baseline integer input to yield  $s_2, t_2, v_2$ , from which come the new values of  $B_{2,1}, A_{2,1}, C_{3,1}$ , which also remains in decimal form. From this second cubic the algorithm now has two additional aggregate inputs,  $\alpha_2, \Omega_2$ , which it can alter, in any precinct, at any time.

The total sum of the new ballots  $\Psi_1 = A_{1,0}, A_{3,0}, C_{2,0} + (B_{1,1}, B_{3,1}, C_{1,1}) + (B_{2,1}, A_{2,1}, C_{3,1})$  is then determined, from which the scale  $z = \frac{\Psi_0}{\Psi_1}$ , is now applied across  $(A_{1,0}, A_{3,0}, C_{2,0}), (B_{1,1}, B_{3,1}, C_{1,1}), (B_{2,1}, A_{2,1}, C_{3,1})$ , and rounded up or down to the nearest integer, using the standard rules of rounding (as in Excel), since numerous tests have confirmed that no rounding preference (a floor, or ceiling) had ever been applied to any vote total in this election.

The scaling action preserves the relative values of  $(A_{1,0}, A_{3,0}, C_{2,0})$  amongst themselves, and ensures that the total sum of scaled and rounded ballots does not exceed  $\pm 9$  from the original total ( $\pm 1$  per each vote total, of which there are nine), and, since no preference is given, the average difference between the true sum of the ballots, and the resulting sum of the ballots, is zero, minimizing the number of existing ballots to be destroyed (and new ballots to be created).

The number of Election Day, Early, and Mail-in Ballots, that must be discarded and injected (exchanged), in order to enforce the new proportion of Election Day, to Early to Mail in Ballots, it then optimized (minimized) by adjusting the values of  $\alpha_1, \Omega_1, \alpha_2$  and  $\Omega_2$  in each precinct based on each precinct's needs to minimize such an exchange of ballot modes, without upsetting the countywide order in which the candidates are to win (that is, so long as the intended winner, McMahlil, receives the most votes in the County, with a sufficient county-wide percentage margin to prohibit an automatic recount, and that Roberts receives more votes than Hyt, then the Neural Network has achieved its task of altering the election, without blowing the number of registered voters, or hardset turnout conditions, and minimizing the number of ballots that are created and destroyed and whose modes are exchanged, across the precincts, and therefore across the entire County).

▣ Gradient descent, how neural networks learn | Chapter 2, Deep learning

<https://www.youtube.com/watch?v=1H1ZwW11Ww-w>

<https://en.wikipedia.org/wiki/AlphaZero>

<https://www.deepmind.com/blog/alphastar-mastering-the-real-time-strategy-game-starcraft-ii>

<https://corporatefinanceinstitute.com/resources/knowledge/economics/nash-equilibrium-game-theory/>

<http://neuralnetworksanddeeplearning.com/chap1.html>

*How Elections are Restored: Examples from 2020; Hartung vs Baker and Stavros vs Miller*

The following Four Pages are an excerpt from a prior article on this subject concerning the 2020 election results of Hartung vs Baker and Stavros vs Miller and the 2004 results of Bush vs Kerry.

*I will provide the reader with a brief explanation of how Election Results are restored, and examples of fair elections in Clark and Washe County in 2008,2012,2016 and the altered election of 2004 (in Bush's favor). We will start with an easy race to restore (most of them follow this procedure) where the Republican Hartung (the intended winner of the algorithm) was given an unfair advantage to secure their election against Democrat challenger Baker for the County Commissioner 4 seat.*

*Hartung was put in a stellar position by the algorithm. The first graph (top left) reads that even if Mr. Hartung received 0% of the Mail-in Vote, he would magically receive 25% of the combined Election Day and Early Vote.*

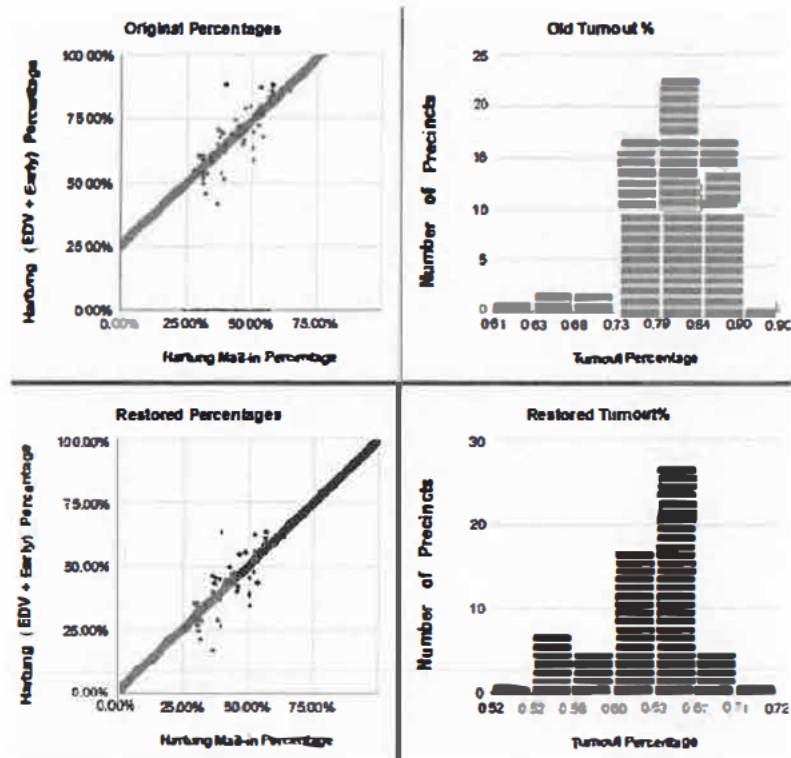
*At the same time, in order to keep Ms. Baker ahead of Hartung in the Mail (to maintain the facade that Democrats overperformed in the Mail), they made it that if Mr. Hartung got 100% of the Early (+EDV) vote, Ms. Baker would magically receive 25% of the Mail-in Vote (since he gets 75% in the Mail, which is the x-axis).*

*Although this observation is not proof of election fraud, after fraud is proven (via the formula used to rig the election) it is through this observation that we can then proceed to restore the election to its rightful state.*

*In a fair election, we expect a candidate that received 10% of the Election Day Vote to get roughly 10% of the Mail-in Vote; likewise if they get 90% of the Election Day Vote, we expect them to get 90% of the Mail-in Vote. Even if Democrats prefer to vote by mail, that should reflect in both percentages across the precincts, not just one of them. In other words, if we plot the election day and mail in percentages against each other across the precincts, they should array themselves across a 45 degree angle of  $y = x$ .*

*To restore this election (go to County Comm; Baker) page in the spreadsheet link on the following page) we first remove the positive intercept from the Winner of the election, plotting the dominant method of voting on the y-axis.*

*We then take the angle of the linear regression, find the difference from 45 degrees, and then execute a rotation matrix to bring the precinct percentages back to the line  $y = x$ . The manner in which the election is rigged determines how the candidate vote totals (integers) are rescaled. Since every election that was altered was done via the West vs East paradigm (you will learn more about this paradigm shortly in Chapter I), we know that Hartung's Mail-in Vote and Baker's EDV+Early Vote are true and authentic (they were used as natural inputs to alter Hartung's Early Vote and Baker's Mail-in Vote, which are the outputs).*



2020 Election Restoration Algorithm, Hartung vs Baker

This is the algorithm to restore the Baker-Hartung Election and applies to most restorations, including for counties in other States, such as Maricopa, Philadelphia (PA), Atlanta (GA), Dallas and Tarrant (TX), Macomb and Oakland (MI).

<https://docs.google.com/spreadsheets/d/1veZGhTfKMcIGkIbNju-jmKjBFfCjON-0569cc6jwZVaRc/edit?usp=sharing>

Restored Washoe Elections

Let  $P$  be the set of 63 precincts that were analyzed.

Let  $a_{i,0}$  be Hartung's recorded Mail in Vote in each precinct.

Let  $b_{i,0}$  be Baker's recorded Mail-in Vote in each precinct.

Let  $c_{i,0}$  be Hartung's recorded Election Day + Early Vote in each precinct.

Let  $d_{i,0}$  be Baker's recorded Election Day + Early Vote in each precinct.

Let  $x_{i,0}$  be Hartung's recorded Mail-in Percentage in each precinct,  $x_{i,0} = \frac{a_{i,0}}{a_{i,0} + b_{i,0}}$ .

Let  $y_{i,0}$  be Hartung's recorded EDV+Early in each precinct,  $y_{i,0} = \frac{c_{i,0}}{c_{i,0} + d_{i,0}}$ .

Let  $m$  be the slope of the linear regression of  $x$  vs  $y$ ;  $m = 0.9779$ .

Let  $b$  be the intercept of the linear regression of  $x$  vs  $y$ ;  $b = + 0.2497$

Let  $\theta = \arctan(m)$ ;  $\theta = 0.7742322822$  radians

Let  $\phi = \frac{\pi}{4} - \theta$ ;  $\phi = 0.01116588115$  radians

Let  $n_1 = \cos\phi$ ;  $n_1 = 0.9999376622$

Let  $n_2 = \sin\phi$ ;  $n_2 = 0.01116564913$

Let  $\tau_i = y_{i,0} - b$  for all precincts.

Let  $x_{i,1}$  be Hartung's Restored Mail-in Percentage in each precinct;  $x_{i,1} = n_1 x_{i,0} - n_2 \tau_i$

Let  $y_{i,1}$  be Hartung's Restored EDV+Early Percentage in each precinct;  $y_{i,1} = n_2 x_{i,0} + n_1 \tau_i$

Let  $a_{i,1}$  be Hartung's intercessory Mail-in Vote in each precinct,  $a_{i,1} = \text{ROUND}[(x_{i,1})(a_{i,0} + b_{i,0})]$

Let  $b_{i,1}$  be Baker's intercessory Mail-in Vote in each precinct,  $b_{i,1} = (a_{i,0} + b_{i,0}) - a_{i,1}$

Let  $c_{i,1}$  be Hartung's intercessory EDV+Early in each precinct,  $c_{i,1} = \text{ROUND}[(y_{i,1})(c_{i,0} + d_{i,0})]$

Let  $d_{i,1}$  be Baker's intercessory EDV+Early in each precinct,  $d_{i,1} = (c_{i,0} + d_{i,0}) - c_{i,1}$ .

Let  $u_{i,1}$  be the Hartung's West Side Scale,  $u_{i,1} = \frac{a_{i,0}}{a_{i,1}}$ , since  $a_{i,0}$  is authentic.

Let  $v_{i,1}$  be the Bakers East Side Scale,  $v_{i,1} = \frac{d_{i,0}}{d_{i,1}}$ , since  $d_{i,0}$  is authentic.

Let  $b_{i,2}$  be Baker's restored Mail-in vote each precinct,  $b_{i,2} = (u_{i,1})(b_{i,1})$ .

Let  $c_{i,2}$  be Hartung's restored EDV+Early Vote in each precinct,  $c_{i,2} = (v_{i,1})(c_{i,1})$ .

We now recalculate Hartung vs Baker using the integers  $a_{i,2}$ ,  $b_{i,2}$ ,  $c_{i,2}$ ,  $d_{i,2}$ .

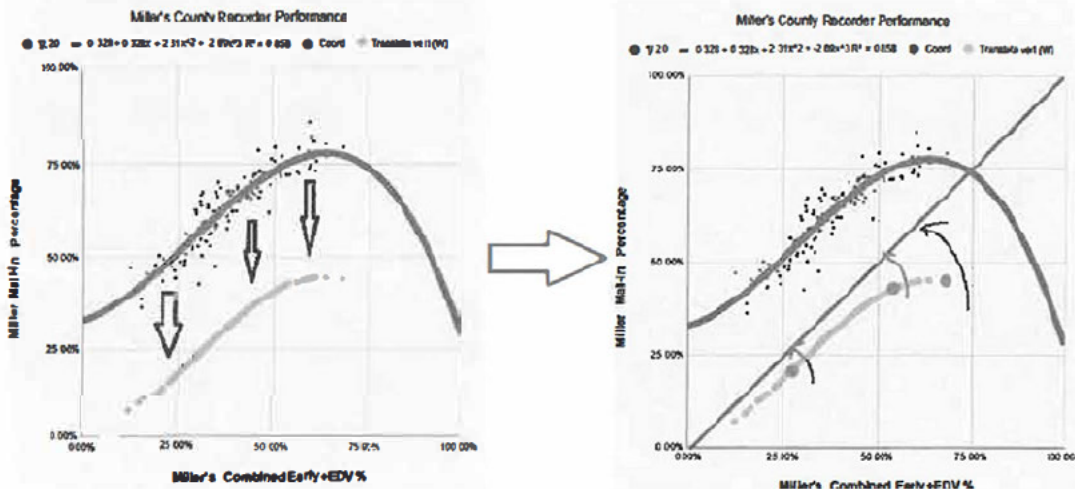
2020 Election Restoration Algorithm, Miller vs Stavros

As for Miller vs Stavros, restoring Nevada's Election is not a simple procedure of translation and rotation, this is because the 2 complex formula introduced an intense quartic curvature to the Early+EDV Percentage vs the Mail-in Percentage. When an election is altered via the East vs West paradigm, it introduces strong quartic curvature into the North vs South paradigms (North vs South would be Early Vote vs Mail-in Vote in 2020, and Election Day Vote vs Early Vote in previous elections, as those were the dominant and natural forms of voting).

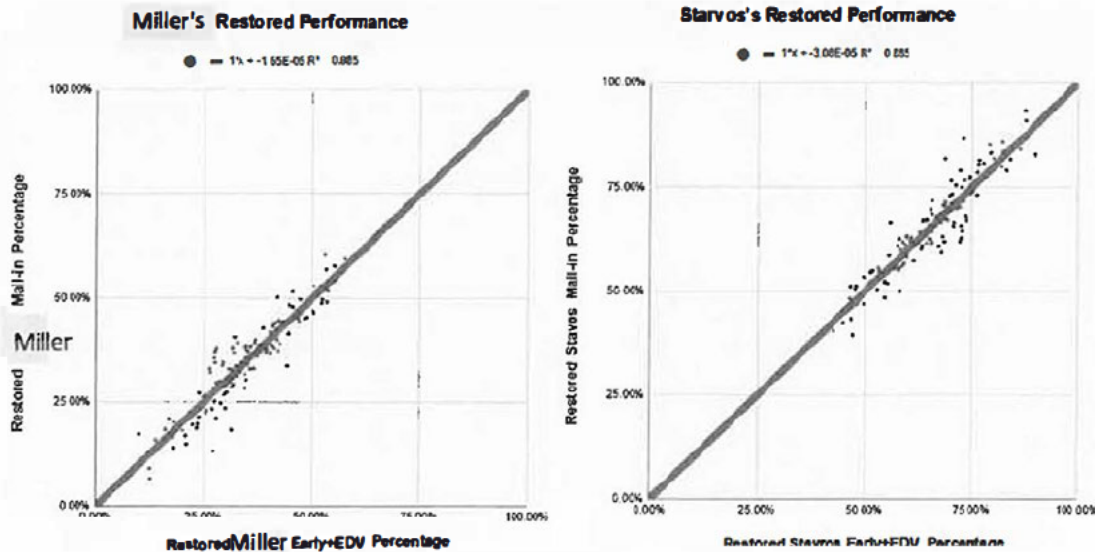
The reason quartic curvature is transferred into the North vs South Arrangement is because quartic curvature naturally occurs in the East vs West Arrangement in a fair election. In a fair election, the North and South percentages form a cloud that can be well approximated by a plane and the East and West percentages form a quartic spiral; however, when the election is altered via the West vs East paradigm, the quartic spiral appears in the traditional North vs South Percentages, and the East vs West percentages assume the plane relationship instead.

Because of this, we first subtract the y-intercept of the winner (as we did previously), and then record the difference of the Mail-in Percentage from the quartic polynomial spine.

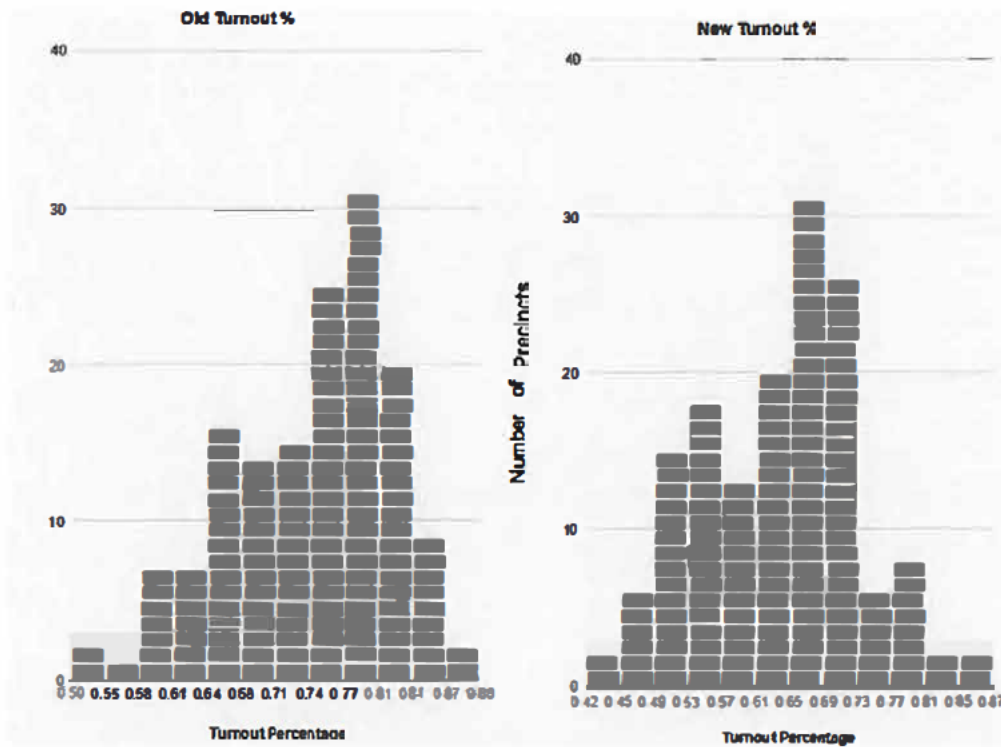
We then do a dynamic rotation of each coordinate along the precinct interpolation of the quartic spine to bring it back to the line  $y = x$  and then add back the original residual distances. We then subtract the new values from 100% to see it from Stavros's Perspective.



We then apply the algorithm on the above page to restore and rescale the integers, knowing that Stavros's Mail-in Vote and Miller's Early Vote+EDV vote are authentic. Miller replaces Hartung as the Intended Winner and the Mail-in Vote is placed on the y-axis instead, as it was the dominant form of voting in this race. Notice that in both elections, the intended Winners, Miller and Hartung, start with a +25% intercept, which seems to be the norm in all of Nevada's altered elections, federal, state and local.







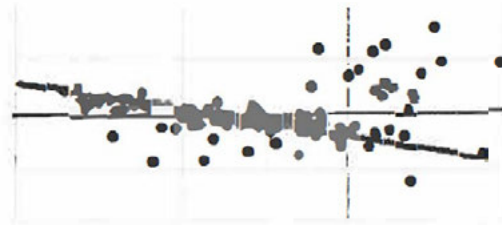
The results show that although Stavros's totals remained close to 75,000 before and after the restoration, Miller's ballot count was inflated from 44715 to 75446.

Original	County Recorder	Restored	PC 44%	Stavros	V%	Margin
Total EDV+Early	82086	Total EDV+Early	91152	Original	75313	11%
Total MiV	68673	Total MiV	37942	Restored	84379	12%
Stavros EDV+Early	50290	Stavros EDV+Early				
Miller EDV+Early	31796	Miller EDV+Early	31796	Miller	V%	Margin
Stavros MiV	25023	Stavros MiV	25023	Original	75446	95%
Miller MiV	43650	Miller MiV	12919	Restored	44715	95%
		<b>Cubic Restore</b>	<b>Miller View</b>			
County Agg. 150 Precincts	V%	<b>b0</b>	<b>0.32758872</b>	County Omega	V%	Phantom
Original	49.95%	<b>b1</b>	<b>0.328462</b>	Original		30731
Restored	57.35%	<b>b2</b>	<b>2.31106857</b>	Restored	70.60%	0
		<b>b3</b>	<b>-2.69332122</b>	Phantom %	20.35%	30731
County Lambda		<b>No b4</b>	<b>null</b>	Stavros to Miller via	Adjudicator	-9066
Original	PC 44%	<b>Phi Range</b>	<b>+5.50</b>	Miller MiV Phantom %	PC 44%	Miller Phantom Share
Restored	55.98%	<b>In Degrees</b>	<b>+15.28</b>	Stav EDV Phantom %	00.00%	100.00%
<b>Original Turnout</b>	<b>74.08%</b>			<b>Restored Stav Early</b>	<b>Div by Adj</b>	<b>15.57%</b>
<b>Restored Turnout</b>	<b>63.43%</b>			<b>Restored Miller MiV</b>	<b>Div by Adj</b>	<b>70.17%</b>

Equation 5.1.1e: The Cubic Exactitude of Miller vs Stavros, 2020, County Commissioner, Clark County

This particular local election is unique even amongst the other altered elections in Clark and Washoe Counties. I had no knowledge of the tightness of this race (15 votes) nor the prior court ruling and proceedings concerning this election. It caught my eye because it had the highest R<sup>2</sup> value of all election when the regression of  $\alpha = k_1g + k_2h + k_3$  was run.

Without removing a single outlying precinct the R<sup>2</sup> of the above plane regression was 0.998, and even stranger, if the residuals of the expected value of  $\alpha$  and the actual value of  $\alpha$  were affine (see the image below, where the residuals have a slope). Intrigued by this observation, I decided to actually view the election result and was astounded by the shallow margin of victory for the Democrat Candidate. A google search concerning this race revealed that there were even legal proceedings about it. <https://www.8newsnow.com/news/local-news/nevada-supreme-court-upholds-millers-election-win-over-stavros-anthon>



It turns out that someone (or something, such a neural network) took direct control of this election and warped the originally rigged flat plane via a cubic, and ignored the election day vote and registered voters entirely from the calculation, acting only the Early and Mail-in Vote.

Let  $a$  be Stavros's Early Vote at a particular precinct.

Let  $b$  be Miller's Early Vote at a particular precinct.

Let  $c$  be Stavros's Mail-in Vote at a particular precinct.

Let  $d$  be Miller's Mail-in Vote at a particular precinct.

Let  $h = \frac{c}{c+b}$ , let  $\alpha = \frac{a+c}{(a+c)+(b+d)}$ ; let  $g = \frac{a}{a+d}$ ,

$0 = k_5g^3 + g^2(k_2 + k_6h) + g(k_1 + k_3h) + (k_0 + k_4h^2 + k_7h^3 - \alpha)$ , which is a general cubic in the form:

$0 = Ag^3 + Bg^2 + Cg + D$ , for this race we take the first principle root of the Cubic Equation.

k0	0.03011967441	k4	0.2314017714
k1	0.8193824172	k5	1.006207413
k2	-0.9499398397	k6	-1.094817236
k3	1.064030566	k7	-0.1217901096

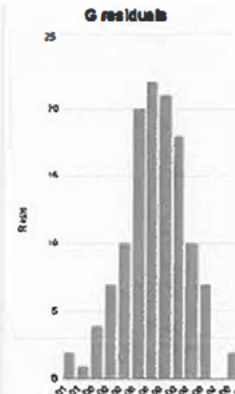
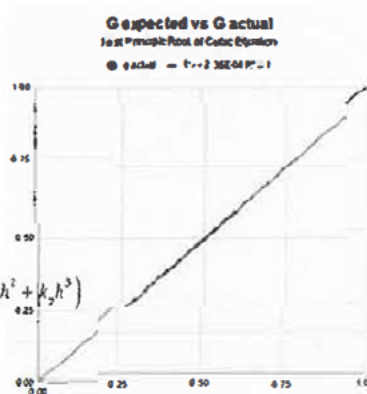
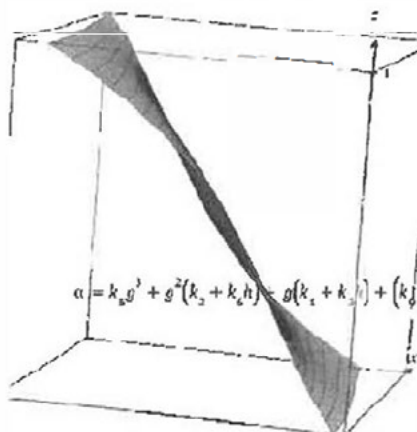
We shall use this closed form Cubic Equation Calculator using the Cardano and Vieta Method from the 16th Century:

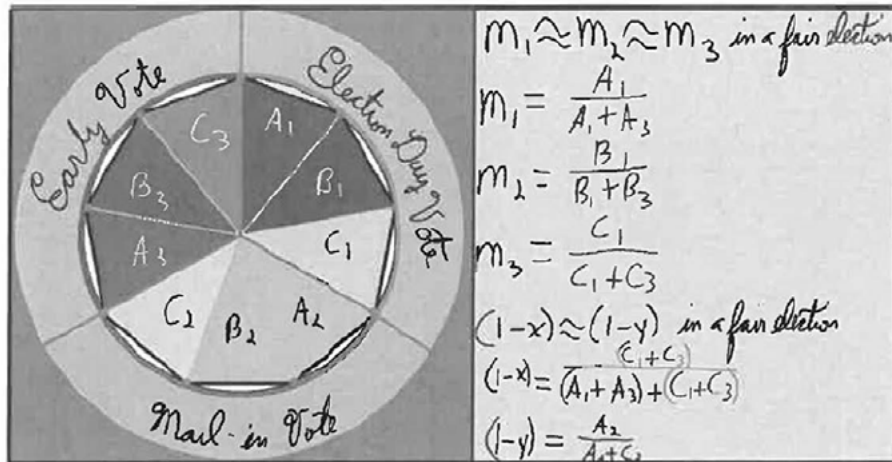
[Cubic Equation Calculator, Complex](#) [Miller vs Stavros](#)

[https://docs.google.com/spreadsheets/d/1uMhvd2NAnT3oxBl\\_uceB1b7icifevz06M5UJopgh2ulJqz4vltAusp#sharing](https://docs.google.com/spreadsheets/d/1uMhvd2NAnT3oxBl_uceB1b7icifevz06M5UJopgh2ulJqz4vltAusp#sharing)

[https://docs.google.com/spreadsheets/d/1vjJhOz2p0Lcmm17N12u11D0u5lANr3vNdy79\\_P1WQm/edit#usp=sharing](https://docs.google.com/spreadsheets/d/1vjJhOz2p0Lcmm17N12u11D0u5lANr3vNdy79_P1WQm/edit#usp=sharing)

Type  $y=0.03011967441 + 0.8193824172x - 0.9499398397x^2 + 1.064030566x^3 + 0.2314017714x^2 + 1.006207413x^3 - 1.094817236x^2 - 0.1217901096x^3$  into this link <https://csdlib.rocks.org/CalcPlot3D/index.html>. Select "add to graph" and choose the " $y = f(x, z)$ " function.





Preface Restoration Algorithm 0.1.3; Restoring the Sheriff Election

<https://docs.google.com/spreadsheets/d/1G1iJn7LX7zo22l4v19st0n3JukG7ZLlYlUm2R5e1lBB8/edit#sharing>

2022, Sheriff Restoration, Clark County, Nevada

Since we know that the relative proportion of  $A_1:A_3$  is true and authentic to the original election results, across the precincts, then we know the expected proportion of Early to Election Day Ballots for all candidates, in all races. Thus, we know the expected proportion of  $B_1$  to  $B_3$ , which is McMahon's Early to Election Day ratio, in each precinct, and  $C_1$  to  $C_3$ , which is Robert's Early to Election Day ratio, in each precinct.

We shall call  $\frac{A_{1i}}{A_{1i}+A_{3i}} = m_{1,1,i}$  where  $i$  is the precinct number index.

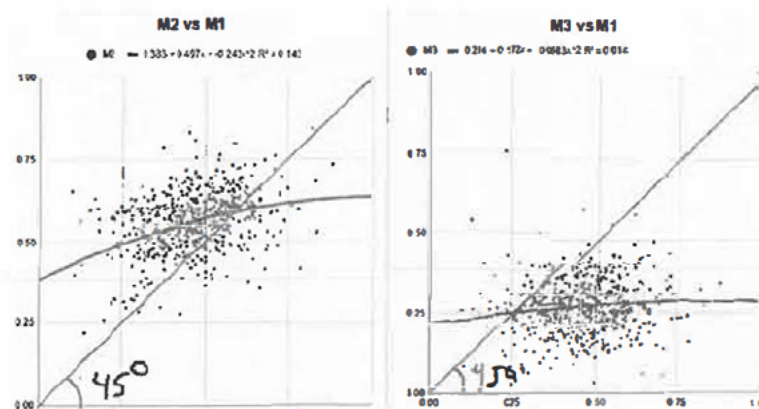
We shall call  $\frac{B_{1i}}{B_{1i}+B_{3i}} = m_{2,1,i}$  where  $i$  is the precinct number index.

We shall call  $\frac{C_{1i}}{C_{1i}+C_{3i}} = m_{3,1,i}$  where  $i$  is the precinct number index.

We now obtain the quadratic regression of  $m_{2,1,i}$  and  $m_{3,1,i}$  in respect to  $m_{1,1,i}$ .

In fair a election, the regression should be strong and strictly linear in the form of  $m_3 = k_0 + k_1 m_1$ , with  $k_0 \approx 0$  and  $k_1 \approx 1$ , and a small residual spread; however, the cubic manifold's manipulation of the vote totals turned this into a curved quadratic relationship, with a massive residual spread.

For Clark County  $\overline{m_{2,1,i}} = 0.383 + 0.497m_{1,1,i} - 0.243(m_{1,1,i})^2$ ;  $\overline{m_{3,1,i}} = 0.214 + 0.172m_{1,1,i} - 0.0983(m_{1,1,i})^2$





We now write the 3D parametric line that passes through the cloud of precincts when  $m_1$ ,  $m_2$  and  $m_3$  are plotted in 3D space, and record the residual values of  $m_2$  and  $m_3$ .

$$u_{0,i} = t; \quad v_{0,i} = 0.383 + 0.497t - 0.243t^2; \quad w_{0,i} = 0.214 + 0.172t - 0.0983t^2$$

We first subtract the intercepts from all  $v_{0,i}$  and  $w_{0,i}$  with the following vector difference:

$$\forall i: (u_{0,i}, v_{1,i}, w_{1,i}) = (u_{0,i}, v_{0,i}, w_{0,i}) - (0, 0.383, 0.214)$$

We now rotate each  $u_{0,i}, v_{1,i}, w_{1,i}$  coordinate on this 3D quadratic line to the straight line diagonal of  $u = v = w$ , while preserving the magnitude of the rotated coordinate.

To do this we set  $\theta_{1,i} = \text{Arctan} \frac{v_{1,i}}{u_{0,i}}$  and then set  $\theta_{2,i} = \frac{\pi}{4} - \theta_{1,i}$ , and execute a rotation matrix on

$u_{0,i}, v_{1,i}, w_{1,i}$  that first rotates  $u_{0,i}, v_{1,i}$  by  $\theta_{2,i}$ , which produces the coordinate  $u_{1,i}, v_{2,i}, w_{1,i}$ , such that  $u = v$ .

Now set  $\phi_{1,i} = \text{Arctan} \frac{w_{1,i}}{u_{1,i}}$  and  $\phi_{2,i} = \frac{\pi}{4} - \phi_{1,i}$  and then rotate  $u_{1,i}, w_{1,i}$  by  $\phi_{2,i}$  to yield  $u_{2,i}, w_{2,i}$ ,

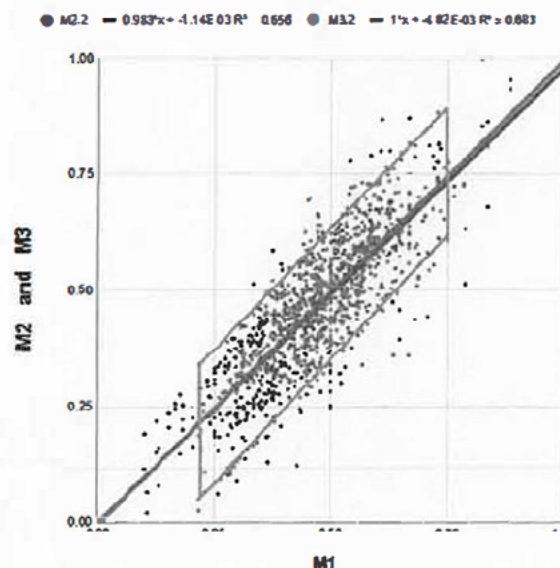
and then set  $v_{2,i} = u_{2,i}$ , such that  $u = v = w$ ; producing the coordinate  $u_{2,i}, v_{2,i}, w_{2,i}$ .

We now find the residual values of  $m_{2,i}$  and  $m_{3,i}$  from their expected values in the earlier quadratic regressions. Let these be  $r_{2,i}$  and  $r_{3,i}$  respectively. We now find the standard deviation of these residuals, let this be  $\sigma_2$  and  $\sigma_3$ .

We now multiply all  $r_{2,i}$  by  $\frac{5\%}{\sigma_2}$ , and all  $r_{3,i}$  by  $\frac{5\%}{\sigma_3}$  if either  $\sigma_2$  and/or  $\sigma_3$  are greater than 5%. This restores the residual spread to the rarely achieved maximum spread of 5% (standard deviation) found in historical data. Remember, that within two sigma, this is a plus or minus 10% residual spread, a range of 20% overall (hence a 5% standard deviation is actually larger than you think!). Let the rescaled residuals be  $r_{2,i}$  and  $r_{3,i}$  respectively.

We now add the vectors  $u_{2,i}, v_{2,i}, w_{2,i}$  and  $0, r_{2,i}, r_{3,i}$  to produce the Intersector Precinct Cloud, this vector shall be the coordinates  $u_{3,i}, v_{3,i}, w_{3,i}$ . Finally, we locally rescale each vector  $u_{3,i}, v_{3,i}, w_{3,i}$  by  $\frac{m_{1,i}}{u_{3,i}}$ , and reset any values in any component below 0% or above 100% to 0% and 100% respectively. Notice that the locally rescaled values fall inside a parallelogram as expected in a fair election.

### Restored: M1,2, M2,2 and M3,2

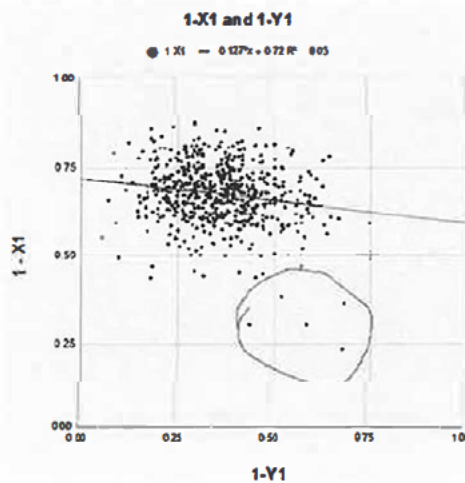


Thankfully, the next two steps are both done in two dimensions.

We now define  $(1 - x_{1,i}) = \frac{(C_{2,i} + C_{3,i})}{(A_{1,i} + A_{3,i}) + (C_{2,i} + C_{3,i})}$ , this percentage of Early and Election Day ballots cast for both Hyt and Roberts that belong to Roberts.

We also define  $(1 - y_{1,i}) = \frac{C_{2,i}}{A_{2,i} + C_{2,i}}$ , this percentage of Mail in ballots cast for both Hyt and Roberts that belong to Roberts.

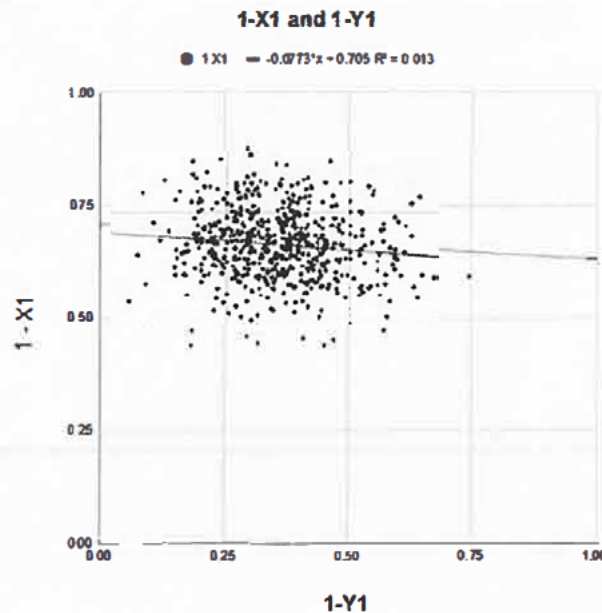
We now plot  $(1 - y_{1,i})$  horizontally and  $(1 - x_{1,i})$  vertically. Using our own eyeballs, we can tell that the five precincts in the maroon circled region, having the property  $(1 - x_{1,i}) < 40\%$  are severe outliers and shall be excluded from the linear regression (as they are currently having a deep and undesirable impact on that linear regression).



When these precincts are removed, the steps on the previous page must also be recalculated. Since you should be doing this in Excel, the update to those previous calculations should be automatic upon their removal, starting with the quadratic regressions:

Update: For Clark County  $\overline{m_{2,1,i}} = 0.442 + 0.264m_{1,1,i} - 0.0229(m_{1,1,i})^2$ ;  $\overline{m_{3,1,i}} = 0.219 + 0.143m_{1,1,i} - 0.0646(m_{1,1,i})^2$ .

With these precincts removed, we obtain the linear regression  $\overline{1 - x_{1,i}} = 0.705 - 0.0773(1 - y_{1,i})$ . We now subtract 0.701 from all  $(1 - x)$  values, and define  $\omega = \text{ARCTAN}(-0.0773) = -3.017\text{degrees} = 0.077146\text{radians}$



Normally, we would subtract the intercept of 0.701 from all of the precincts, and then rotate the precinct data by 48.017 degrees back to the line of  $(1 - x_1) = (1 - y_1) \Rightarrow (x = y)$ . However, this particular Sheriff's election is so botched and so warped, that there is no correlation between the election day, mail-in and early vote percentages, between any two candidates, or any combination of two candidates against the remaining third candidate.

This is not our fault. We did not alter this election, we did not administer an illicit pair of cubic manifolds to hijack the proportions between the ballots cast across Clark County.

Since there are no longer any naturally existing correlations between the candidate's election day, mail in, and early vote percentages across the precincts, we cannot restore this election using the conventional method of translation and rotation on percentages of ballots cast. Quite simply, there is no axis, linear or polynomial, that can pass through a circular scatter plot, with any substantial degree of correlation.

This leaves us with only one choice, the Nuclear Option: Turnout-Aggregate Restoration.

In a fair election, a candidate's performance is strictly linear with the percentage of registered voters that turnout. If a candidate, Kathy, receives a mean of 40% of the casted ballots across the precincts, then, regardless of the standard deviation of the candidate's performance, the regression of the percentage of registered voters who voted for Kathy, against the percentage of voters that turned out for all candidates, shall be in the form of  $\Psi_k = 0.4\Psi_r$ , where  $\Psi_k = \frac{\text{Kathy's Vote}}{\text{Registered}}$ ,  $\Psi_r = \frac{\text{Total Ballots Cast}}{\text{Registered}}$ .

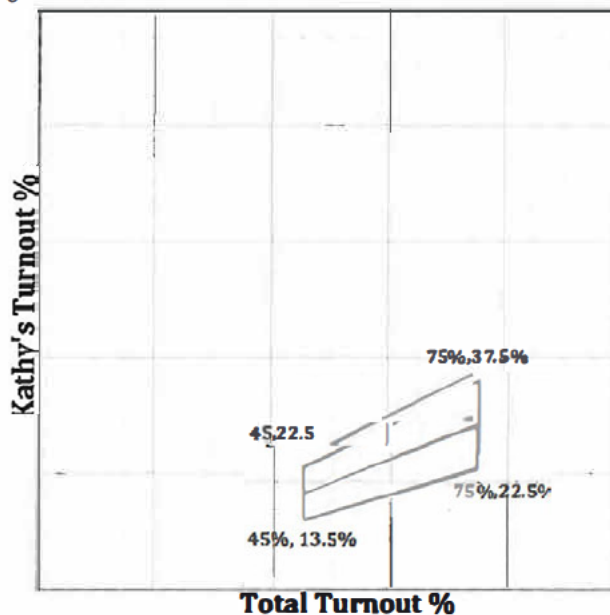
In the below diagram, Kathy receives 40% of all ballots cast, with a standard deviation of 5%, and the overall turnout across the precincts has a mean of 60%, with a standard deviation of 7.5%.

As a result, the precincts shall exist within a strict trapezoidal boundary. The horizontal boundaries are from 45% to 75%, which is two standard deviations from 60%. With Kathy receiving 40% of ballots cast, with a standard deviation of 5%, then Kathy shall always receive between 30% and 50% of all ballots cast.

We now multiply both horizontal boundaries by 30% and 50%, producing the four vertices of the trapezoid that bounds the precinct data, that is, the precinct data exists in the region  $0.3x \leq y \leq 0.5x$ ;  $0.45 \leq x \leq 0.75$ , which is the equation of an obtuse trapezoid, with the line  $y = 0.4x$  being both the only and the natural regression of this data.

In this scenario, the  $R^2$  value of this regression does not measure the accuracy of the regression, but the standard deviation of Kathy's turnout performance. The lesser the variance, the faster the  $R^2$  value converges to 1; the greater the variance, the faster the  $R^2$  value converges to zero.

This allows us to obtain the linear regression of any such set of data by simply knowing the mean and standard deviations of total turnout and ballots cast percentages for a candidate.



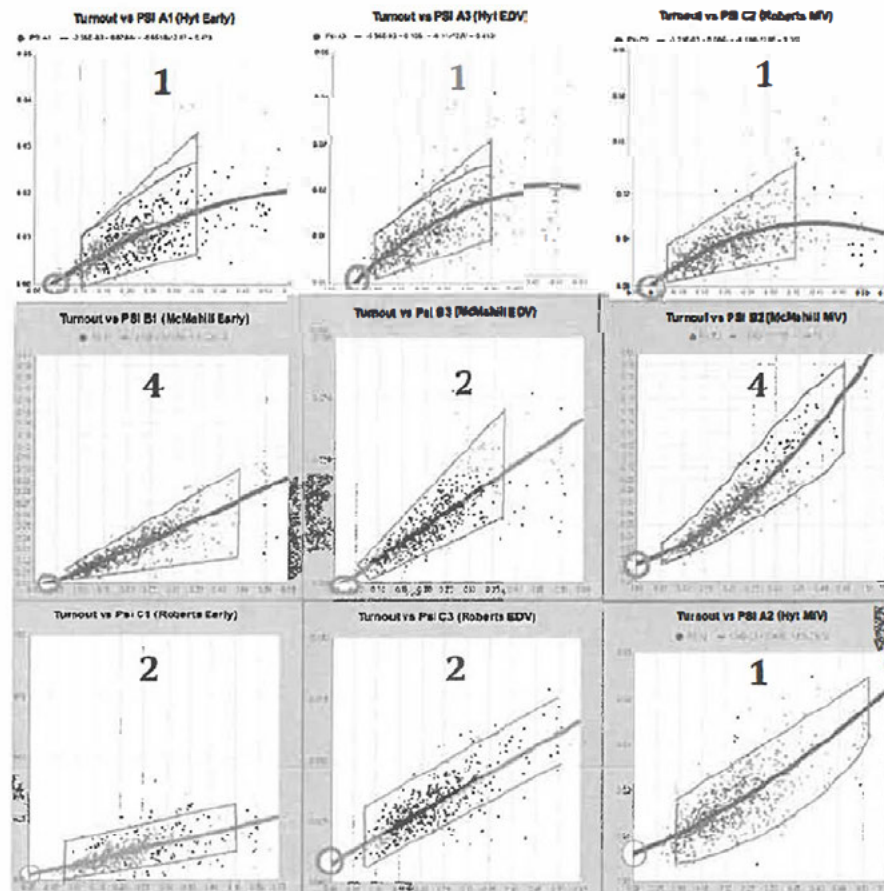
In the graphs below you can see the relationship between total precinct turnout (from 0% to 55% of registered voters) on the horizontal axis against the percentage of registered voters that turned out to vote for each candidate in each mode. The large green numbers, 1, 2 and 4, tell you the relative scale of the  $y$  - axis. The number 1 implies that the  $y$ -axis extends from 0% to 5%, the number two implies from 0% to 10%, and the number 4 implies 0% to 20%.

The first three graphs on the top row are the natural inputs  $A_1, A_2, C_2$ , that is, Hyt's Early Vote, Hyt's Election Day Vote and Robert's Mailin Vote, reduced to the percentage of registered voters that turned out to vote in those categories. Notice that is quite easy to draw their bounding trapezoids by hand before the quadratic concavity overtakes them.

In the three graphs highlighted and bordered in yellow, we see the turnouts of  $B_1, B_2, C_1$ , which are the illegal outputs of the first cubimaniifold. Notice that the quadratic regressions of  $B_1$  and  $B_2$  against the total precinct turnout have a negative intercept, while the intercept of  $C_1$  is positive. Also, observe that all of the intercepts of our natural inputs are negative. This informs us that the Neural Network was increasing the  $\Omega_1$  operators across the precincts, which increases  $C_1$  with intensity, drawing from  $B_3$  and the combined sum of  $A_1, A_2, C_2$ , while raising the  $\alpha_1$  operators to lessen the draw from  $B_3$ .

In the final graphs highlighted and bordered in gray, we see the turnouts of the final three illegal outputs,  $A_2, B_2, C_2$ . The first thing we observe is that both  $A_2$  and  $B_2$  are concave up, this informs us that the Neural Network heavily increased the  $\Omega_2$  operators across the precincts, since both  $A_2$  and  $B_2$  are on the North Side and  $\Omega$  is the North Side Horizontal Aggregate Percentage. We also see that the graph of  $C_3$  has non-negligible positive intercept, but also lacks concavity, this tells us that the  $\alpha_2$  operators were decreased across the precincts, causing  $g$  to decrease, which means that  $C_3$  will increase, since both  $B_2$  and  $C_3$  are on the west side; however, the increase in the  $\Omega_2$  operators must have been substantially greater than the decrease in the  $\alpha_2$  operators, and thus the southwest quarter, which is  $u_2 = B_1 + B_3$ , is what suffered the greatest relative loss, and hence the negative intercept of  $B_1$  in the yellow graphs, since the draw into  $C_3$  came primarily from  $B_1 + B_3$ .

Let us now briefly observe the comedy of these graphs, it says that Roberts Mail-in vote is always around one-third his Election Day Vote; however, McMahonill gets three times as many Mail-in Votes as he does Election Day Votes, that is a ninefold ratio difference





Our next step is restore  $C_1$ , which is Roberts's Early Vote.

The reason we first restore  $C_1$  is because it the output of the first cubic manifold, and since we know that Roberts received a legitimate Mail-in vote (relative to  $A_1$  and  $A_3$ ), we know that there are indeed people who support Roberts. Since  $C_1$  is the output of the first cubic manifold, it is also the least distorted of the illegal outputs

Remember that the vote totals in the second cubic manifold are scaled against the sum of the illegal outputs  $u_2 = B_1 + B_3$ , and that the proportion of this sum to  $t_1 = C_1$  and  $v_1 = A_1 + A_3 + C_2$  in the first cubic manifold is the aggregate percentage  $\alpha_1$ , where

$$\frac{(A_1 + A_3 + C_2) + C_1}{B_1 + B_3} = \frac{1 - \alpha_1}{\alpha_1}.$$

Thus, since the outputs of the second cubic manifold,  $A_2, B_2, C_3$ , which are scaled against  $u_2$ , and  $u_2$  is scaled against  $t_1 + v_1$ , means, that by definition,  $A_2, B_2, C_3$  are also scaled against  $t_1 + v_1$ . Hence, we start with  $C_1$ , since this value is only rescaled once in the first cubic manifold, and was also the least important output of the Neural Network (since the Neural Network set  $g_1$  instead of  $(1 - h_1)$ ) as the output of the cubic manifold, where  $g_1 = \frac{s_1}{s_1 + v_1}$ ,  $(1 - h_1) = \frac{t_1}{u_1 + t_1}$ .

To begin the restoration of  $C_1$  we use the same intercept and concavity of the quadratic for  $C_2$ , whilst retaining the linear constant of  $C_1$

The quadratic regressions of the turnout percentage of Roberts' Mail-in Vote and Early vs the Total Turnout Percentage is

$$w_1 = \overline{\Psi[C_2]} = k_0 + k_1\Psi[T] + k_2(\Psi[T])^2$$

$$w_2 = \overline{\Psi[C_1]} = z_0 + z_1\Psi[T] + z_2(\Psi[T])^2.$$

For the second equation we simply replace  $z_0$  with  $k_0$  and  $z_2$  with  $k_2$ , and retain  $z_1$ .

$$w_2 = \overline{\Psi[C_1]} = c_0 + z_1\Psi[T] + c_2(\Psi[T])^2$$

We then find the residuals of  $\Psi[C_1]$  from  $w_2$ , and the standard deviation of those residuals. We then find the standard deviation of the residuals of  $\Psi[C_2]$  from  $w_1$ , and then find the proportion of the standard deviations, and then rescale the  $\Psi[C_1]$  residuals to in respect to the proportion of those standard deviations.

Finally, we add those rescaled residuals to  $w_2$  and have, to the best our ability, in lieu of the Nuclear Option, restored the turnout percentage of  $C_1$ . We now reset the actual integer values of  $C_1$  against the integer values of the Registered Voters multiplied by the restored turnout percentages, and resolve the decimals values of the restored  $C_1$  integers using the standard rules of rounding. Any negative integer returns are simply set to zero.

With  $C_1$  restored, we can immediately restore  $C_3$  from the  $(m_{1,2,i}, m_{2,2,i}, m_{3,2,i})$  vectors. Recall that  $m_{3,2,i} = \frac{C_{1,i}}{C_{1,i} + C_{3,i}}$ , which is the restored proportion of  $C_1$  to  $C_3$  across the precincts, thus:

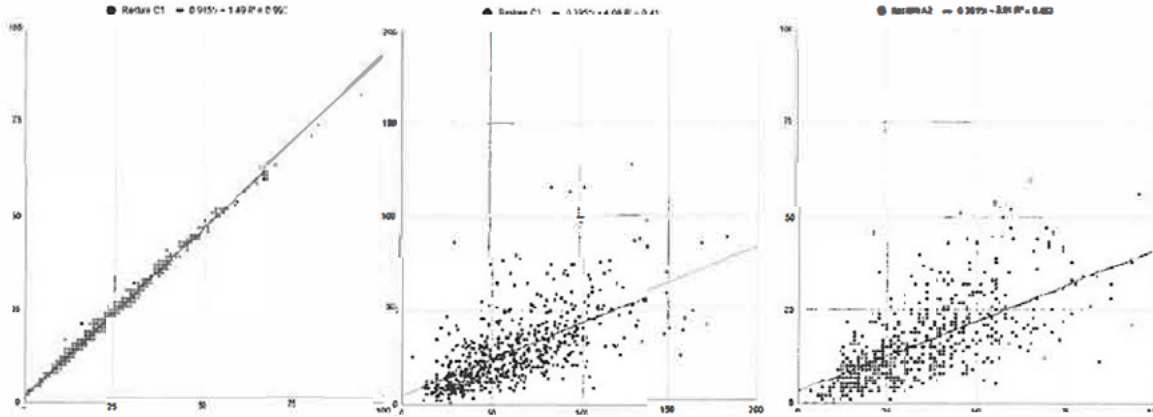
$$\left[ \frac{C_3}{C_1} = \frac{1 - m_{3,2,i}}{m_{3,2,i}} \right] \Rightarrow [m_{3,2,i} C_3 = C_1 (1 - m_{3,2,i})] \Rightarrow \left[ C_3 = \frac{C_1 (1 - m_{3,2,i})}{m_{3,2,i}} \right]$$

With knowledge of the relative values of  $A_1, A_3, C_1, C_2, C_3$ , we can now restore  $A_2$ .

Let  $n_{3,0,i} = \frac{C_2}{C_2 + (C_1 + C_3)}$ , then we know the percentage of Mail-in Votes to Early and Election Day Votes for all candidates, in all races, across the precincts. In the same manner that we calculated the restoration vectors  $(m_{1,2,i}, m_{2,2,i}, m_{3,2,i})$ , we shall then do so for the  $n$  vectors, yielding  $(n_{1,2,i}, n_{2,2,i}, n_{3,2,i})$ . We now apply  $n_{1,2,i} = \frac{A_2}{A_2 + (A_1 + A_3)}$  against  $A_1, A_3$  to yield  $A_2$ :  $\left[ A_2 = \frac{(A_1 + A_3)(n_{1,2,i})}{(1 - n_{1,2,i})} \right]$

As expected, the  $C_1$  values were the least disturbed. Robert's only received an 11% boost to his Early Vote Performance across the precincts from the first cubic manifold. The below graphs are the county recorder values of  $C_1, C_3, A_2$  (horizontal axes, from left to right) against their restored values.

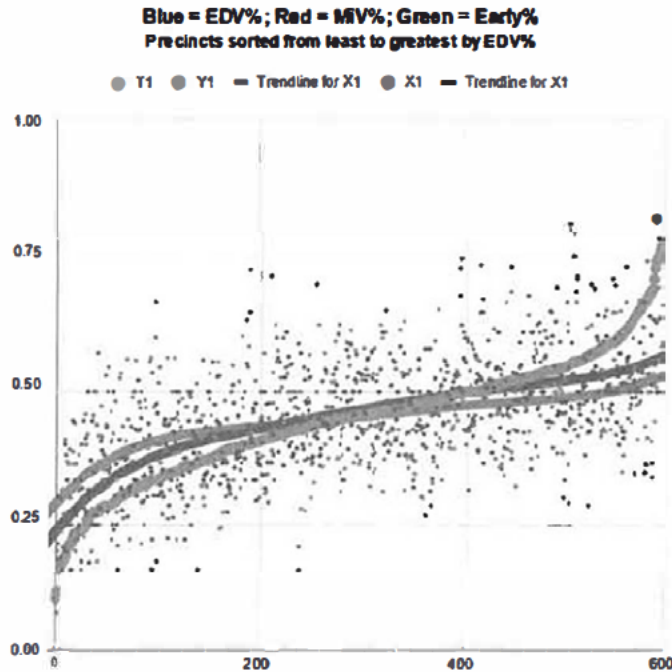
It shows that Robert's Election Day Votes and Hyt's Mail-in Votes were more than doubled from what they should have been. This is not surprising since both  $C_3$  and  $A_2$  are the outputs of second cubic manifold, which were leveraged against the the first cubic manifold, whose natural inputs were  $v_1 = C_2, A_1, A_3$ . The county-wide increasing both  $\Omega_1$  and  $\Omega_2$  in manifolds would convert into a massive spike of  $A_2$  and  $C_3$  ballots.



Amongst only Hyt and Roberts, with all of their vote totals restored, we can now project the true winner: Roberts won.

We can also see that the Election Day Percentage, Mail-in Percentage and Early Percentage, between only Hyt and Roberts are now strongly correlated in the below quantile plot, where the precincts were sorted from least to greatest by Hyt's Election Day Percent.

That is, the precincts now obey the expectation that Hyt's mode percentages are to be roughly equal to one another at any particular precinct, and we didn't even have to act on those percentages directly to achieve this. Amazing right!



Of course, we still have the problem of restoring  $B_1, B_2, B_3$ . We must first recognize that all of McMahon's vote totals were outputs in both of the manifolds.

Thus, it is possible that McMahon did not receive a significant share of the votes in any precinct. If this is the case, then there will still be no correlations between the Election Day, Mail in and Early Vote percentages of McMahon against the restored values of Hyt and Roberts. Simulations of altered elections, making Jo Jorgenson win the 2020 Election in Peoria (IL), Maricopa, Atlanta and Clark and Washoe Counties, revealed that if a truly insignificant candidate is compelled to victory via Manifolds (the simulations used simple plane functions, instead of cubics), that there will no correlation at all between Jorgenson's Election Day, Early and Mail-in Percentages across the precincts.

However, if McMahon was a significant candidate, then the restored values of Hyt and Roberts should reveal a tangible correlation between the Election Day, Mail in and Early percentages that we can translate and rotate back to 45 degrees to obtain McMahon's true performance. We shall examine the relationship between McMahon and Roberts.

Let  $s_{1,i} = C_{1,i} + C_{3,i}$ , where  $C_{1,i}$  and  $C_{3,i}$  are the restored values

Let  $t_{1,i} = B_{1,i} + B_{3,i}$

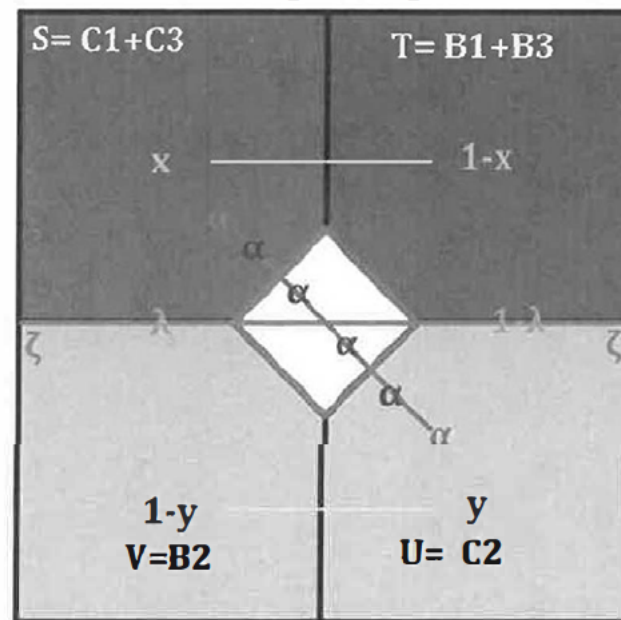
Let  $u_{1,i} = C_{2,i}$

Let  $v_{1,i} = B_{2,i}$

Let  $w_{1,i} = (1 - x_{1,i}) = \frac{t_{1,i}}{s_{1,i} + t_{1,i}}$ , be McMahon's intercessory combined Early and Election Day percentage.

Let  $z_{1,i} = (1 - y_{1,i}) = \frac{v_{1,i}}{u_{1,i} + v_{1,i}}$  be McMahon's intercessory combined Mail-in percentage.

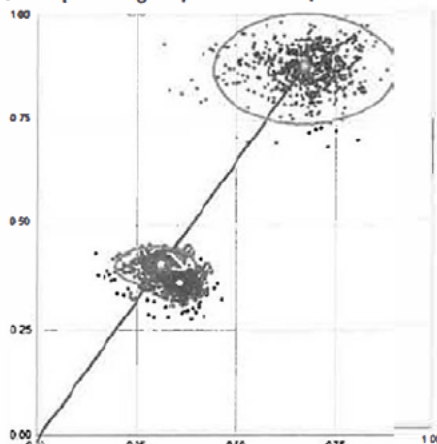
### North vs South



We now graph  $(1 - x)$  vs  $(1 - y)$  across the precincts. Since the relative value of  $A_2$  was increased by a factor of 2.1429, the relative value of  $C_3$  was increased by a factor of 2.1726, we assume that McMahon's vote relative vote totals were also increased by the same factor, since all of his votes were illegal outputs from the cubic manifolds (that is, not a single one of his vote totals were authentic).

We take the average of those two factors aforementioned, 2.1578, and take the vector from the origin to the midpoint of the precinct cloud in the  $(1 - x)$  vs  $(1 - y)$  graph, and divide that vector by 2.1578, and all of the distances of each precinct from that centroid by 2.1578, we do this because each precincts  $x, y$  value is acting as a complex number (thus the centroid distances were more than doubled).

We then rotate the centroid to the  $x = y$  line, while preserving the precinct offsets (both direction and magnitude) from the rotated center.



To do the above set  $\bar{w}$  to average all of  $w_i$  and  $\bar{z}$  to the average of all  $z_i$ .

We now set the vector  $(w_{2,i}, z_{2,i}) = (w_{1,i}, z_{1,i}) - (\bar{w}, \bar{z})$  for all precincts, the vectors  $(w_{2,i}, z_{2,i})$  are the precinct offsets from the center.

Set  $\theta = \text{ARCTAN} \frac{\bar{z}}{\bar{w}}$ , and set  $\phi = \frac{\pi}{4} - \theta$ .

Now set  $(w_{3,i}, z_{3,i}) = \left( \frac{w_{2,i}}{2.1578}, \frac{z_{2,i}}{2.1578} \right) + \left( \frac{\bar{w} \cos \phi - \bar{z} \sin \phi}{2.1578}, \frac{\bar{w} \sin \phi + \bar{z} \cos \phi}{2.1578} \right)$ . These are the restored percentages.

Set  $t_{2,i} = w_{3,i}(s_{1,i} + t_{1,i})$

Set  $v_{2,i} = z_{3,i}(u_{1,i} + v_{1,i})$

Set  $s_{2,i} = (s_{1,i} + t_{1,i}) - t_{2,i}$

Set  $u_{2,i} = (u_{1,i} + v_{1,i}) - v_{2,i}$

Set  $\beta_{1,i} = \frac{s_{1,i}}{s_{2,i}}$ , this is the North Side S scale; set  $\beta_{2,i} = \frac{u_{1,i}}{u_{2,i}}$ , this is the South Side U scale.

Set  $s_{3,i} = \beta_{1,i}(s_{2,i})$ ; set  $t_{3,i} = \beta_{1,i}(t_{2,i})$ , rounding  $t_{3,i}$  to the nearest integer, using the standard rules of rounding.

Set  $u_{3,i} = \beta_{2,i}(u_{2,i})$ ; set  $v_{3,i} = \beta_{2,i}(v_{2,i})$ , rounding  $v_{3,i}$  to the nearest integer, using the standard rules of rounding.

The value of  $v_{3,i}$  is the restored value of  $B_2$ , which is McMahon's Mail-in Vote.

We now split  $t_{3,i} = B_1 + B_3$  via (remember that crazy thing at the start of this process, about the ratio of  $A_1$  and  $A_3$  !!!)

$$\left[ \frac{B_1}{B_1 + B_3} = m_{2,2,i} \right] \Rightarrow [B_1 = m_{2,2,i}(t_{3,i})] \Rightarrow [B_3 = (1 - m_{2,2,i})(t_{3,i})]$$

And we're done...almost. Just one more step!



The Neural Network will undoubtedly have learned over the course of its self-training trials to preserve the original number of total ballots cast in each race down the ballot, while ensuring that the new Mail-in, Election Day and Early Vote totals match each other down the ballot as well.

The choice to increase or decrease  $\alpha_1, \Omega_1, \alpha_2, \text{ or } \Omega_2$  within either of the Sheriff's Cubic Manifolds is therefore not made in isolation concerning the Sheriff's race, but rather it is an intense balancing act of producing all of the selected winners down the entire ballot, while making the Mail-in, Early and Election Day totals match in each race in each precinct, while also preserving the total number of ballots that were cast to minimize the creation and destruction of ballots.

The most obvious solution to this problem would be to rescale all the relative totals in each precinct until their sum matched the original sum of all ballots cast. It is impossible to believe that the Neural Network would have found any other way to accomplish this.

Also remember that the Neural Network is not obliged (nor would conclude in self-training) that it must preserve the relative values of  $A_1$  to  $A_3$  to  $C_2$  between precincts. It only needs to preserve those proportions within a precinct itself, not between precincts. With all of the above in mind, this why there is almost zero correlation between the candidates Election Day, Mail in and Early Percentages, because this localized min-maxing of  $\alpha_1, \Omega_1, \alpha_2, \Omega_2$  is done within a precinct, not between them (with the only exception being that net sum of votes across the county produces the intended winner, the primary objective of the Neural Network).

Undoubtedly, the Neural Network will place higher emphasis on matching the number of Mail-in, Election Day and Early ballots, since a human would have instructed it to place a higher emphasis on this mission, as it would seem strange if there was ten times as many Mail-in ballots for the Sheriff's race than the Governor's Primary across the precincts.

However, it would also seem just as strange if total voter turnout for the Sheriff's race was also tens higher than the Governor's primary, hence the Neural Network will also strive to preserve the original number of ballots cast in each race.

We now perform the final step of the Sheriff Restoration:

Let  $Y_{1,i}$  the sum of the County Recorder values of  $A_1, A_2, A_3, B_1, B_2, B_3, C_1, C_2, C_3$  in each precinct.

Let  $Y_{2,i}$  the sum of the County Recorder values of  $A_1, A_3, C_2$  and the restored values of  $A_2, B_1, B_2, B_3, C_1, C_3$  in each precinct.

$$\text{Let } \Lambda_i = \frac{Y_{1,i}}{Y_{2,i}}$$

In each precinct, multiply County Recorder values of  $A_1, A_3, C_2$  and the restored values of  $A_2, B_1, B_2, B_3, C_1, C_3$  by  $\Lambda_i$ . Then round these values to the nearest integer, using the standard rules of rounding.

We have now restored the Sheriff's 2022 Election in Clark County, Nevada, and Roberts is the rightful winner.

Results	Original Totals	Restored Totals
A1	11627	30715
A2	20748	25064
A3	13275	33776
B1	37509	20701
B2	82460	15887
B3	28967	23933
C1	13901	35478
C2	11290	28463
C3	36953	42733
Candidates	Original	Restored
Hyt	45650	89555
McMahill	148936	60521
Roberts	62144	106674
Mode	Original	Restored
Early	63037	86894
MiV	114498	69414
EDV	79195	100442

Preface Equation 0.2.1: The Trivariate Real Number Cubic Turnout Manifold, US Senate

Let Candidate A be Sam Brown; let Candidate B be Cortez; let Candidate C be Laxalt.

Let  $A_1, A_2, A_3$  be Brown's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $B_1, B_2, B_3$  be Cortez's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $C_1, C_2, C_3$  be Laxalt's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $s_1 = A_1$

Let  $t_1 = (B_1 + B_3)$

Let  $u_1 = A_3$

Let  $v_1 = (C_1 + C_3)$ ; this is the input square.

Let  $R$  be the number of registered voters at the precinct.

$$m_1 = \frac{s_1}{s_1 + u_1}, n_1 = \frac{t_1}{t_1 + v_1}, \alpha_1 = \frac{s_1 + u_1}{(s_1 + u_1) + (t_1 + v_1)}, \Omega_1 = \frac{s_1 + t_1}{(s_1 + t_1) + (u_1 + v_1)}, \lambda_1 = \frac{s_1 + v_1}{(s_1 + v_1) + (u_1 + v_1)}$$

$$\xi_1 = \frac{t_1 + v_1}{s_1 + u_1} = \frac{1 - \alpha_1}{\alpha_1}, \quad w_1 = (1 - n_1) = \frac{v_1}{t_1 + v_1}; \quad \Psi = \frac{s_2 + u_2}{R}$$

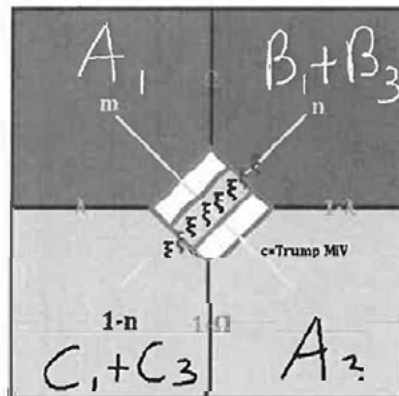
In a fair election:

$$n = \Omega + \xi(\Omega - m) = \frac{\Omega - \alpha m}{1 - \alpha} = \frac{(\xi + 1)(\Omega - \lambda) + \xi}{2\xi}; \quad w = \lambda + \xi(\lambda - m) = \frac{(\xi + 1)(\lambda - \Omega) + \lambda}{2\xi}$$

In the above sequence of equalities, three of the five proportions must always be known to resolve  $n_1$ , however, in Clark County we obtain the illegal cubic manifold equations that yields  $n_1$  with  $\Omega_1$  and  $\lambda_1$  without either  $\alpha_1$  nor  $m_1$ .

Even more outrageous is that the  $R^2$  of this function is rather low, until a third parameter,  $\Psi$ , is added. Taking an  $R^2$  of bivariate plane and quadratic of  $\Omega_1$  and  $\lambda_1$  unto  $n_1$  from below 0.99, all the way to 0.998. To ensure there wasn't a trivial correlation with  $\Psi$ , artificially increasing the  $R^2$  value, the number of registered voters was randomized across the precincts in tens of millions of simulations, without changing the number of ballots cast, and there was no significant increase in  $R^2$  in any of these trials. Thus, this formula works with, and only with, the precise number of registered voters present in each Clark County precinct.

**Opposition: Diagonal vs Diagonal**



The trivariate cubic equation will have  $w_1 = 1 - n_1$  isolated on the right-hand side. In the diagram on the previous page,  $w_1$  is the Light Blue Diagonal Percentage, that is the percentage share of ballots that belong to  $v_1$  amongst  $t_1$  and  $v_1$ ,  $w_1 = \frac{v_1}{t_1+v_1}$ , in other words, this is the share of Early and Election Day ballots that Laxalt shall receive against the number of Early and Election Day ballots of both Laxalt and Cortez.

As to how we discern between whether or not  $t_1$  or  $v_1$  was the input square, is to compare the ratios of  $C_1 : C_3$  and  $B_1 : B_3$  to Hyt's  $A_1 : A_3$  ratio in the Sheriff's race. From this we learn that the histogram and quantile plots of  $C_1 : C_3$  have an identical match to Hyt's results in the Sheriff's race, while the histogram and quantile plots Cortez's  $B_1 : B_3$  ratios are alien, furthermore that there is zero correlation between Cortez's  $B_1 : B_3$  ratios and either Hyt's  $A_1 : A_3$  or Laxalt's  $C_1 : C_3$  ratios (also recall that Hyt's  $A_1 : A_3$  ratio was authentic, since Hyt's  $A_1, A_3$  were logically compelled to be the only authentically input source).

As to the presence of the  $\Psi$  parameter, it informs us that this Equation determines the voter turnout in each precinct, to which all other races down the ballot shall be attuned to (whereas the Sheriff's race established the proportion of Early to Mail-in to Election Day ballots cast in each precinct, the Senate Race establishes the proportion of Democrat to Republican Ballots in the partisan primaries and the precinct turnout in all primaries, both partisan and non-partisan).

Once the  $w_1$  proportion is illegally resolved from the cubic surface of  $\Omega, \lambda_1$  and  $\Psi$ , both  $m_1$  and  $\alpha_1$  are compelled into existence, since in any election, fair or unfair:

$$w = \frac{(\xi+1)(\lambda-\Omega)+\xi}{2\xi} \Rightarrow \xi = \frac{\Omega-\lambda}{(\lambda-\Omega+1-2w)}; m = \lambda + \xi(\lambda - w); w = 1 - n = \frac{v}{t+v}$$

Since the proportions,  $w_1, \Omega, \lambda_1$  are known, it compels the value of  $\xi_1$ , which is proportion of Blue Diagonal to Red Diagonal Ballots, that is  $\xi_1 = \frac{t_1+v_1}{s_1+u_1}$ , is now forced, and since  $\alpha_1 = \frac{1}{1+\xi_1}$ , then Brown's aggregate percentage share of the ballots in this ballot set is also compelled (Brown is the algorithmically intended loser).

Since  $\xi_1, w_1, \lambda_1$  are known, it forces the value of  $m_1$ , which is the percentage of  $s_1$  ballots amongst  $s_1$  and  $u_1$  and tells us proportion of  $s_1$  to  $u_1$  ballots via the identity:  $\frac{s_1}{u_1} = \frac{m_2}{1-m_2}$ . Since the value of  $t_1$  is known (the input square), the values of  $s_2, u_2$  and  $v_2$  are also known, as the pairwise proportions betwixt them have all been forced.

The illegal trivariate cubic equation is as follows, with an  $R^2 = 0.998666$  (video on next is the 4D surface that the Clark County precincts rest upon when their  $\Omega, \lambda, w$  values are plotted in  $x, y, z$  space respectively, with  $\Psi$  acting as the fourth dimension) The residual values have a left-tailed Poisson distribution, and the residual errors come from, and only from, whether or not they rounded the illegally calculated vote totals up or down to the nearest integer.

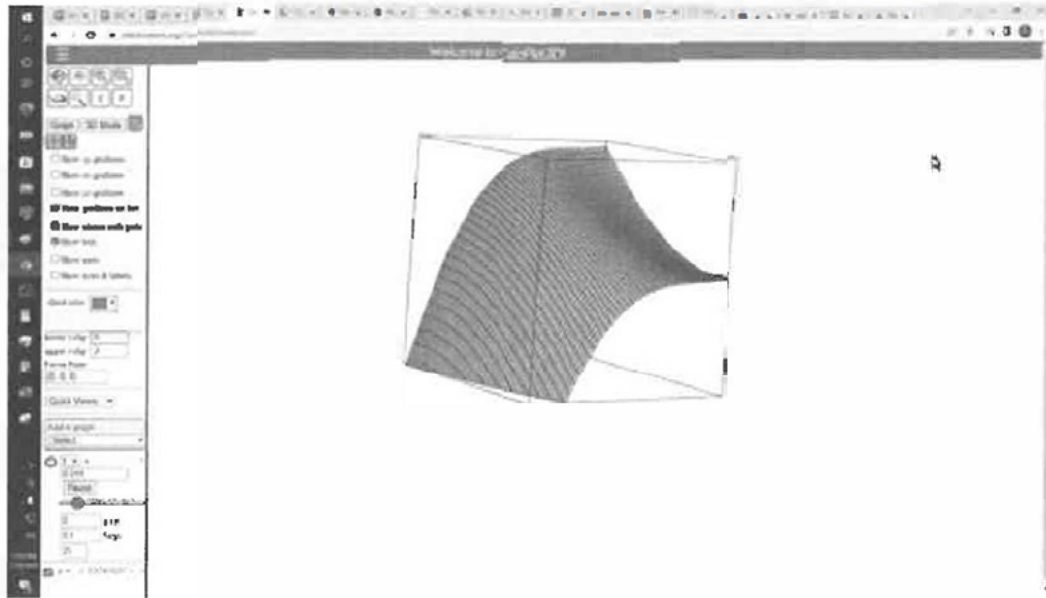
$$w = \sum_{k=0}^{k=3} \left( \sum_{j=0}^{j=k} \left( \sum_{t=0}^{t=k-j} \left( \binom{k-j-t}{k_j, ((k-j)-t)} (\Psi^{(k-j)-t}) (\Omega^t) (\lambda^j) \right) \right) \right); z_{k,j,t} \in \mathbb{R}$$

$z_{0,0,0}$	$z_{1,0,0}$	$z_{1,0,1}$	$z_{1,1,0}$		
-1.13741914767888	-0.603407714515924	2.33501596981659	7.38865441852249		
$z_{2,0,0}$	$z_{2,0,1}$	$z_{2,0,2}$	$z_{2,1,0}$	$z_{2,1,1}$	$z_{2,2,0}$
69.9462999161332	-14.6467141937464	-0.917356759338873	12.0015396345406	-9.16489580692723	-9.01806410681456
$z_{3,0,0}$	$z_{3,0,1}$	$z_{3,0,2}$	$z_{3,0,3}$		
288.161113813985	-24.8740476649254	6.07211023080162	-0.269537406940344		
$z_{3,1,0}$	$z_{3,1,1}$	$z_{3,1,2}$	$z_{3,2,0}$	$z_{3,2,1}$	$z_{3,3,0}$
-148.440286412835	8.10273581556975	2.25169584417017	-5.55677292495965	6.71125826193019	3.71284521219786

Since the average reader of this article shall not be aware of the implications of a trivariate cubic manifold input, with a single output, it means that there is a continuous smooth four dimensional surface upon which the precincts sit.

The fourth dimension of this manifold is the percentage of registered voters that cast their early or election day ballots for Brown. As this percentage increases from 00.00% to 15.00%, the 3D surface of  $\Omega, \lambda, w$  (the x,y,z axes) upon which the precincts lay changes smoothly, without any erratic discontinuities or massive accelerations.

As to whether or not a 19 vector regression is justified, bear in mind that 16 of those vectors are products and powers of only three input vectors, and that attempting a lower degree (linear and quadratic with  $k = 1$  or  $2$ ), yielded residuals with a distinct and pronounced cubic curvature, this would be like asking me to fit a straight line to approximate the shape of a hockey stick.

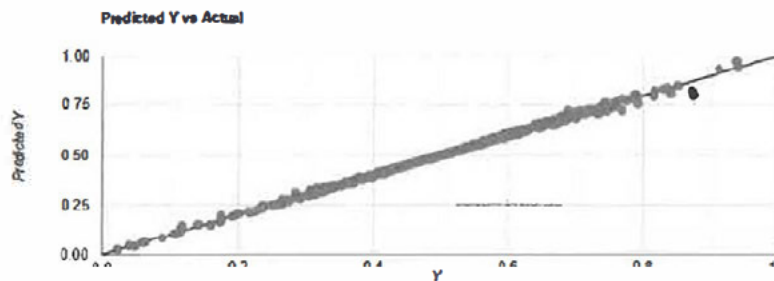
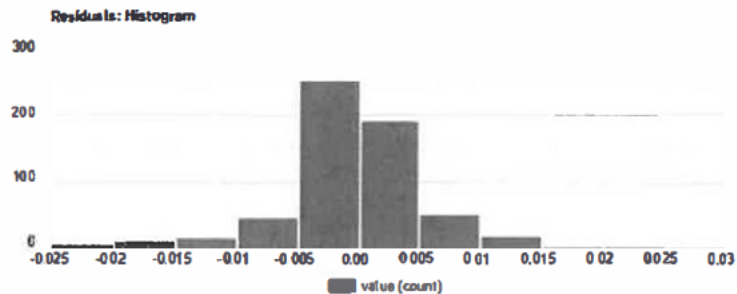


#### 1. Y and X relationship

R square ( $R^2$ ) equals 0.9973342946. It means that the predictors ( $X$ ) explain 99.7% of the variance of  $Y$ .

Adjusted R square equals 0.9972466676.

The coefficient of multiple correlation ( $R$ ) equals 0.9986662579. It means that there is a very strong correlation between the predicted data ( $\hat{y}$ ) and the observed data ( $y$ ).



*Preface Equation 0.2.2; The Bivariate Real Number Quadratic Manifold US Senate*

Let Candidate A be Sam Brown; let Candidate B be Cortez; let Candidate C be Laxalt.

Let  $A_1, A_2, A_3$  be Brown's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $B_1, B_2, B_3$  be Cortez's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $C_1, C_2, C_3$  be Laxalt's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $s_1 = B_2$

Let  $t_1 = C_2$

Let  $u_1 = B_1 + B_3$ ; this is the input  $B_1$  and  $B_3$  were illegally determined in the prior equation.

Let  $v_1 = (A_1 + A_3 + C_1 + C_3) + A_2$ ; Direct subtraction from  $v_1$  shall yield  $A_2$  as an output.

$$g_1 = \frac{s_1}{s_1 + v_1}, h_1 = \frac{u_1}{u_1 + t_1}, \alpha_1 = \frac{s_1 + u_1}{(s_1 + u_1) + (t_1 + v_1)}, \Omega_1 = \frac{s_1 + t_1}{(s_1 + t_1) + (u_1 + v_1)}, \lambda_1 = \frac{s_1 + v_1}{(s_1 + v_1) + (u_1 + v_1)}$$

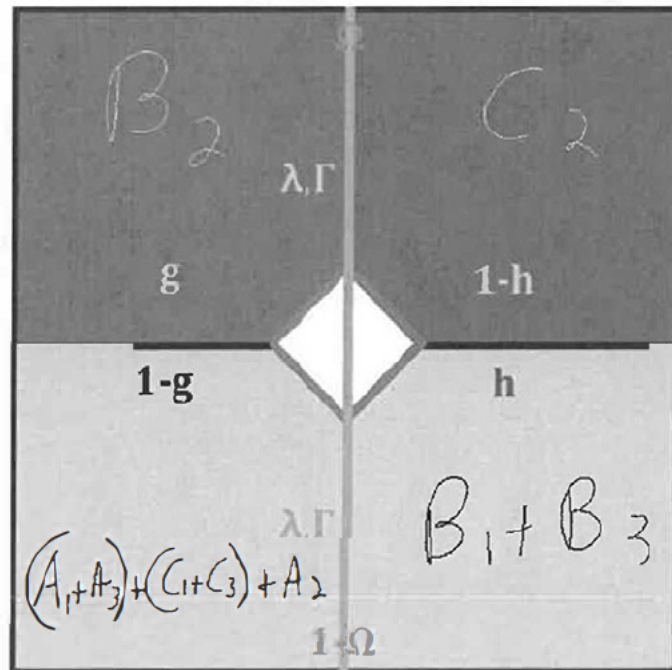
$$\Gamma_1 = \frac{u_1 + t_1}{s_1 + v_1} = \frac{1 - \lambda_1}{\lambda_1}, \quad w_1 = (1 - h_1) = \frac{t_1}{u_1 + t_1}$$

In a fair election:

$$g = \alpha + \Gamma(\alpha - h) = \frac{\alpha - (1 - \lambda)h}{\lambda} = \Omega + \Gamma(\Omega - w) = \frac{\Omega - (1 - \lambda)w}{\lambda} = \frac{(\Gamma + 1)(\Omega + \alpha) - \Gamma}{2}$$

In the above sequence of equalities, three of the five proportions must always be known to resolve  $g_1$ , however, in Clark County we obtain the illegal quadratic manifold equations that yields  $g_1$  with only  $\alpha_1$  and  $\Omega_1$  (see next page).

### West vs East



The bivariate quadratic equation will have  $g$  isolated on the right-hand side. In the diagram on the previous page,  $g$  is the West Side Percentage, that is the percentage share of ballots that belong to  $s$  amongst  $s$  and  $v$ ,  $g = \frac{s}{s+v}$ .

Once  $g$  is illegally resolved from the cubic surface of  $\alpha, \Omega$ , both  $h$  and  $\lambda$  are compelled into existence, since in any election, fair or unfair:

$$g = \frac{(\Gamma+1)(\Omega+\alpha)-\Gamma}{2} \Rightarrow \Gamma = \frac{2g-\Omega-\alpha}{(\Omega+\alpha-1)}; h = \alpha + \Gamma^{-1}(\alpha - g); w = 1 - h = \frac{t}{u+t}$$

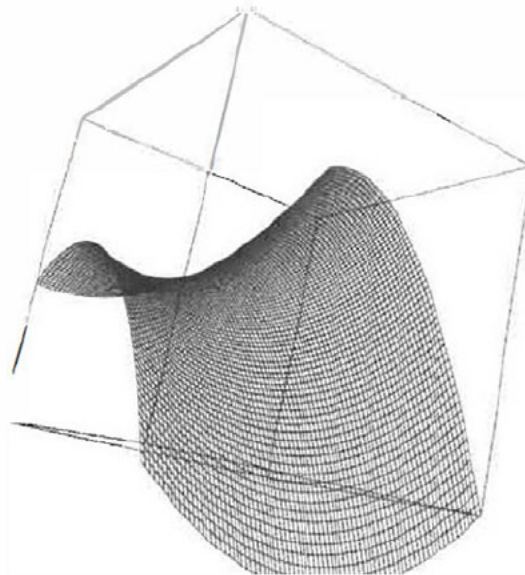
Since the proportions,  $g_1, \alpha_1, \Omega_1$  are known, it forces the value of  $\Gamma_1$ , which is proportion of East Side Ballots to West Side Ballots, that is  $\Gamma_1 = \frac{u_1+t_1}{s_1+v_1}$ , is now forced. Since  $s_1$  and  $v_1$  are both known at this stage, then so the sum of  $u_1$  and  $v_1$ .

Since  $\Gamma_1, \alpha_1, g_1$  are known, it forces the value of  $h_1$ , which is the percentage of  $u_1$  ballots amongst  $u_1$  and  $t_1$ . Since the sum of  $u_1$  and  $t_1$  is already known, and  $h_1$  tells us proportion of  $t_1$  to  $u_1$  ballots via the identity:  $\frac{t_1}{u_1} = \frac{1-h_1}{h_1}$ , then we know the values of  $u_1$  and  $t_1$ .

The illegal bivariate quadratic equation is as follows, with an  $R^2 = 0.9983801128$  (image below is the 3D surface that the Clark County precincts rest upon when their  $\alpha, \Omega, g$  values are plotted in  $x, y, z$  space respectively. The residual values have a perfect normal distribution, and the residual errors come from, and only from, whether or not they rounded the illegally calculated vote totals up or down to the nearest integer.

$$g = k_0 + k_1\Omega + k_2\alpha + k_3\Omega^2 + k_4\alpha\Omega + k_5\alpha^2$$

$k_0$	$k_1$	$k_2$	$k_3$	$k_4$	$k_5$
0.1590436749	+0.8413736582	+0.4076454491	-0.28055677	+0.1852754507	+0.2240821095



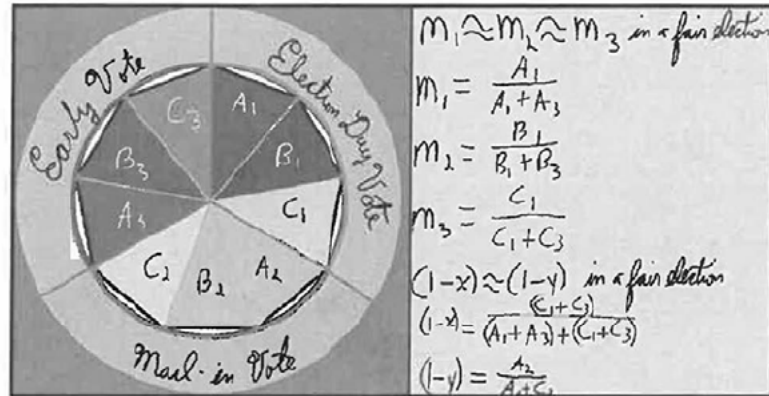
After the execution of this formula, the following values are known:

Illegally Calculated Inputs are:  $(A_1 + A_3); (B_1 + B_3)$

Illegal Outputs are:  $A_2, B_2, C_2$

Natural Inputs:  $C_1, C_3$





Preface Restoration Algorithm 0.2.3: Restoring the Senate Election

2022, Senate Restoration, Clark County, Nevada

[https://docs.google.com/spreadsheets/d/1cXN79YLPn\\_6n13WBCABCLFR5LEn8dt92Rc9in1u01st/cedit2usrn=sharing](https://docs.google.com/spreadsheets/d/1cXN79YLPn_6n13WBCABCLFR5LEn8dt92Rc9in1u01st/cedit2usrn=sharing)

Since we have the advantage of the restored Sheriff's Race, the restoration of the Senate race is far easier, as we can import the ratio of Early to Mail-in to Election Day ballots in each precinct

Since the second manifold equations informs us that all mail-in totals,  $A_2, B_2, C_2$ , are illegitimate output, we first act to restore the Early and Election Day Totals, and as there is no correlation between Laxalt's and Browns Election Day, Early and Mail-in Percentages, we first restore the relationship between Laxalt and Cortez, since they are correlated, and we know Laxalt's Early and Election Day ratio to not only be preserved, but also identical to Hyt's Early to Election Day ratio in the Sheriff's race.

Is it not surprising that the two candidates, from different races, whose Early to Election Day Ratios were preserved as inputs into their respective manifolds, have nearly identical values?

Let  $x_{1,i} = \frac{C_1}{C_1+B_1}$  be Laxalt's Early Vote Percentage amongst Laxalt and Cortez in each precinct.

Let  $y_{1,i} = \frac{C_3}{C_3+B_3}$  be Laxalt's Election Day Percentage amongst Laxalt and Cortez in each precinct.

Let  $\overline{y_{1,i}} = k_0 + k_1(x_{1,i}) + k_2(x_{1,i})^2 + k_3(x_{1,i})^3$  be the cubic regression of  $y_{1,i}$ .

For Clark County:  $k_0 = 0.0298$ ;  $k_1 = 2.24$ ;  $k_2 = -2.91$ ;  $k_3 = 1.72$

Let  $u_{0,i} = x_{1,i}$ ;  $v_{0,i} = \overline{y_{1,i}} - k_0$ , this removes the intercept advantage for Cortez.

Let  $r_{0,i} = y_{1,i} - \overline{y_{1,i}}$ , this restores the residual value.

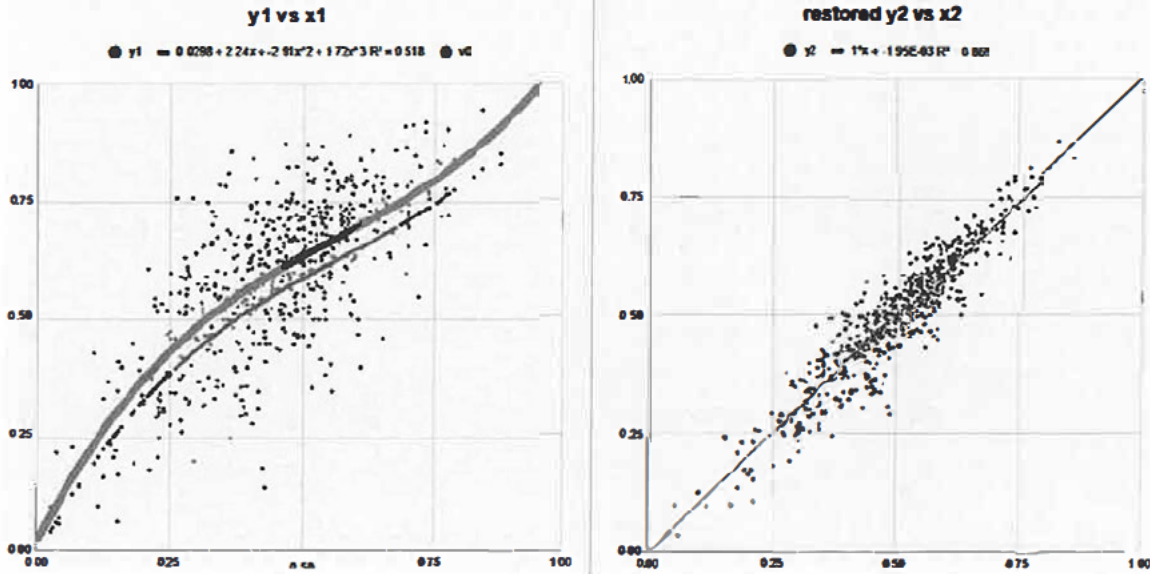
Let  $\sigma$  be the standard deviation of all  $r_{0,i}$ . If  $\theta > 5\%$ , then scale all residuals uniformly by  $\frac{5\%}{\sigma}$ .

Set  $\theta_i = \frac{\pi}{4} - \text{ARCTAN}\left(\frac{v_{0,i}}{u_{0,i}}\right)$  for all precincts.

Set  $u_{1,i} = u_{0,i} \cos\theta_i - v_{0,i} \sin\theta_i$ ;  $v_{1,i} = u_{0,i} \sin\theta_i + v_{0,i} \cos\theta_i$ . This smashes the cubic into the  $y = x$  line, while preserving the magnitude of the hijacked vector.

We now set  $(x_{2,i}, y_{2,i}) = (u_{1,i}, v_{1,i})$ . If either coordinate is above or below 0% to 100%, then we reset to 0 to 1 respectively. These are the restored percentages.

Below is the graph of the original Early Vote Percentage (horizontal axis) vs the original Election Day Percentage (vertical axis) on the left side, the restored percentages on the right side after the algorithm on the above page is executed.



Now we set  $d_i = C_1 + B_1$ , the total number of Early Ballots for Laxalt and Cortez in each precinct.

Now we set  $f_i = C_3 + B_3$ , the total number of Election Day Ballots for Laxalt and Cortez in each precinct.

Let  $s_i = (x_{2,i})(d_i)$  be Laxalt's Intercessory Early Vote in each precinct.

Let  $t_i = d_i - s_i$  be Cortez's Intercessory Early Vote in each precinct.

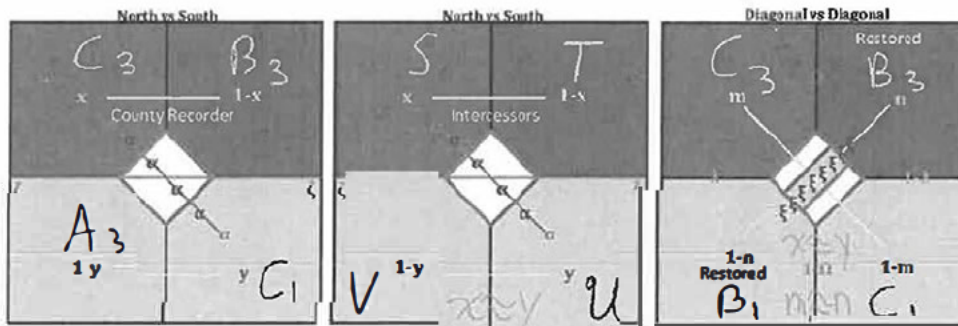
Let  $u_i = (y_{2,i})(f_i)$  be Laxalt's Intercessory Election Day Vote in each precinct.

Let  $v_i = f_i - u_i$  be Cortez's Intercessory Election Day Vote in each precinct.

Let  $Z_{1,i} = \frac{C_3}{s_i}$  be the North Side Scale in each precinct.

Let  $Z_{2,i} = \frac{C_1}{u_i}$  be the South Side Scale in each precinct.

Let  $C_{1,2,i} = z_{1,i}(s_i)$ ;  $B_{1,2,i} = z_{1,i}(t_i)$ ;  $C_{3,2,i} = z_{2,i}(u_i)$ ;  $B_{3,2,i} = z_{2,i}(v_i)$ , each rounded to the nearest integer, be the restored Early and Election Day totals of Laxalt and Cortez.





Seeing that Laxalt's  $C_1 : C_3$  ratio is nearly identical to Hyt's  $A_1 : A_3$  and Robert's  $C_1 : C_3$  ratios in the Sheriff's Primary, and that Cortez's  $B_1 : B_3$  ratio also matches, we know that is safe to import Robert's  $C_2 : (C_1 + C_3)$  ratio from the Sheriff's Primary to yield Laxalt's and Cortez's Mail-in totals in the Senate race.

Recall that  $n_{3,2,i} = \frac{c_2}{c_2 + (c_1 + c_3)}$  is Robert's Mail-in to combined Early+EDV total in the Sheriff's race.

Let  $C_{2,2,i} = \left( \frac{n_{3,2,i}}{1 - n_{3,2,i}} \right) (C_{1,2,i} + C_{3,2,i})$ , which is the product of Robert's  $n$  percentage with the sum of Laxalt's Early and Election Day Vote, be Laxalt's restored Mail-in Vote.

Let  $B_{2,2,i} = \left( \frac{n_{3,2,i}}{1 - n_{3,2,i}} \right) (B_{1,2,i} + B_{3,2,i})$ , which is the product of Robert's  $n$  percentage with the sum of Cortez's Early and Election Day Vote, be Cortez's restored Mail-in Vote.

We now have the restored totals for Laxalt and Cortez, in all modes of voting. We now proceed to restore Brown's totals.

Let  $q_{1,i} = \frac{C_{1,2,i}}{C_{1,2,i} + C_{3,2,i}}$ ;  $q_{2,i} = \frac{B_{1,2,i}}{B_{1,2,i} + B_{3,2,i}}$  be Laxalt's and Cortez's Early to EDV ratio in each precinct.

Since  $q_{1,i} \approx q_{2,i}$  across the precincts, let  $q_{3,i} = \frac{1}{2}(q_{1,i} + q_{2,i})$  be Brown's Early to EDV ratio in each precinct.

Let  $w_i = A_{1,0,i} + A_{3,0,i}$  be the sum of the County Recorder totals for Brown's Early and EDV ballots.

Let  $A_{1,1,i} = (q_{3,i})(w_i)$  be Brown's Intercessory Early Vote, rounded to the nearest integer.

Let  $A_{3,1,i} = w_i - A_{1,1,i}$  be Brown's Intercessory Early Vote.

Let  $A_{2,1,i} = \left( \frac{n_{3,2,i}}{1 - n_{3,2,i}} \right) (w_i)$ , which is the product of Robert's  $n$  percentage with the sum of Brown's Early and Election Day Vote, be Brown's intercessory Mail-in Vote.

Although we've restored the proportions of  $A_1 : A_2 : A_3$ , we do not yet know the proportion of the sum of all of Laxalt's and Cortez's ballots to Brown's. Thankfully, the solution to this is rather easy.

Let  $\Lambda_i$  be the total sum of ballots cast in each precinct in the county recorder data for Laxalt, Cortez and Brown.


Let  $\rho_i$  be the total sum of restored ballots for Laxalt and Cortez.

Let  $\Delta_i = \Lambda_i - \rho_i$ , be the difference of Laxalt's and Cortez's restored totals from the Total Ballots Cast.

Let  $\omega_i$  be the total sum of county recorder ballots for Brown.

Let  $Z_{3,i} = \frac{\Delta_i}{\omega_i}$  be the Great Scale in each precinct.

Let  $A_{1,2,i} = Z_{3,i}(A_{1,1,i})$ ;  $A_{2,2,i} = Z_{3,i}(A_{2,1,i})$ ;  $A_{3,2,i} = Z_{3,i}(A_{3,1,i})$  be the restored values of Brown's Early, Mail-in and Election Day Totals in each precinct.



In Columns O:Y on the *Original Data* sheet, the restored values can be found:  2022, Senate Restoration, Clark County, Nevada  
[https://docs.google.com/spreadsheets/d/1cXM7j9T-Pp\\_6pEWBCABC1fR5BEa8dt92RcqipHofjs0/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1cXM7j9T-Pp_6pEWBCABC1fR5BEa8dt92RcqipHofjs0/edit?usp=sharing)

Results	Brown Early	Brown Mail	Brown EDV	Cortez Early	Cortez Mail	Cortez EDV	Laxalt Early	Laxalt Mail	Laxalt EDV
Original	12409	15115	9780	22531	71055	13711	20545	27553	23449
Restored	35361	25665	39015	17845	15134	20337	20343	17270	22815

Results	Brown	Laxalt	Brown's%	Republican	Democrat	Republican %	Early%	MIV%	EDV%
Original Total	37304	71647	34.2392%	108951	107297	50.3824%	25.66%	52.64%	21.71%
Restored Total	100041	60428	62.3429%	160469	53316	75.0609%	34.40%	27.16%	38.43%




Results	Brown	Cortez	Laxalt	Brown's Margin
Original Total	37304	107297	71647	-34343
Restored Total	100041	53316	60428	+39513

Although the action of the manifolds to upset the winner of the election is always a sad sight, what is most striking about this restoration is that percentage of Republican ballots cast increased from 50.38%, which is a 1:1 ratio of Democrats to Republicans, to 75.06%, which is a 3:1 ratio of Republicans to Democrats, and demonstrates that such a massive change was indeed possible in the 2020 General Election.

Candidate	Votes	Pct.
 Adam Laxalt 	112,504	55.7%
 Sam Brown	69,519	34.4
Sharelle Mendenhall	6,149	3.0
Total reported	201,832	

Let us now subtract 11219 ballots from Adam Laxalt's Statewide total, and add 62,737 ballots to Sam Brown's Statewide total.

Of course, assuming that Washoe and the other Counties of Nevada conducted fair elections...

Candidate	Votes	Pct.
 Adam Laxalt 	101,285	<del>55.7%</del> 43.37%
 Sam Brown	132,256	<del>34.4</del> 56.63%
Sharelle Mendenhall	6,149	3.0
Total reported	201,832	

Preface Equation 0.3.1: The Trivariate Real Number Cubic Turnout Manifold, Governor

Let Candidate A be Gilbert; let Candidate B be Sisolak; let Candidate C be Lombardo.

Let  $A_1, A_2, A_3$  be Gilbert's Early Vote, Mail-in Vote and Election Day Vote respectively.

Let  $B_1, B_2, B_3$  be Sisolak's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $C_1, C_2, C_3$  be Lombardo's Early Vote, Mail in Vote and Election Day Vote respectively.

Let  $s_1 = A_1$

Let  $t_1 = (B_1 + B_3)$

Let  $u_1 = A_3$

Let  $v_1 = (C_1 + C_3)$ ; this is the input square.

Let  $R$  be the number of registered voters at the precinct.

$$m_1 = \frac{s_1}{s_1 + u_1}, n_1 = \frac{t_1}{t_1 + v_1}, \alpha_1 = \frac{s_1 + u_1}{(s_1 + u_1) + (t_1 + v_1)}, \Omega_1 = \frac{s_1 + t_1}{(s_1 + t_1) + (u_1 + v_1)}, \lambda_1 = \frac{s_1 + v_1}{(s_1 + v_1) + (u_1 + v_1)}$$

$$\xi_1 = \frac{t_1 + v_1}{s_1 + u_1} = \frac{1 - \alpha_1}{\alpha_1}, \quad w_1 = (1 - n_1) = \frac{v_1}{t_1 + v_1}, \quad \Psi = \frac{s_2 + u_2}{R}$$

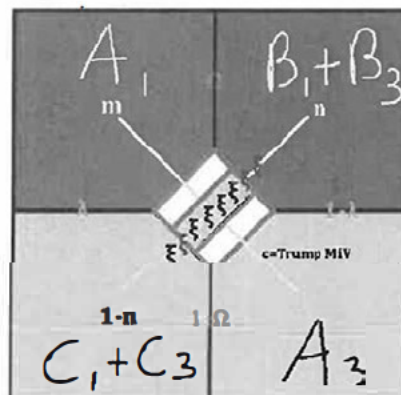
In a fair election:

$$n = \Omega + \xi(\Omega - m) = \frac{\Omega - \alpha m}{1 - \alpha} = \frac{(\xi + 1)(\Omega - \lambda) + \xi}{2\xi}, \quad w = \lambda + \xi(\lambda - m) = \frac{(\xi + 1)(\lambda - \Omega) + \xi}{2\xi}$$

In the above sequence of equalities, three of the five proportions must always be known to resolve  $n_1$ , however, in Clark County we obtain the illegal cubic manifold equations that yields  $n_1$  with  $\Omega_1$  and  $\lambda_1$  without either  $\alpha_1$  or  $m_1$ .

Even more outrageous is that the  $R^2$  of this function is rather low, until a third parameter,  $\Psi$ , is added. Taking a  $R^2$  of bivariate plane and quadratic of  $\Omega_1$  and  $\lambda_1$  unto  $n_1$  from below 0.99, all the way to 0.998. To ensure there wasn't a trivial correlation with  $\Psi$ , artificially increasing the  $R^2$  value, the number of registered voters was randomized across the precincts in tens of millions of simulations, without changing the number of ballots cast, and there was no significant increase in  $R^2$  in any of these trials. Thus, this formula works with, and only with, the precise number of registered voters present in each Clark County precinct.

**Opposition: Diagonal vs Diagonal**



The trivariate cubic equation will have  $w_1 = 1 - n_1$  isolated on the right hand side. In the diagram on the previous page,  $w_1$  is the Light Blue Diagonal Percentage, that is the percentage share of ballots that belong to  $v_1$  amongst  $t_1$  and  $v_1$ ,  $w_1 = \frac{v_1}{t_1+v_1}$ , in other words, this is the share of Early and Election Day ballots that Lombardo shall receive against the number of Early and Election Day ballots of both Lombardo and Sisolak.

As to how we discern between whether or not  $t_1$  or  $v_1$  was the input square, is to compare the ratios of  $C_1 : C_3$  and  $B_1 : B_3$  to Hyt's  $A_1 : A_3$  ratio in the Sheriff's race. From this we learn that the histogram and quantile plots of  $C_1 : C_3$  have an identical match to Hyt's results in the Sheriff's race, while the histogram and quantile plots Sisolak's  $B_1 : B_3$  ratios are alien, furthermore that there is zero correlation between Sisolak's  $B_1 : B_3$  ratios and either Hyt's  $A_1 : A_3$  or Lombardo's  $C_1 : C_3$  ratios (also recall that Hyt's  $A_1 : A_3$  ratio was authentic, since Hyt's  $A_1, A_3$  were logically compelled to be the only authentically input source).

As to the presence of the  $\Psi$  parameter, it informs us that this Equation determines the voter turnout in each precinct, and this the general form of this trivariate cubic is identical to the Senate Race (but with a vastly different set of constants), which also invoked the same  $\Psi$  parameter, part of the NeuralNetwork's cost function was to make most similar the Republican and Democrat turnouts of the Senate and the Governor Race, while adhering to the proportion of Early to Mail-in to Election Day ballots made manifest by the Sheriff Race.

Once the  $w_1$  proportion is illegally resolved from the cubic surface of  $\Omega_1, \lambda_1$  and  $\Psi$ , both  $m_1$  and  $\alpha_1$  are compelled into existence, since in any election, fair or unfair:

$$W = \frac{(\xi+1)(\lambda-\Omega)+\xi}{2\xi} \Rightarrow \xi = \frac{\Omega-\lambda}{(\lambda-\Omega+1-2w)}; m = \lambda + \xi(\lambda - w); w = 1 - n = \frac{v}{t+v}$$

Since the proportions,  $w_1, \Omega_1, \lambda_1$  are known, it compels the value of  $\xi_1$ , which is proportion of Blue Diagonal to Red Diagonal Ballots, that is  $\xi_1 = \frac{t_1+v_1}{s_1+u_1}$ , is now forced, and since  $\alpha_1 = \frac{1}{1+\xi_1}$ , then Gilbert's aggregate percentage share of the ballots in this ballot set is also compelled (Gilbert is the algorithmically intended loser).

Since  $\xi_1, w_1, \lambda_1$  are known, it forces the value of  $m_1$ , which is the percentage of  $s_1$  ballots amongst  $s_1$  and  $u_1$  and tells us proportion of  $s_1$  to  $u_1$  ballots via the identity:  $\frac{s_1}{u_1} = \frac{m_2}{1 - m_2}$ . Since the value of  $t_1$  is known (the input square), the values of  $s_2, u_2$  and  $v_2$  are also known, as the pairwise proportions betwixt them have all been forced.

The illegal trivariate cubic equation is as follows, with an  $R^2 = 0.9988018849$  (video on next is the 4D surface that the Clark County precincts rest upon when their  $\Omega, \lambda, w$  values are plotted in  $x, y, z$  space respectively, with  $\Psi$  acting as the fourth dimension) The residual values have a left-tailed Poisson distribution, and the residual errors come from, and only from, whether or not they rounded the illegally calculated vote totals up or down to the nearest integer.

$$w = \sum_{k=0}^{k=3} \left( \sum_{j=0}^{j=k} \left( \sum_{t=0}^{t=k-j} \left( (z_{k,j,((k-j)-t)}) (\Psi^{(k-j)-t}) (\Omega^t) (\lambda^j) \right) \right) \right); z_{k,j,t} \in \mathbb{R}$$

$z_{0,0,0}$	$z_{1,0,0}$	$z_{1,0,1}$	$z_{1,1,0}$		
1.23432200675597	-12.7924428834813	-4.52074189309496	0.86645936279092		
$z_{2,0,0}$	$z_{2,0,1}$	$z_{2,0,2}$	$z_{2,1,0}$	$z_{2,1,1}$	$z_{2,2,0}$
-8.25612835213541	14.8922383673489	5.72812721610535	36.574964039959	2.89158378064167	-2.85296044650022
$z_{3,0,0}$	$z_{3,0,1}$	$z_{3,0,2}$	$z_{3,0,3}$		
605.670185368042	37.1523531624116	-8.5639772178256	-2.43329977143731		
$z_{3,1,0}$	$z_{3,1,1}$	$z_{3,1,2}$	$z_{3,2,0}$	$z_{3,2,1}$	$z_{3,3,0}$
-100.901214897166	-25.1093777001369	-3.38150119705824	-14.9393149687676	1.30270575103349	1.67597666609799

*Preface Equation 0.3.2; The Bivariate Real Number Quadratic Mail in Manifold, Governor*

Let Candidate A be Gilbert; let Candidate B be Sisolak; let Candidate C be Lombardo.  
 Let  $A_1, A_2, A_3$  be Gilbert's Early Vote, Mail in Vote and Election Day Vote respectively  
 Let  $B_1, B_2, B_3$  be Sisolak's Early Vote, Mail in Vote and Election Day Vote respectively  
 Let  $C_1, C_2, C_3$  be Lombardo's Early Vote, Mail in Vote and Election Day Vote respectively.  
 Let  $s_2 = B_2$   
 Let  $t_2 = (A_1 + C_3) + A_2$ ;  $A_2$  is the output;  $A_1, C_3$  were already illegally calculated.  
 Let  $u_2 = (B_1 + B_3)$ , this is the input square,  $B_1, B_3$  were already illegally calculated.  
 Let  $v_2 = (C_1 + A_3) + C_2$ ;  $C_2$  is the output;  $C_1, A_3$  were already illegally calculated.  
 Let  $R$  be the number of registered voters at the precinct.

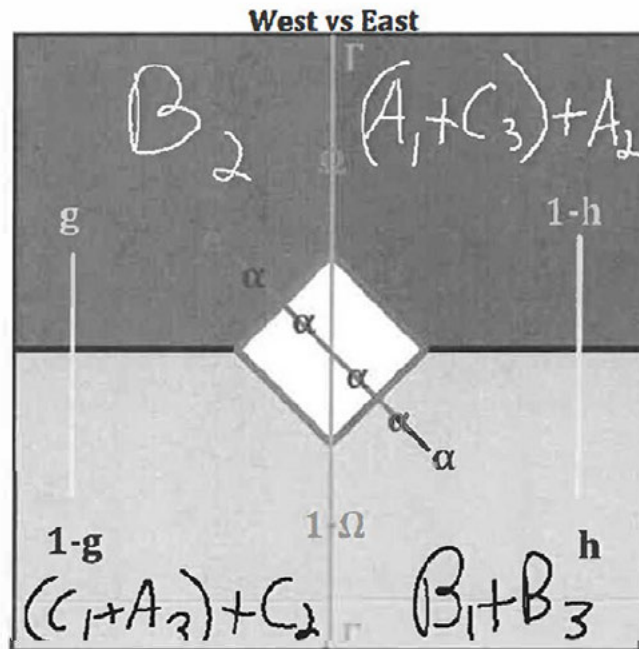
$$g_2 = \frac{s_2}{s_2+v_2}, h_2 = \frac{u_2}{u_2+t_2}, \alpha_2 = \frac{s_2+u_2}{(s_2+u_2)+(t_2+v_2)}, \Omega_2 = \frac{s_2+t_2}{(s_2+t_2)+(u_2+v_2)}, \lambda_2 = \frac{s_2+v_2}{(s_2+v_2)+(u_2+v_2)}$$

$$\Gamma_2 = \frac{u_2+t_2}{s_2+v_2} = \frac{1-\lambda_2}{\lambda_2}, \quad w_2 = (1 - h_2) = \frac{t_2}{u_2+t_2}$$

In a fair election:

$$g = \alpha + \Gamma^{-1}(\alpha - h) = \frac{\Omega - \alpha \Gamma}{1 - \alpha} = \frac{-(\xi+1)(\Omega-\lambda)+\xi}{2\xi}; \quad w = \Omega + \Gamma(\Omega - g) = \frac{(\Gamma+1)(\Omega-\alpha)+\Gamma}{2\Gamma}$$

In the above sequence of equalities, three of the five proportions must always be known to resolve  $g_1$ , however, in Clark County we obtain the illegal cubic manifold equations that yields  $g_1$  with  $h_1$  and  $\alpha_1$  without either  $\Gamma_1$  nor  $\Omega_1$ .



The bivariate quadratic equation will have  $g$  isolated on the right-hand side. In the diagram on the previous page,  $g$  is the West Side Percentage, that is the percentage share of ballots that belong to  $s$  amongst  $s$  and  $v$ ,  $g = \frac{s}{s+v}$ .

Once  $g$  is illegally resolved from the quadratic surface of  $h, \alpha$ , both  $\Gamma$  and  $\Omega$  are compelled into existence, since in any election, fair or unfair:

$$g = \alpha + \Gamma^{-1}(\alpha - h) \Rightarrow \Gamma = \frac{g - \alpha}{\alpha - h}; \quad g = \Omega + \Gamma^{-1}(\Omega - w) \Rightarrow \Omega = \frac{g + \Gamma w}{\Gamma + 1} = \frac{g + \Gamma(1 - h)}{\Gamma + 1}$$

Since  $h_2$  is known, and  $u_2$  is the input square, then  $t_2 = \frac{h}{1-h}(u_2)$  and is therefore known. Thus  $A_2$ , which is Gilbert's Mail-in Vote, is known known via the subtraction:  $A_2 = v_2 - (A_1 + C_3)$ .

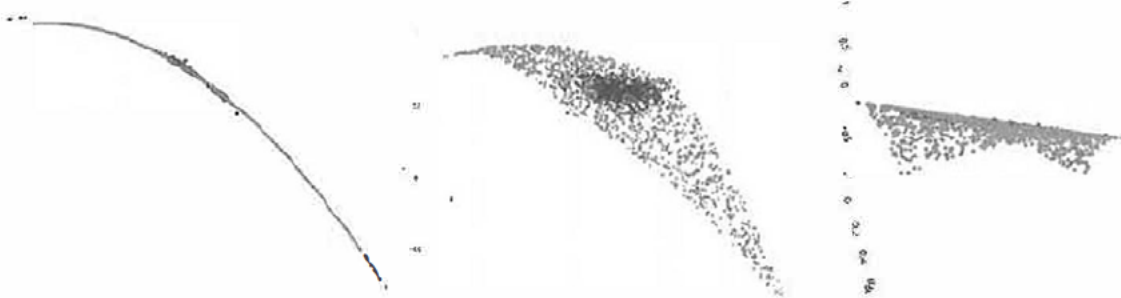
Since the proportions,  $g_2, h_2, \alpha_2$  are known, it forces the value of  $\Gamma_2$  which is proportion of East Side Ballots to West Side Ballots, that is  $\Gamma_2 = \frac{u_2 + t_2}{s_2 + v_2}$ , which means we also know  $\Gamma_2^{-1} = \frac{s_2 + v_2}{u_2 + t_2}$ , which is the proportion of West Side to East Side ballots, thus  $(B_2) + ((C_1 + A_3) + C_2) = s_2 + v_2 = \Gamma_2^{-1}(u_2 + v_2)$ . Knowing the value of  $g_2$  allows us to split this the sum of  $s_2$  and  $v_2$ , that is:  $B_2 = s_2 = g_2(s_2 + v_2)$ , which is Sisolak's Mail in Vote;  $t_2 = (1 - g_2)(s_2 + v_2)$ ;  $C_2 = t_2 - (C_1 + A_3)$ , which is Lombardo's Mail-in Vote.

The illegal bivariate quadratic equation is as follows, with an  $R^2 = 0.9988816647$

$$g_2 = k_0 + k_1 \alpha_2 + k_2 h_2 + k_3 \alpha_2^2 + k_4 h_2 \alpha_2 + k_5 h_2^2$$

$k_0$	$k_1$	$k_2$	$k_3$	$k_4$	$k_5$
0.005070874159	1.535448595	0.549045972	-0.6614892743	1.303368815	-0.632192474

The below image is the 3D curved manifold (red) upon which the precincts (blue) lay upon.



As to why the Neural Network chose to invoke the same Trivariate Turnout Manifold as the Senate race in the first of the equations, yet opted to follow up with quadratic of  $g = f(h, \alpha)$  instead of  $g = f(\alpha, \Omega)$  shall most likely remain as mysterious as the thought processes which incited the Neural Network, Leela Zero, to execute her Immortal Queen Sacrifice against Stockfish.

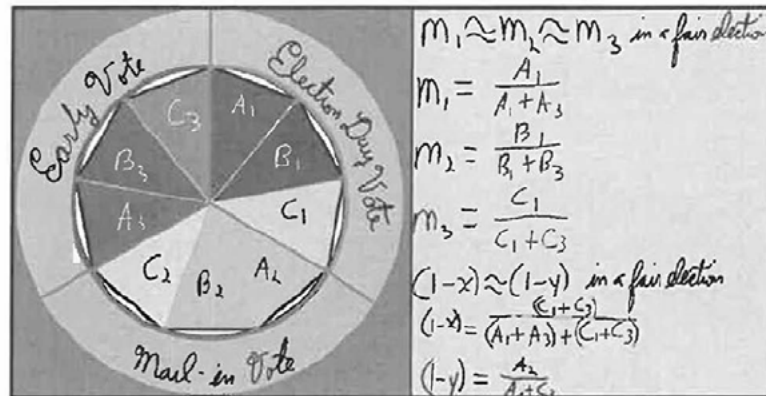
<https://youtu.be/ANhT0UeOPt8>

Leela Chess Zero's Immortal Queen Sacrifice

[https://tcec-chess.com/articles/Sufi\\_18\\_-\\_Sajder.pdf](https://tcec-chess.com/articles/Sufi_18_-_Sajder.pdf)

TCEC Season 18 Superfinal round 65





*Preface Restoration Algorithm 0.2.3: Restoring the Governor's Race*

2022, Governor Restoration, Clark County, Nevada

[https://docs.google.com/spreadsheets/d/11NLDyJh-Cr0FzQj4d\\_RYCuBilJM0h7Ov4F5YGrVBbM4/edit#usp=sharing](https://docs.google.com/spreadsheets/d/11NLDyJh-Cr0FzQj4d_RYCuBilJM0h7Ov4F5YGrVBbM4/edit#usp=sharing)

Since we have the advantage of the restored Sheriff's Race, the restoration of the Governor's race is far easier, as we can import the ratio of Early to Mail-in to Election Day ballots in each precinct.

Since the second manifold equations informs us that all mail-in totals,  $A_2, B_2, C_2$ , are illegitimate outputs, we first act to restore the Early and Election Day Totals, and as there is no correlation between Lombardo's and Gilbert's Election Day, Early and Mail-in Percentages, we first restore the relationship between Lombardo and Sisolak, since they are correlated, and we know Lombardo's Early and Election Day ratio to not only be preserved, but also identical to Hyt's Early to Election Day ratio in the Sheriff's race.

Is it not surprising that the three candidates, from different races, whose Early to Election Day Ratios were preserved as inputs into their respective manifolds, have nearly identical values (Hyt, Laxalt and Lombardo).

Let  $x_{1,i} = \frac{C_1}{C_1+B_1}$  be Lombardo's Early Vote Percentage amongst Lombardo and Sisolak in each precinct.

Let  $y_{1,i} = \frac{A_3}{A_3+B_3}$  be Lombardo's Election Day Percentage amongst Lombardo and Sisolak in each precinct.

Let  $\overline{y_{1,i}} = k_0 + k_1(x_{1,i}) + k_2(x_{1,i})^2 + k_3(x_{1,i})^3$  be the cubic regression of  $y_{1,i}$ .

For Clark County:  $k_0 = 0.115$ ;  $k_1 = 1.1$ ;  $k_2 = 0.238$ ;  $k_3 = 0.164$

Let  $u_{0,i} = x_{1,i}$ ;  $v_{0,i} = \overline{y_{1,i}} - k_0$ , this removes the intercept advantage for Sisolak.

Let  $r_{0,i} = y_{1,i} - \overline{y_{1,i}}$ , this restores the residual value.

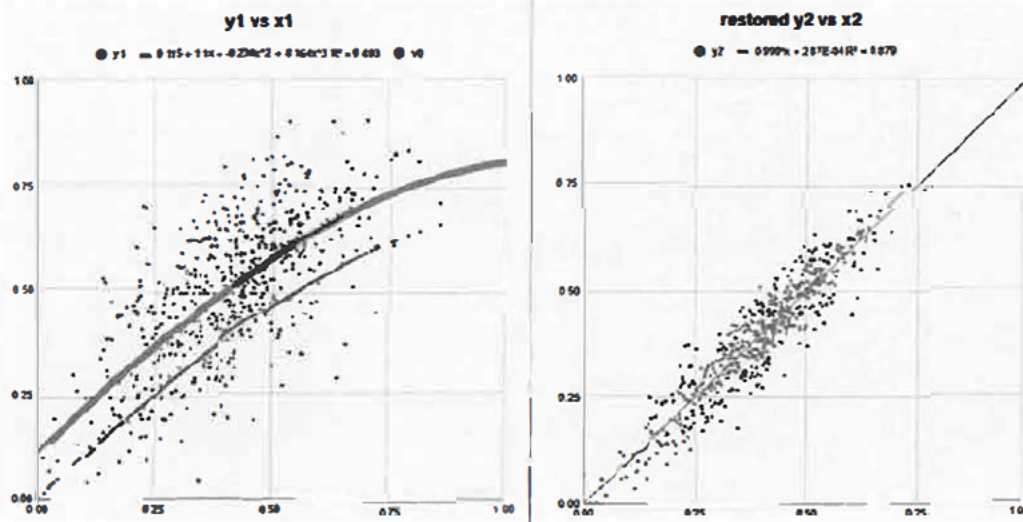
Let  $\sigma$  be the standard deviation of all  $r_{0,i}$ . If  $\theta > 5\%$ , then scale all residuals uniformly by  $\frac{5\%}{\sigma}$ .

Set  $\theta_i = \frac{\pi}{4} - \text{ARCTAN}\left(\frac{v_{0,i}}{u_{0,i}}\right)$  for all precincts.

Set  $u_{1,i} = u_{0,i} \cos \theta_i - v_{0,i} \sin \theta_i$ ;  $v_{1,i} = u_{0,i} \sin \theta_i + v_{0,i} \cos \theta_i$ . This smashes the cubic into the  $y = x$  line, while preserving the magnitude of the hijacked vector.

We now set  $(x_{2,i}, y_{2,i}) = (u_{1,i}, v_{1,i})$ . If either coordinate is above or below 0% to 100%, then we reset to 0 to 1 respectively. These are the restored percentages.

Below is the graph of the original Early Vote Percentage (horizontal axis) vs the original Election Day Percentage (vertical axis) on the left side, the restored percentages on the right side after the algorithm on the above page is executed.



Now we set  $d_i = C_1 + B_1$ , the total number of Early Ballots for Lombardo and Sisolak in each precinct.

Now we set  $f_i = C_3 + B_3$ , the total number of Election Day Ballots for Lombardo and Sisolak in each precinct.

Let  $s_i = (x_{2,i})(d_i)$  be Lombardo's Intercessory Early Vote in each precinct.

Let  $t_i = d_i - s_i$  be Sisolak's Intercessory Early Vote in each precinct.

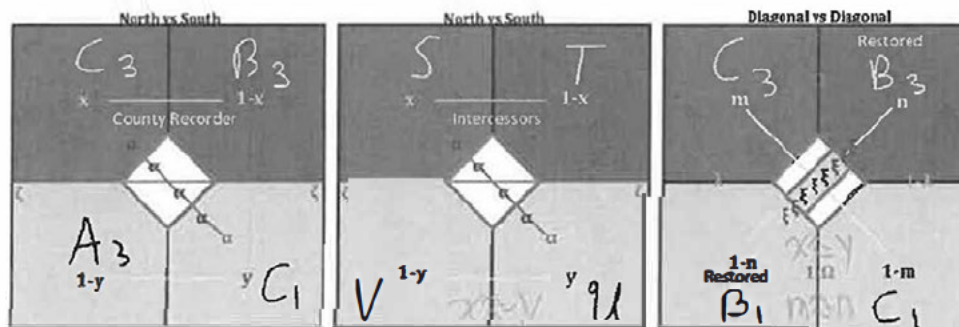
Let  $u_i = (y_{2,i})(f_i)$  be Lombardo's Intercessory Election Day Vote in each precinct

Let  $v_i = f_i - u_i$  be Sisolak's Intercessory Election Day Vote in each precinct

Let  $Z_{1,i} = \frac{C_3}{s_i}$  be the North Side Scale in each precinct.

Let  $Z_{2,i} = \frac{C_1}{u_i}$  be the South Side Scale in each precinct.

Let  $C_{1,2,i} = z_{1,i}(s_i)$ ;  $B_{1,2,i} = z_{1,i}(t_i)$ ;  $C_{3,2,i} = z_{2,i}(u_i)$ ;  $B_{3,2,i} = z_{2,i}(v_i)$ , each rounded to the nearest integer, be the restored Early and Election Day totals of Lombardo and Sisolak



Seeing that Lombardo's  $C_1 : C_3$  ratio is nearly identical to Hyt's  $A_1 : A_3$  and Robert's  $C_1 : C_3$  ratios in the Sheriff's Primary, and that Sisolak's  $B_1 : B_3$  ratio also matches, we know that is safe to import Robert's  $C_2 : (C_1 + C_3)$  ratio from the Sheriff's Primary to yield Lombardo's and Sisolak's Mail-in totals in the Senate race.

Recall that  $n_{3,2,i} = \frac{c_2}{c_1 + (c_1 + c_3)}$  is Robert's Mail-in to combined Early+EDV total in the Sheriff's race.

Let  $C_{2,2,i} = \left( \frac{n_{3,2,i}}{1 - n_{3,2,i}} \right) (C_{1,2,i} + C_{3,2,i})$ , which is the product of Robert's  $n$  percentage with the sum of Lombardo's Early and Election Day Vote, be Lombardo's restored Mail-in Vote.

Let  $B_{2,2,i} = \left( \frac{n_{3,2,i}}{1 - n_{3,2,i}} \right) (B_{1,2,i} + B_{3,2,i})$ , which is the product of Robert's  $n$  percentage with the sum of Sisolak's Early and Election Day Vote, be Sisolak's restored Mail-in Vote.

We now have the restored totals for Lombardo and Sisolak, in all modes of voting. We now proceed to restore Gilbert's totals.

Let  $q_{1,i} = \frac{C_{1,2,i}}{C_{1,2,i} + C_{3,2,i}}$ ,  $q_{2,i} = \frac{B_{1,2,i}}{B_{1,2,i} + B_{3,2,i}}$  be Lombardo's and Sisolak's Early to EDV ratio in each precinct.

Since  $q_{1,i} \approx q_{2,i}$  across the precincts, let  $q_{3,i} = \frac{1}{2}(q_{1,i} + q_{2,i})$  be Gilbert's Early to EDV ratio in each precinct.

Let  $W_i = A_{1,0,i} + A_{3,0,i}$  be the sum of the County Recorder totals for Gilbert's Early and EDV ballots.

Let  $A_{1,1,i} = (q_{3,i})(W_i)$  be Gilbert's Intercessory Early Vote, rounded to the nearest integer.

Let  $A_{3,1,i} = W_i - A_{1,1,i}$  be Gilbert's Intercessory Early Vote.

Let  $A_{2,1,i} = \left( \frac{n_{3,2,i}}{1 - n_{3,2,i}} \right) (W_i)$ , which is the product of Robert's  $n$  percentage with the sum of Gilbert's Early and Election Day Vote, be Gilbert's intercessory Mail-in Vote.

Day Vote, be Gilbert's intercessory Mail-in Vote.

Although we've restored the proportions of  $A_1 : A_2 : A_3$ , we do not yet know the proportion of the sum of all of Lombardo's and Sisolak's ballots to Gilbert's. Thankfully, the solution to this is rather easy.

Let  $\Lambda_i$  be the total sum of ballots cast in each precinct in the county recorder data for Lombardo, Sisolak and Gilbert.


Let  $\rho_i$  be the total sum of restored ballots for Lombardo and Sisolak.

Let  $\Delta_i = \Lambda_i - \rho_i$  be the difference of Lombardo's and Sisolak's restored totals from the Total Ballots Cast.

Let  $\omega_i$  be the total sum of county recorder ballots for Gilbert.

Let  $Z_{3,i} = \frac{\Delta_i}{\omega_i}$  be the Great Scale in each precinct.

Let  $A_{1,2,i} = Z_{3,i}(A_{1,1,i})$ ;  $A_{2,2,i} = Z_{3,i}(A_{2,1,i})$ ;  $A_{3,2,i} = Z_{3,i}(A_{3,1,i})$  be the restored values of Gilbert's Early, Mail-in and Election Day Totals in each precinct.

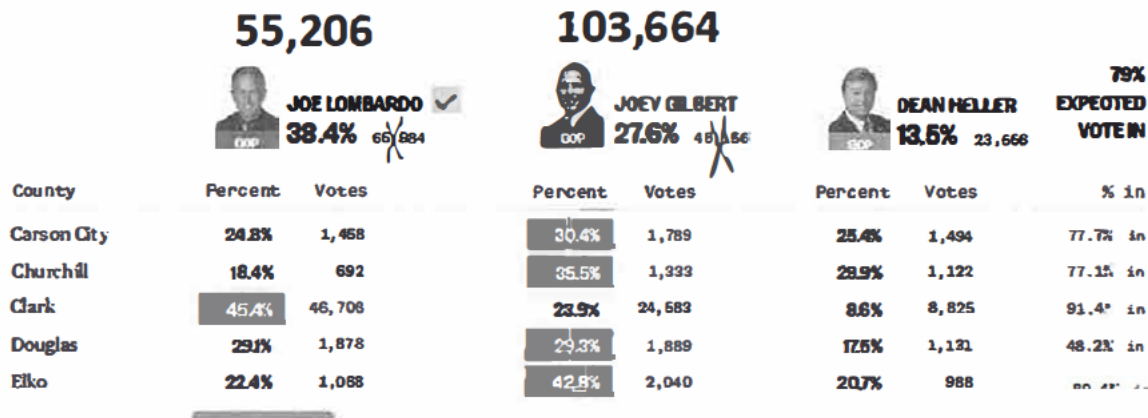
In Columns O:Y on the *Original Data* sheet, the restored values can be found:  2022, Senate Restoration, Clark County, Nevada  
[https://docs.google.com/spreadsheets/d/1cXM7j9T-Pp\\_6pEWB-CABCIfr5EE8dt92RcqpHofjS0/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1cXM7j9T-Pp_6pEWB-CABCIfr5EE8dt92RcqpHofjS0/edit?usp=sharing)

Results	Gilbert Early	Gilbert Mail	Gilbert EDV	Sisolak Early	Sisolak Mail	Sisolak EDV	Lombardo Early	Lombardo Mail	Lombardo EDV
Original	8802	7652	11850	22048	70327	13441	16420	24238	15203
Restored	32780	21489	29543	22516	17591	21995	16412	12489	15182

Results	Gilbert	Sisolak	Lombardo	Republican	Democrat	Republican %	Early%	MiV%	EDV%
Original Total	28304	105818	65861	84165	105816	44.30%	24.88%	53.80%	21.31%
Restored Total	83812	62102	44083	127895	62102	67.31%	37.74%	27.14%	35.12%

Results	Gilbert	Sisolak	Lombardo	Gilbert Margin
Original Total	28304	105818	55861	-27557
Restored Total	83812	62102	44083	39729

Although the action of the manifolds to upset the winner of the election is always a sad sight, what is most striking about this restoration is that percentage of Republican ballots cast increased from 50.38%, which is a 1:1 ratio of Democrats to Republicans, to 75.06%, which is a 3:1 ratio of Republicans to Democrats, and demonstrates that such a massive change was indeed possible in the 2020 General Election.



# EXHIBIT B

# EXHIBIT B



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# Dr. Oliver A. Hemmers

[REDACTED]  
[REDACTED]  
[REDACTED] [REDACTED]

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July 02, 2022

Craig A. Mueller, Esq.  
Mueller and Associates  
808 South Seventh Street  
Las Vegas, Nevada 89101

Re: Request for an expert opinion on the 'Clark County, 2022, Governor Primary Precinct Analysis' Summary

Dear Mr. Mueller:

I was initially contacted on June 30, 2022 and was requested to provide my expert opinion as a mathematically trained physicist on the Summary of a report on the Clark County, 2022, Governor Primary Precinct Analysis.

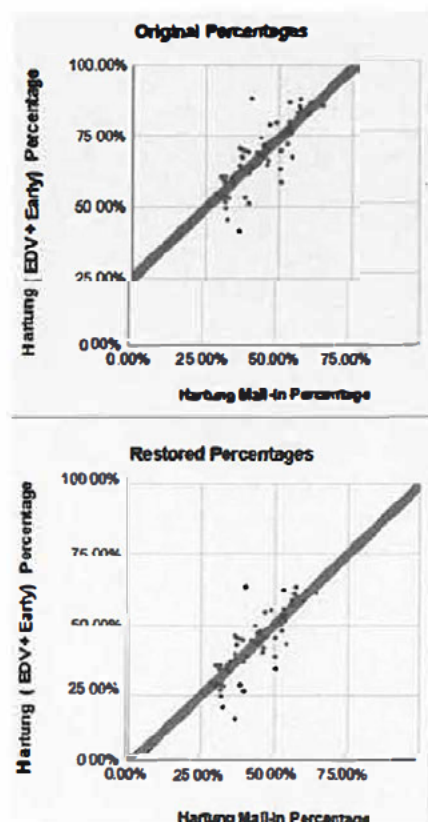
My educational background is in quantum physics, specifically atomic and molecular physics, and I received a PhD in that field from the Institute for Radiation and Nuclear Physics at the Technical University in Berlin, Germany (1993). I worked in my area of research for 27 years and designed/built unique elementary particle analyzers and containment vessels capable of spectroscopically analyzing gaseous, liquid and solid samples for photo absorption, electron and ion emissions including partial-differential cross sections within high-vacuum experimental chambers. The required data analysis involved statistical particle distribution and regression analysis, and mathematical data interpretation techniques to discern real physics-based data from experimental artifacts, fake signals, and electronic interferences.

## **Opinion on the Summary Report titled 'Clark County, 2022, Governor Primary Precinct Analysis'**

- 1) The paper under review [1] claims that a mathematical analysis can determine the difference between a fair and an unfair election, and where the unfair election is an election for which the results are predetermined algorithmically. It is assumed that causality is a valid assumption during an election where the effect cannot precede the cause, more specific that knowing the aggregate percentage of votes for a candidate cannot precede the election day and mail-in percentages. This might seem to be a trivial assumption, but it lies at the very core of the analysis.
- 2) In the preface, two examples are presented for a bivariate analysis [2] related to election results. A bivariate (Two-Variables) is described as follows [2]: The analysis of two specific variables to determine the empirical relationship present between them is referred to as bivariate analysis and it is considered to be one of the simplest forms of quantitative analysis. It is of utmost help when it comes to testing simple hypotheses of association and determining the extent to which it becomes easier to predict the value of one particular variable, given the value of the other variable is already known. There are three main types of bivariate analysis:
  - a. **Scatter Plots:** It makes use of dots to represent the values for two different numeric variables. In other words, it provides us with a visual idea of what pattern the variables are following.



- b. **Regression Analysis:** This involves a wide range of tools that can be utilized to determine just how the data points might be related. It tends to provide us with an equation for the curve/line along with giving us the correlation coefficient.
  - c. **Correlation Coefficients:** This shows how one particular variable moves about with relation to another.
- 3) In certain cases of bivariate data, one variable is said to determine or influence the other one. These two types of variables are distinguished as independent and dependent variables. The former refers to a situation wherein neither of the variables is considered to be dependent on each other.[2] A simple example is the relationship that exists between teenagers reading (independent variable) and their scores in English (dependent variable). **Cause -> Effect**
  - 4) The paper specifically uses the bivariate real number plane formula and the West vs. East paradigm to calculate the results as shown in [3,4].
  - 5) The Preface concludes with a brief explanation how the election results were successfully restored for the 2020 Election of Hartung vs. Baker [4]. The data and calculations are shown in [4]. The data can be shown in form of two graphs, one is the original data (top), and one is the restored data (bottom).

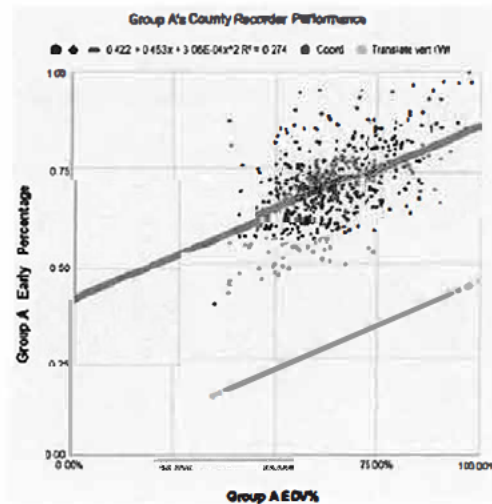
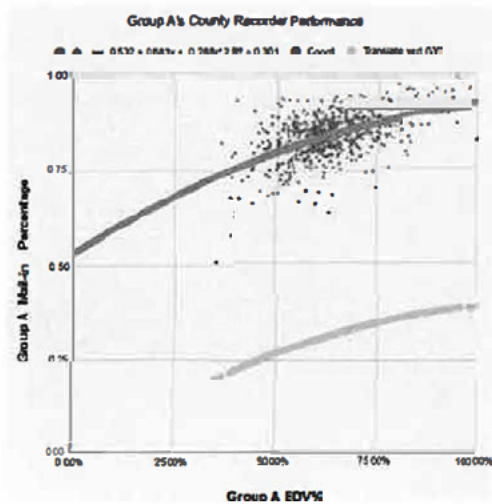


The blue dots represent the results of the individual election precincts, and the red curve is a polynomial (quartic) fit through the blue data cluster. The fact that in the top graph the red line does not end at 0%/0% as shown in the bottom graph, means that there is a problem with the election results. In a fair election, the sum of the Early Day and Election Day votes should produce very similar results to the Mail-in votes when the regression analysis has a high confidence (usually called  $R^2$ ), meaning the x-values and the y-values should be similar (when x is 10% then y should be close to 10% as well) and not off by 25%.

- a) Even when Hartung received 0% of the Mail-in votes, he would “magically” receive 25% of the combined Election Day and Early Votes. This is impossible. Also, should Hartung receive 100%

of the Election Day and Early Votes then Baker would “magically” receive 25% of the Mail-in votes (100% minus his 75% =25%). Again, this is not possible in a fair election.

- b) Even though this discrepancy is not proof of fraud nor an explanation of what type of fraud rigged the election, it is still possible to correct the numbers and restore the true values, as if there was a fair election. The result is shown in the bottom picture and the calculated values can be found in [4].
  - c) This method of the applied Election Restoration Algorithm has been successfully used over the past two years not only on Hartung vs. Baker but also for Maricopa, Philadelphia, Atlanta, Dallas and Tarrant, Macomb and Oakland, as well as the last federal election.
- 6) The same methods [5] that have been honed and applied to various elections over the past two years, have been applied to the Group B vs Group A candidates in the 2022 Gubernatorial Primary [6].



- a. As an example, the Group A data is shown in the two figures above. The blue dots are from [6], the red curve is a polynomial fit through the blue dots and the pink line is an extrapolation of the polynomial fit using the shown equation in the graph. Both have the Election Day vote percentages on the x-axis. As for the y-axis, the left graph has the Mail-in percentages and the right graph the Early vote percentages. It can be seen that the y-intercepts and the polynomial spines between the two graphs are quite different. Reference [1] shows the restored positions of Group A’s Election Day percentage which are virtually the same in both graphs [1].
- b. In order to be able to restore the original data it is important to identify what part of the data is authentic in order to make the corrections to the illegal data. As written in [1], for the illegal equations that govern the percentages of ballots cast between Group B vs Group A, the input percentage is  $h$  (as shown on page 3 in [1]), which is equal to Group B’s Mail-in vote divided by Group A’s combined Early and Election Day votes. From that we know that Group A’s Mail-in vote and Group A’s Early and Election Day votes are authentic.
- c. Therefore, you can restore Group A’s and Group B’s totals and then multiply the individual vote totals of each candidate in each group by the net proportions of change between collectives of Group A and B in each precinct.

## Summary

- 1) Reference [1] and the included references therein describe how using a restoration algorithm that is based on the well-established mathematical Bivariate Analysis [2] in particular the Bivariate Real Number Plane Formula [5], which has been applied numerous times over the past two years for many US county elections can also be applied to the recent 2022 Gubernatorial Primary in Nevada.

- 2) For the mathematical restoration of the original data, it is not necessary to claim fraud nor to know any specifics of the fraud.
- 3) The applied restoration of the official election results shows a significant difference between original and restored election data for all candidates reviewed.

## **Professional Opinion and Basis of these Opinion**

It is my professional opinion that the reviewed paper [1] including the references therein is based on established statistics and statistical analyses and correct in its described methods that have been applied numerous times over the past two years. It is also evident that a restoration of the 2022 Gubernatorial Primary election data is necessary in order to correct for obvious major flaws in the original data. This restoration will affect all candidates' election results significantly.

## **Information considered in Formulating the Above Opinions**

1. "Clark County, 2022, Governor Primary Precinct Analysis; Summary".
2. [Bivariate Analysis - Types and Examples \(vedantu.com\)](#)
3. [Restored Nevada 2022 Primary Elections - Google Sheets](#)
4. [Restored Washoe Elections - Google Sheets](#)
5. [Clark and Washoe Precinct Analysis - Google Docs](#)
6. [Clark County, NV \(clarkcountynv.gov\)](#)

## **Attachments**

Curriculum Vitae of Dr. Oliver Hemmers

## **Compensation**

My fee schedule is \$200.00 per hour plus expenses. To review all materials to date and prepare this report, I have spent 11 hours. I have not been compensated, yet.

Should you require clarification of any of the material contained herein, please do not hesitate to contact me.

Thank you for the opportunity to assist you in this matter.

Sincerely,

Dr. Oliver A. Hemmers

- 2) For the mathematical restoration of the original data, it is not necessary to claim fraud nor to know any specifics of the fraud.
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Sincerely,



Dr. Oliver A. Hemmers

# EXHIBIT C

# EXHIBIT C

## Curriculum Vitae Dr. Oliver A. Hemmers

### Education, Research, and Leadership Experience

#### **1. Education**

Dr. (rerum naturalium) in Physics, "Correlation Effects in small Molecules", Technische Universität Berlin, Germany, 1993, Advisor: Professor Dr. Uwe E. Becker – Magna Cum Laude

Diplom (M. Sci.) in Physics, "Studies of Correlation Effects in Molecules with Synchrotron Radiation", Technische Universität Berlin, Germany, 1988, Advisor: Professor Dr. Uwe E. Becker

#### **2. Non-Academic Positions**

2020 – Present	Founder and Owner of Infinity Health Solutions – Consulting and Broker Services
2015 – 2021	Vice President for Operations at Infinity Capital Management – Health Care Finance
2015 – Present	President of Skybot Challenge a 501(c)3 non-Profit for STEM Education
2014 – 2020	Advisor to the Trans Global Business and Conventions Agency
2002 – Present	Co-Founder and Director at GPmicro, a Cloud Backup Company
2001 – 2021	Director, Member of the Board, Infinity Capital Management
2012 – 2016	Chairman of the Board for the Nevada Alliance for Defence, Energy, and Business
2010 – 2013	Advisory Board Member, Longenecker and Associates, Inc.
2009 – 2012	Scientific Advisory Board Member and Reviewer, Nevada Institute for Renewable Energy Commercialization (NIREC)
2009 – 2012	Member of the Green Technology Committee of the Nevada Development Authority
2002 – 2012	Co-founder, Director, and Member of the Board, Gruintine Pueche, Inc.

#### **3. Academic and Administrative Positions**

2014 – 2016	PhD Thesis Advisory Committee Member
2013 – 2014	Research Project Director for the Vice President for Research, UNLV
2011 – 2014	Director of the UNLV Initiative for High-Energy X-Ray Applications (HEXA)
2011 – 2014	Associate Director of the Nevada System of Higher Education EPSCoR Program
2011 – 2014	DOE EPSCoR Project Director for the State of Nevada
2008 – 2013	Executive Director, Harry Reid Center for Environmental Studies, UNLV
2009 – 2011	Acting Director, Marjorie Barrick Museum, UNLV
2009 – 2010	Executive Director, Transportation Research Center, UNLV
2006 – 2009	Director, Office of Strategic Energy Programs, UNLV
2009 – 2014	Research Professor, UNLV
2006 – 2009	Associate Research Professor, Department of Chemistry, UNLV
1998 – 2006	Assistant Research Professor, Department of Chemistry, UNLV
1994 – 1998	Postdoctoral Fellow, Department of Chemistry, UNLV
1993 – 1994	Postdoctoral Fellow at the Surface Science Division, Fritz-Haber-Institute of the Max-Planck Society in Berlin, Germany
1988 – 1993	Research Assistant, Department of Physics, Technical University Berlin, Germany

#### **4. Academic Service**

2013 – 2014	Accelerator Facility Radiation Safety Committee
2012	Member of the Harry Reid Silver State Award Review Committee
2011 – 2014	Chair of the UNLV Accelerator Project Advisory Committee
2011 – 2013	Member (ex-officio) of the UNLV Research Council
2010 – 2012	Member of the UNLV Sustainability Council



2009 – 2013	Member on the Council on Centers, Institutes, Museums, and Laboratories
2008 – 2013	Member of the UNLV Academic Council
2008 – 2013	Member of the UNLV Deans' Council
2008 – 2013	Chair of the HRC Executive Committee

### **5. Research Activities & Interests**

- Optimization of biodiesel/biofuel production processes
- Hydrogen fuel storage technologies
- Materials for Solar Power Production
- New materials under extreme conditions for energy research
- Physics of Climate Change
- Applications of soft x-ray spectroscopy using synchrotron radiation on gas-phase, solids and surfaces to probe electronic structures, correlations and processes.
- High-Energy X-Ray Applications for UNLV Accelerator Initiative
- Material science such as the synthesis and characterization of surrogate substituted fluorapatite for long-term nuclear waste storage

### **6. Research Management Experience**

- Successfully completed the reconstruction of the UNLV facility that houses the UNLV Program for High-Energy X-Ray Applications (2010 – 2014) and installed and made operational the first Varian M6 Linatron accelerator (August 2014) for the user community. Planned efforts include development of nuclear materials transmutation research as well as radiography applications and radiation resistance studies related to cancer research and future space travel.
- Appointed as the NSHE lead in the State of Nevada effort to respond to the FAA SIR on establishing test sites within the US for to help to determine how to successfully integrate unmanned aerial vehicles/systems into the US air space (2012 to 2013). Appointed by Governor's Office of Economic Development (GOED) in June 2012 to head up FAA test site proposal development and writing effort and to coordinate with 30+ stakeholders the overall proposal structure and content in support of GOED. FAA awarded Nevada as one of 6 new US Test Sites on December 30, 2013.
- UNLV Lead to establish a Cyber security Initiative with Oak Ridge National Laboratory, Nevada National Security Site, University of Tennessee, Knoxville, Louisiana Tech University, and Mississippi State University to work on extreme cyber test beds such as major power grid infrastructure and other relevant cyber security issues (2011 to 2013).
- Managed as Executive Director the Harry Reid Center for Environmental Studies (HRC) at UNLV and developed research themes (Energy & Materials, Environment, Health, and Security) to further focus the HRC mission areas for better campus integration. In 2012, HRC had 68 active projects with a total funding volume of \$21M. Total personnel 67 professional/classified staff, 5 postdoctoral scholars, 28 graduate and 24 undergraduate students. In 2012 HRC outperformed the sum of all other research centers at UNLV by more than a factor of two and was only second to the College of Science in total research funding.
- Restructuring (Nov. 2008 to June 2010) the UNLV Harry Reid Center for Environmental Studies to better meet the demands of interdisciplinary research across campus and orchestrating campus-wide environmental and renewable energy related efforts including research, education and outreach
- Leading the restructuring of the Transportation Research Center (in 2010/11) that was moved from the College of Engineering (CoE) to the HRC and then successfully returned as one of the CoE strongest research unit.
- Leading the assessment and restructuring of the Barrick Museum, which lost all research activities due to State funding cuts and the transition of the defunct Museum into the College of Fine Arts to become a successful Museum for Fine Arts.
- UNLV managerial point of contact for the Nevada Renewable Energy Consortium and the state-wide Task Leader for Solar Energy Research projects within the Consortium from 2009 to 2012.

- Project manager and lead-PI on a DOE funded project (\$6.9 million) that focuses on the development of biodiesel using ionic transfer membranes involving over 20 researchers from UNLV and one external company.
- Principal Investigator on a DOE funded project on Hollow Glass Microspheres: Glasses and Nano-composites for Hydrogen Storage.
- State of Nevada Director for DOE EPSCoR Programs and Deputy Director for the Nevada EPSCoR Program.
- PI or co-PI on about \$12 million in research funding over the last 18 years with most of the funds being allocated to projects at UNLV.
- Supervised and co-mentored over 50 students, post-docs and research professors

## **7. Student and Postdoctoral Research Advisor**

Total Undergraduate Students Advised and co-supervised: 23

Total Graduate Students Advised and co-supervised: 9

Total Postdoctoral Scholars Sponsored and co-supervised: 12

## **8. Research and Project Grants**

### **Funded Research Grants (including Program Management) as PI or co-PI:**

- Secured for UNLV a new Varian K-15 Linatron X-Ray accelerator, including a 5-year service contract with a total value of **\$2.8M**.
- UNLV Accelerator Facility renovation funded by UNLV **\$1.8M**, Equipment and services donated by Varian to date (June 2013) about **\$1M**.
- "Global Security Directorate Initiatives", DOE (ORNL) (funding allocated, total **\$100k**), 1 year and 2 months project period, starting date 11/2012.
- "Development of Biofuels using Ionic Transfer Membranes III", DOE (funded, total **\$1,875M**), 2-year project period, starting date 1/2011.
- "Efficient thermal management and temperature amplification for lunar based systems", NASA (funded, total **\$750k**), 12 months project period, starting date 10/2010.
- "X-Ray Interactions with Molecules", NSF (funded, total **\$440k**), 3 year project period, starting date 7/2010.
- "Hollow Glass Microspheres: Glasses and Nano-composites for Hydrogen Storage", DOE (funded, total **\$654k**), starting date 1/2010.
- "Development of Biofuels using Ionic Transfer Membranes II", DOE (funded, total **\$1,28M**), 18 months project period, starting date 7/2009.
- Applied Research Initiative (ARI) match funds for "Development of Biofuels using Ionic Transfer Membranes" State of Nevada General Fund (funded, total **\$221k**), starting date 11/2006.
- "Hydrogen Fuel Cells and Storage Technology – Task 11", DOE (funded, total **\$200k**), 2nd year, starting date 9/2006.
- "Development of Biofuels using Ionic Transfer Membranes", DOE (funded, total **\$3,7M**), starting date 7/2006.
- "X-Ray Atomic and Molecular Spectroscopy: Probing Fundamental Interactions between X-Rays and Matter", NSF (funded, total **\$450k**), 3-year project period, starting date 7/2006.
- "Material and Environmental Science with X-Rays", PNNL (funded, total **\$83k**), 11 months, starting date 10/2005.
- "Hydrogen Fuel Cells and Storage Technology – Task 11", DOE (funded, total **\$200k**), 1st year, starting date 9/2005.
- "X-Ray Atomic and Molecular Spectroscopy: Probing Fundamental Interactions between X-Rays and Matter", NSF (funded, total **\$45k**), 1-year project period, starting date 7/2005.
- "Material and Environmental Science with X-Rays", PNNL and LBNL, (funded, total **\$17k**), 4 months, starting date 6/2005.
- "Material and Environmental Science with X-Rays", EUV Technology, Inc., (funded, total **\$10k**), 2 months, starting date 11/2004.

- X-Ray Laser Photoelectron Spectroscopy”, LLNL, (funded, total **\$32.5k**), 2 years, starting date 5/2003.
- “Material and Environmental Science with X-Rays”, Univ. Of Alberta, CA, (funded, total **\$51k**), 3-year project period, starting date 7/2002.
- “X-Ray Atomic and Molecular Spectroscopy: Probing Fundamental Interactions between X-Rays and Matter”, NSF (funded, total **\$425k**), 3-year project period, starting date 7/2002.
- “Evaluation of Fluorapatite as a Waste-Form Material”, UNLV Transmutation Research Program, Task 16, Advanced Fuel Cycle Initiative, DOE (funded, total **\$476k**), 3-year project period, starting date 8/2002.
- Post-doctoral support to work at the Department of Chemistry, UNLV, German Research Society (DFG), funded **\$60k** for 18 months, 5/95 – 4/96 and 10/96 – 9/97.

## **9. Research Accomplishments**

- 100 publications most of them peer-reviewed
- 200 presentations at national and international scientific conferences/meetings
- 18 invited talks at national and international scientific conferences/meetings and institutions
- 21 public speaking engagements, one book, two patents

## **10. Patents**

Patent # 7,047,377 “FLEXIBLE REMOTE DATA TRANSFER AND DATA SYNCHRONIZATION”, May 16, 2006.

Patent # 8,663,429 “HOLLOW GLASS MICROSPHERE CANDIDATES FOR REVERSIBLE HYDROGEN STORAGE, PARTICULARLY FOR VEHICULAR APPLICATIONS”, March 4, 2014.

## **11. Research Education and Lead**

### **Research Professors**

Research Professor Dr. Craig Palmer (2008 – 2013) – supervisor  
Research Professor Dr. Denis Beller (2008 – 2013) – supervisor  
Research Professor Dr. David Stahl (2010 – 2012) – supervisor  
Assoc. Research Professor Dr. K.E. Lipinska (2006 – 2013) – supervisor  
Assoc. Research Professor Dr. Jian Ma (2008 – 2013) – supervisor  
Assoc. Research Professor Dr. Thomas Hartmann (2008 – 2013) – supervisor  
Assoc. Research Professor Dr. Anthony Hechanova (2008 – 2010) – supervisor  
Assoc. Research Professor Dr. Wayne Stolte (2008 – 2014) – co-supervisor  
Assist. Research Professor Dr. Allen Johnson (2008 – 2012) – supervisor

### **Post-Doctoral Scholars**

Dr. David Gardenghi (6/2012 – 2014) – co-supervisor  
Dr. Jason Young (10/2007 – 6/2008) – co-supervisor  
Dr. Iraida Demchenko (7/2007- 9/2011) – supervisor  
Dr. Anna Wolska (7/2002 – 6/2005) – co-supervisor  
Dr. Björn Zimmermann (7/2002 – 6/2004) – co-supervisor  
Dr. Renaud Guillemin (12/2000 – 8/2005) – co-supervisor  
Dr. Sung-Woo Yu (5/2000 – 3/2004) – co-supervisor  
Dr. Ponnusamy Nachimuthu (5/2000 – 9/2006) – co-supervisor  
Dr. Gunnar Öhrwall (9/1999 – 7/2001) – co-supervisor  
Dr. Marcelo Sant’Anna (4/1999 – 1/2001) – co-supervisor  
Dr. Ivan Dominguez-Lopez (1/1999 – 12/1999) – co-supervisor  
Dr. David Hansen (6/1998 – 2/1999) – co-supervisor

Graduate Students

Jason Thompson (2013 – 2014) – supervisor  
 Kyle Bowen (2011 – 2016) – co-supervisor  
 Patricia Kalita (2010 – 2014) – co-supervisor  
 Amanda Hudson (1/2002 – 9/2007) PhD, M.S. in Chemistry 12/2003 – co-supervisor  
 Lan Dang (1/1998 – 12/2006) M.S. in Chemistry 7/2001 – co-supervisor  
 Cong-Ich Tran (1/2001 – 1/2007) M.S. in Chemistry 8/2003 – co-supervisor  
 G.W. Chinthaka Silva (1/2002 – 8/2005) M.S. in Chemistry – co-supervisor  
 Chirantha P. Rodrigo (8/2002 – 5/2005) M.S. in Chemistry – co-supervisor  
 Ina P. Bashta (1/2002 – 5/2004) B.S. in Chemistry – co-supervisor

Undergraduate Students

Robert Gray (2013 – 2014) – supervisor  
 Anna Childs (2011 – 2013) – co-supervisor  
 Kyle Bowen (2007 – 2011) – co-supervisor  
 Ranjay Kaushal (2005, 2007) – supervisor  
 Satpreet Singh (2005) – supervisor  
 Dyane Hill (2005) – supervisor  
 Joe Baker (2002 – 03) – co-supervisor  
 Felice Ferri (2001 – 03) – co-supervisor  
 Monica Pangilinan (2001) – co-supervisor  
 Sierra Laidman (2001) – co-supervisor  
 Inna Bashta (2000-02) – co-supervisor  
 Jennifer Overberg (2000 – 01) – co-supervisor  
 Maraya Lotrakul (1999 – 02) – co-supervisor  
 Melanie Blackburn (1999) – co-supervisor  
 Tara Goddard (1999) – co-supervisor  
 Colin Cunliff (1999) – co-supervisor  
 Jason Fong (1996 – 2000) – co-supervisor  
 Scott Oblad (1996) – co-supervisor  
 Brett Vanderford (1996) – co-supervisor  
 Ryan Martin (1996) – co-supervisor  
 Jeanette Daniels (1995) – co-supervisor  
 Greg Fisher (1994 – 95) – co-supervisor  
 Tammy Nguyen (1994) – co-supervisor

**12. Research Collaborations**

Amusia, M. Ya.	Hebrew University of Jerusalem, Jerusalem, Israel
Arce, J.C.	Departamento de Quimica, Universidad del Valle, A. A. 25360 Cali, Colombia
Berrah, N.	Western Michigan University, Kalamazoo, Michigan
Chakraborty, H.S.	Department of Physics, Indian Institute of Technology—Madras, Madras, India
Cheng, K.T.	Lawrence Livermore National Laboratory
Ceolin, D.	CEA/DRECAM/SPAM, CEN Saclay, 91191 Gif /Yvette Cedex, France
Chernysheva, L.V.	Physical-Technical Institute, St. Petersburg, Russia
Derevianko, A.	University of Nevada, Reno
Deshmukh, P.C.	Department of Physics, Indian Institute of Technology—Madras, Madras, India
Fadley, C.S.	University of California at Davis
Guillemin, R.	Laboratoire de Chimie-Physique Matiere et Rayonnement
Heske, C.	University of Nevada, Las Vegas
Johnson, W.R.	University of Notre Dame
Kanter, E.P.	Argonne National Laboratory
Krässig, B.	Argonne National Laboratory
Langer, B.	Max-Born-Institut, Berlin, Germany

Langhoff, P.W.	San Diego Supercomputer Center, University of California–San Diego
Leclercq, N.	CEA/DRECAM/SPAM, CEN Saclay, 91191 Gif /Yvette Cedex, France
LeGuen, K.	CEA/DRECAM/SPAM, CEN Saclay, 91191 Gif /Yvette Cedex, France
Lubell, M.S.	Department of Physics, City College of New York, New York, New York 10031
Manson, S.T.	Georgia State University
Martin, N.L.S.	University of Kentucky, Lexington, Kentucky 40506
McKoy, V.	California Institute of Technology, Pasadena, California
Miron, C.	CEA/DRECAM/SPAM, CEN Saclay, 91191 Gif /Yvette Cedex, France
Morin, P.	CEA/DRECAM/SPAM, CEN Saclay, 91191 Gif /Yvette Cedex, France
Piancastelli, M.N.	University „Tor Vergata“, Rome, Italy
Rolles, D.	University of Western Michigan
Sheehy, J.A.	Air Force Research Laboratory, AFRL/PRSP, Edwards AFB, CA
Simon, M.	Laboratoire de Chimie-Physique Matiere et Rayonnement
Southworth, S.H.	Argonne National Laboratory
Wehlitz, R.	Synchrotron Radiation Center, University of Wisconsin
Whitfield, S.	University of Wisconsin-Eau Claire, Eau Claire, Wisconsin
Yu, S.-W.	Lawrence Livermore National Laboratory
Zhou, H.L.	Georgia State University
Zimmermann, B.	Max-Planck-Institute for the Physics of Complex Systems, Dresden, Germany

### **13. Professional Services**

- Member of the Nevada Institute of Renewable Energy Commercialization's (NIREC) Technology Commercialization Advisory Board (TCAB) (2010 – 2012)
- Member of the Institutional Management team of the NSHE Nevada Renewable Energy Consortium (NVREC) and the Management Advisory Committee (2009 – 2012)
- Member of the NDA Green Technology Committee (2009 – 2012)
- Reviewer for the American Institute of Physics (Physical Review Letters and Physical Review A)
- Reviewer for the Institute of Physics (Journal of Physics B and the New Journal of Physics)
- Reviewer for the National Science Foundation
- Reviewer for Fonds zur Förderung der wissenschaftlichen Forschung (Austrian Science Fund)
- Physical Review Letters; Physical. Review. B; NSF Sustainable Energy Pathways Review Panel, on sustainability of photovoltaic systems, Proposal reviewer for the Austrian Science Fund

### **14. Professional Events Organization**

- Co-Chair of the Workshop on X-Ray Atomic and Molecular Spectroscopy using Synchrotron Radiation from the Advanced Light Source, UNLV, May 23-24, 1994
- Co-Chair of the Workshop on X-Ray Atomic and Molecular Spectroscopy using Synchrotron Radiation, UNLV, December 6-7, 2001
- Chair of the 2007 Inaugural Energy Symposium, UNLV, August 15-16, 2007
- Member of organizing committee for the first National Clean Energy Summit, UNLV, August 18-19, 2008
- Chair of the UNLV Renewable Energy Symposium, UNLV, August 20, 2008
- Session Chair (Biofuels) of the 42<sup>nd</sup> Western Regional Meeting of the American Chemical Society, September 23 -27, 2008, Las Vegas, Nevada.
- Chair of the 3<sup>rd</sup> Annual UNLV Renewable Energy Symposium, UNLV, August 11-12, 2009
- Chair of the Second Annual Nevada Renewable Energy Consortium Meeting, UNLV, August 20, 2010
- Co-Chair and Moderator (Panel 3) of the 2010 UNLV Clean Energy Forum: A Game Changing Agenda for a Sustainable Energy Future, UNLV, September 8, 2010
- Co-Chair (IWP Int. Advisory Com., RIXS Int. Advisory Com., Local Organizing Committee) of the joint workshops the 2011 International Workshop on Photoionization (IWP) and the 2011 International Workshop on Resonant Inelastic X-ray Scattering (RIXS), Las Vegas, Nevada, May 22-27, 2011.
- Organizer and Panelist on public Forum "Fukushima Daiichi Nuclear Power Plant Accident: What happened, could it happen here, and what are the implications to U.S. policy?" at the Barrick Museum Auditorium, Las Vegas, March 21, 2011

- Organizer and Panelist on public forum commemorating the 25th anniversary of the Chernobyl nuclear plant disaster and a round-table discussion on "America's Portfolio: What is Nuclear Energy's Role?" at the Barrick Museum Auditorium, Las Vegas, April 26, 2011
- Co-hosted and organized meetings with NSTec and NASA officials to explore research collaborations with UNLV.
- Hosted the Fourth Integrated Symposium on Collaborative Research Initiatives between National Security Technologies, LLC and the University of Nevada, Las Vegas on February 28, 2012.
- Biofuels kick-off meeting phase III at UNLV on September 7, 2012.
- Hosted the first Cyber Security Collaborations Symposium at the Stan Fulton Building September 11, 2012. The symposium and participants were part of a collaboration between HRC/UNLV, Oak Ridge National Laboratory, the University of Tennessee, Louisiana Tech, and Mississippi State University
- Co-organized and co-hosted the USAF-UNLV UAS and Cyber Security Meeting, 7 March, 2013
- Co-organized with USAF and moderated a Symposium called 'Titans of Industry', JW Marriott Las Vegas Resort & Spa • 26 & 27 June, 2013

### **15. Professional Memberships**

American Physical Society (1988 to 2014)

American Association for the Advancement of Sciences (2010 to 2014)

### **16. Teaching**

Fall 2001

UNLV Chemistry

Molecular Spectroscopy – CHE 793

### **17. Publications – Refereed Journal Articles**

1.) U. Becker, R. Wehlitz, O. Hemmers, B. Langer, and A. Menzel: Observation of Participator Auger Decay following Valence Photoionization with Excitation  
Phys. Rev. Lett. 63, 1054-1057 (1989)

2.) B. Langer, J. Viehhaus, O. Hemmers, A. Menzel, R. Wehlitz, and U. Becker: High-resolution photoelectron spectrometry study of conjugate shakeup processes in the Li 1s threshold region  
Phys. Rev. A 43, Rap. Comm. 1652-1655 (1991)

3.) R. Wehlitz, F. Heiser, O. Hemmers, B. Langer, A. Menzel, and U. Becker: Electron-Energy and -Angular Distributions in the Double Photoionization of Helium  
Phys. Rev. Lett. 67, 3764-3767 (1991)

4.) U. Becker, O. Hemmers, B. Langer, A. Menzel, R. Wehlitz, and W. B. Peatman: Evidence for atomic processes in molecular valence double ionization  
Phys. Rev. A 45, R1295-R1298 (1992)

5.) U. Becker, O. Hemmers, B. Langer, I. Lee, A. Menzel, R. Wehlitz, and M. Ya. Amusia: Multiplet-changing Auger transitions in valence double photoionization  
Phys. Rev. A 47, R767-R770 (1993)

6.) O. Hemmers, F. Heiser, J. Eiben, R. Wehlitz, and U. Becker: Observation of Non-isotropic Auger Angular Distribution in the C(1s) Shape Resonance of CO  
Phys. Rev. Lett. 71, 987-990 (1993)

7.) O. Hemmers, F. Heiser, J. Eiben, R. Wehlitz, and U. Becker: Variation of the C (KVV) Auger angular distribution in the C(1s)  $\sigma^*$ -resonance of CO  
Nucl. Instrum. And Methods B87, 209-214 (1994)



- 8.) B. Langer, J. Viefhaus, O. Hemmers, A. Menzel, R. Wehlitz, and U. Becker: Observation of parity-unfavored transitions in the nonresonant photoionization of argon  
Phys. Rev. A 51, R882-R885 (1995)
- 9.) N. Saito, F. Heiser, O. Hemmers, A. Hempelmann, K. Wieliczek, J. Viefhaus, and U. Becker: Vibrational-state-dependent decay of the CO C(1s) excitation  
Phys. Rev. A 51, R4313-R4316 (1995)
- 10.) T. Liebsch, O. Plotzke, F. Heiser, U. Hergenhahn, O. Hemmers, R. Wehlitz, J. Viefhaus, B. Langer, S.B. Whitfield, and U. Becker: Angle-resolved photoelectron spectroscopy of C<sub>60</sub>  
Phys. Rev. A 52, 457-464 (1995)
- 11.) O. Hemmers, S.B. Whitfield, N. Berrah, B. Langer, R. Wehlitz, and U. Becker: Angular distributions of the C(1s) photoelectron satellites in CO  
J. Phys. B 28, L693-L700 (1995)
- 12.) B. Langer, N. Berrah, A. Farhat, O. Hemmers, and J.D. Bozek: Auger resonant Raman spectroscopy used to study the angular distributions of the Xe 4d<sub>5/2</sub> → 6p decay spectrum  
Phys. Rev. A 53, R1946-R1949 (1996)
- 13.) Norio Saito, Franz Heiser, Oliver Hemmers, Kornel Wieliczek, Jens Viefhaus, and Uwe Becker: Kinetic-energy- and angular-resolved fragmentation of CO in vibrational-resolved C 1s excitation  
Phys. Rev. A 54, 2004-2010 (1996)
- 14.) W. Ng, G. Jones, R.C.C. Perera, D. Hansen, J. Daniels, O. Hemmers, P. Glans, S.B. Whitfield, H. Wang, and D.W. Lindle: First Results from the High-Brightness X-Ray Spectroscopy Beamline at ALS  
Rev. Sci. Instr. 67, (9) (1996)
- 15.) N. Berrah, B. Langer, J.D. Bozek, T. Gorczyca, O. Hemmers, D.W. Lindle, and O.F. Toader: Angular-distribution parameters and R-matrix calculations of Ar 3s<sup>-1</sup> → np Resonances  
J. Phys. B 29, 5351-5365 (1996)
- 16.) R. Wehlitz, I.A. Sellin, O. Hemmers, S.B. Whitfield, P. Glans, H. Wang, D.W. Lindle, B. Langer, N. Berrah, J. Viefhaus, and U. Becker: Photon energy dependence of ionization-excitations in helium at medium energies  
J. Phys. B 30, L51-L58 (1997)
- 17.) E.W.B. Dias, H.S. Chakraborty, P.C. Deshmukh, S.T. Manson, O. Hemmers, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, J.C. Levin, I.A. Sellin, and R.C.C. Perera: Breakdown of the Independent Particle Approximation in High-Energy Photoionization  
Phys. Rev. Lett. 78, 4553-4556 (1997)
- 18.) D.W. Lindle, O. Hemmers, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, R. Wehlitz, J.C. Levin, I.A. Sellin, and R.C.C. Perera: The X-Ray Atomic and Molecular Spectroscopy Program at the Advanced Light Source  
Indian J. Phys. 71B(3), 325-334 (1997)
- 19.) W. C. Stolte, Y. Lu, J.A.R. Samson, O. Hemmers, D.L. Hansen, S.B. Whitfield, H. Wang, P. Glans, and D.W. Lindle: The K-shell Auger decay of atomic oxygen  
J. Phys. B 30, 4489-4497 (1997)
- 20.) O. Hemmers, G. Fischer, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, J.C. Levin, I.A. Sellin, R.C.C. Perera, E.W.B. Dias, H.S. Chakraborty, P.C. Deshmukh, and S.T. Manson: Beyond the dipole approximation: angular-distribution effects in valence photoemission  
J. Phys. B 30, L727-L733 (1997)

- 21.) D.L. Hansen, M.E. Arrasate, J. Cotter, G.R. Fisher, O. Hemmers, K.T. Leung, J.C. Levin, R. Martin, P. Neill, R.C.C. Perera, I.A. Sellin, M. Simon, Y. Uehara, B. Vanderford, S.B. Whitfield, and D.W. Lindle: Photofragmentation of third-row hydrides following photoexcitation at deep-core levels  
Phys. Rev. A 58, 3757 (1998)
- 22.) O. Hemmers, S.B. Whitfield, P. Glans, H. Wang, D.W. Lindle, R. Wehlitz, and I.A. Sellin: High-resolution electron time-of-flight apparatus for the soft-x-ray region  
Rev. Sci. Instrum. 69, 3809 (1998)
- 23.) O. Hemmers, F. Heiser, J. Viehhaus, K. Wieliczek and U. Becker: Angle-resolved resonant Auger electron spectroscopy of CO after vibrational-resolved C  $1s \rightarrow \eta\ell\lambda$  excitations  
J. Phys. B 32, 3769 (1999)
- 24.) D.L. Hansen, O. Hemmers, H. Wang, D.W. Lindle, P. Focke, I.A. Sellin, C. Heske, H.S. Chakraborty, P.C. Deshmukh, S.T. Manson: Validity of the independent-particle approximation in x-ray photoemission: The exception, not the rule  
Phys. Rev. A 60, R2641 (1999)
- 25.) D.W. Lindle and O. Hemmers: Breakdown of the Dipole Approximation in Soft-X-Ray Photoemission  
J. Electron Spectrosc. Relat. Phenom. 100, 297 (1999)
- 26.) A. Derevianko, O. Hemmers, S. Oblad, P. Glans, H. Wang, S.B. Whitfield, R. Wehlitz, I.A. Sellin, W.R. Johnson, and D.W. Lindle: Electric-octupole and pure-electric-quadrupole effects in soft x-ray photoemission  
Phys. Rev. Lett. 84, 2116 (2000)
- 27.) N. Saito, A. Hempelmann, F. Heiser, O. Hemmers, K. Wieliczek, J. Viehhaus, and U. Becker: Lifetime effects on the dissociation of core-excited N<sub>2</sub> and CO molecules  
Phys. Rev. A 61, 022709 (2000)
- 28.) P.W. Langhoff, J.C. Arce, J.A. Sheehy, O. Hemmers, H. Wang, P. Focke, I.A. Sellin, and D.W. Lindle: On the angular distributions of electrons photoejected from fixed-in-space and randomly oriented molecules, in A. Hitchcock and K.T. Leung, eds., Proceedings of the Eighth International Conference on Electronic Spectroscopy & Structure (ICESS8), Berkeley, CA, USA, August 8-12, 2000, J. Electron Spectrosc. Relat. Phenom. 114-116, 23 (2001)
- 29.) H.S. Chakraborty, D.L. Hansen, O. Hemmers, P.C. Deshmukh, P. Focke, I.A. Sellin, C. Heske, D.W. Lindle, and S.T. Manson: Interchannel coupling in the photoionization of the M-shell of Kr well above threshold: Experiment and Theory  
Phys. Rev. A 63, 042708 (2001)
- 30.) W.C. Stolte, D.L. Hansen, M.N. Piancastelli, I. Dominguez Lopez, A. Rizvi, O. Hemmers, H. Wang, A.S. Schlachter, M.S. Lubell, and D.W. Lindle: Anionic Photofragmentation of CO: A Selective Probe of Core-Level Resonances  
Phys. Rev. Lett. 86, 4504 (2001)
- 31.) O. Hemmers, S.T. Manson, M.M. Sant'Anna, P. Focke, H. Wang, I.A. Sellin, and D.W. Lindle: Relativistic effects on interchannel coupling in atomic photoionization: the photoelectron angular distribution of Xe 5s  
Phys. Rev. A 64, 022507 (2001)
- 32.) D.W. Lindle and O. Hemmers: Time-of-Flight Photoelectron Spectroscopy of Atoms and Molecules  
J. Alloys Comp. 328, 27 (2001)
- 33.) H. Wang, G. Snell, O. Hemmers, M.M. Sant'Anna, I.A. Sellin, N. Berrah, D.W. Lindle, P.C. Deshmukh, N. Haque, and S.T. Manson: Dynamical relativistic effects in photoionization: Spin-orbit-resolved angular distributions of xenon 4d photoelectrons near the Cooper minimum

Phys. Rev. Lett. 87, 123004 (2001)

34.) J.C. Arce, J.A. Sheehy, P.W. Langhoff, O. Hemmers, H. Wang, P. Focke, I.A. Sellin, and D.W. Lindle: On the Angular Distributions of Molecular Photoelectrons: Dipole Cross Sections for Fixed-in-Space and Randomly Oriented Molecules

Chem. Phys. Lett. 346, 341 (2001); Erratum 349, 349 (2001)

35.) O. Hemmers, H. Wang, P. Focke, I.A. Sellin, D.W. Lindle, J.C. Arce, J.A. Sheehy, and P.W. Langhoff: Large Nondipole Effects in the Angular Distributions of K-Shell Photoelectrons from Molecular Nitrogen

Phys. Rev. Lett. 87, 273003 (2001)

36.) O. Hemmers, M. Blackburn, T. Goddard, P. Glans, H. Wang, S.B. Whitfield, R. Wehlitz, I.A. Sellin, and D.W. Lindle: Dipole and Nondipole Angular-Distribution Effects in the Valence Photoemission of Neon

J. Electron Spectrosc. Relat. Phenom. 123, 257 (2002)

37.) B. Krässig, E.P. Kanter, S.H. Southworth, R. Guillemin, O. Hemmers, D.W. Lindle, R. Wehlitz, and N.L.S. Martin: Photoexcitation of a Dipole-Forbidden Resonance in Helium

Phys. Rev. Lett. 88, 203002 (2002)

38.) R. Guillemin, O. Hemmers, D.W. Lindle, K. Le Guen, D. Ceolin, C. Miron, N. Leclercq, P. Morin, M. Simon, and P.W. Langhoff: Non-Dipolar Electron Angular Distributions from Fixed-in-Space Molecules

Phys. Rev. Lett. 89, 033002 (2002)

39.) S. Laidman, M. Pangilinan, R. Guillemin, S.W. Yu, G. Öhrwall, D.W. Lindle, and O. Hemmers: Exploring the Limits of the Dipole Approximation with Angle-Resolved Electron Time-of-Flight Spectrometry

Journal of Undergraduate Research, Office of Science, U.S. Department of Energy, Vol. II, 65-70 (2002)

40.) D.L. Hansen, W.C. Stolte, O. Hemmers, R. Guillemin, and D.W. Lindle: Anion formation moderated by post-collision interaction following core-level photoexcitation of CO

J. Phys. B 35, L381 (2002)

41.) O. Hemmers, R. Guillemin, E.P. Kanter, B. Krässig, D.W. Lindle, S.H. Southworth, R. Wehlitz, J. Baker, A. Hudson, M. Lotrakul, D. Rolles, W.C. Stolte, I.C. Tran, A. Wolska, S.W. Yu, M.Ya. Amusia, K.T. Cheng, L.V. Chemysheva, W.R. Johnson, and S.T. Manson: Dramatic nondipole effects in low-energy photoionization: experimental and theoretical study of Xe 5s

Phys. Rev. Lett. 91, 053002 (2003)

42.) E.P. Kanter, B. Krässig, S.H. Southworth, R. Guillemin, O. Hemmers, D.W. Lindle, R. Wehlitz, M.Ya. Amusia, L.V. Chemysheva, and N.L.S. Martin: E1-E2 interference in the VUV photoionization of He

Phys. Rev. A 68, 012714 (2003)

43.) O. Hemmers, R. Guillemin and D.W. Lindle: Nondipole effects in soft x-ray photoionization

Radiat. Phys. Chem. 70, 123 (2004)

44.) R. Guillemin, O. Hemmers, D. Rolles, S.-W. Yu, A. Wolska, I. Tran, A. Hudson, J. Baker, and D.W. Lindle: Nearest-Neighbor-Atom Core-Hole Transfer in Isolated Molecules

Phys. Rev. Lett. 92, 223002 (2004)

45.) O. Hemmers, R. Guillemin, D. Rolles, A. Wolska, D.W. Lindle, K.T. Cheng, W.R. Johnson, H.L. Zhou, and S.T. Manson: Nondipole effects in the photoionization of Xe  $4d_{5/2}$  and  $4d_{3/2}$ : Evidence for quadrupole satellites

Phys. Rev. Lett. 93, 113001 (2004)

46.) O. Hemmers, R. Guillemin, A. Wolska, D.W. Lindle, D. Rolles, K.T. Cheng, W.R. Johnson, H.L. Zhou, and S.T. Manson: Nondipole effects in Xe 4d photoionization

J. Electron Spectrosc. Relat. Phenom. 144-147, 51 (2005)

- 47.) O. Hemmers, R. Guillemin, D. Rolles, A. Wolska, D.W. Lindle, E. Kanter, B. Krässig, S. Southworth, R. Wehlitz, P. Langhoff, V. McKoy, and B. Zimmermann: Nondipole effects in molecular nitrogen valence shell photoionization  
*J. Electron Spectrosc. Relat. Phenom.* **144-147**, 155 (2005)
- 48.) R. Guillemin, O. Hemmers, D.W. Lindle, and S.T. Manson: Experimental investigation of nondipole effects in photoemission at the Advanced Light Source  
*Radiat. Phys. Chem.* **73**, 311 (2005)
- 49.) O. Hemmers, R. Guillemin, D. Rolles, A. Wolska, D.W. Lindle, E.P. Kanter, B. Krässig, S.H. Southworth, R. Wehlitz, B. Zimmermann, V. McKoy, and P.W. Langhoff: Low-Energy Nondipole Effects in Molecular Nitrogen Valence-Shell Photoionization  
*Phys. Rev. Lett.* **97**, 103006 (2006)
- 50.) D. Céolin, M.N. Piancastelli, R. Guillemin, W.C. Stolte, S.-W. Yu, O. Hemmers, and D.W. Lindle: Fragmentation of methyl chloride studied by partial positive and negative ion yield spectroscopy  
*J. Chem. Phys.* **126**, 084309 (2007)
- 51.) G.W.C. Silva, L. Ma, O.A. Hemmers, and D.W. Lindle: Micro-Structural characterization of precipitation-synthesized fluorapatite nano-material by transmission electron microscopy using different sample preparation techniques  
*Micron* **39**, 269 (2008)
- 52.) P.C. Deshmukh, T. Banerjee, H.R. Varma, O. Hemmers, R. Guillemin, D. Rolles, A. Wolska, S.W. Yu, D.W. Lindle, W.R. Johnson, and S.T. Manson: Theoretical and Experimental Demonstration of the Existence of Quadrupole Cooper Minima  
*J. Phys. B: At. Mol. Opt. Phys.* **41**, 021002 (2008)
- 53.) K.E. Lipinska-Kalita, P.E. Kalita, O.A. Hemmers, T. Hartmann: Equation of State of Gallium Oxide to 70 Gpa: Comparison of Quasihydrostatic and Nonhydrostatic Compression  
*Phys. Rev. B* **77**, 094123 (2008)
- 54.) G.W. Chinthaka Silva, O. Hemmers, K.R. Czerwinski, and D.W. Lindle: Investigation of Nanostructure and Thermal Behavior of Zinc-Substituted Fluorapatite.  
*Inorg. Chem.*, **47**(17), 7757-7767 (2008)
- 55.) K.E. Lipinska-Kalita, O.A. Hemmers, P.E. Kalita, G. Mariotto, S. Gremesch, R.J. Hemley, T. Hartmann: High-Pressure Structural Integrity and Structural Transformations of glass-derived Nanocomposites: a Review  
*J. of Phys. and Chem. of Solids*, **69**, 2268-2273 (2008)
- 56.) Kristina E. Lipinska-Kalita, Patricia E. Kalita, Cédric Gobin, Oliver A. Hemmers, Thomas Hartmann and Gino Mariotto: Stability and equation of state of a nanocrystalline Ga-Ge mullite in a vitroceramic composite: A synchrotron x-ray diffraction study  
*Phys. Rev. B* **77**, 134107 (2008)
- 57.) I.N. Demchenko, K. Lawniczka-Jablonska, T. Tyliczszak, N.R. Birkner, W.C. Stolte, M. Chernyshova, and O. Hemmers, XANES studies of modified and newly synthesized nanostructured manganese oxides  
*J. Elect. Spect. Rel. Phen.* **24**, 171 (2009)
- 58.) W.C. Stolte, R. Guillemin, I.N. Demchenko, G. Öhrwall, S.-W. Yu, J.A. Young, M. Taupin, O. Hemmers, M.N. Piancastelli and D.W. Lindle, Inner-shell photofragmentation of Cl<sub>2</sub>  
*J. Phys. B: At. Mol. Opt. Phys.* **43**, 155202 (2010)

59.) I. N. Demchenko, J. D. Denlinger, M. Chernyshova, K. M. Yu, D. T. Speaks, P. Olalde-Velasco, O. Hemmers, W. Walukiewicz, A. Derkachova, and K. Lawniczak-Jablonska, Full multiple scattering analysis of XANES at the Cd L 3- and O K- edges in CdO films combined with a soft-x-ray emission investigation Phys. Rev. B **82**, 075107 (2010)

60.) K. Lipinska, P. Kalita, O. Hemmers, S. Sinogeikin, G. Mariotto, C. Segre and Y. Ohki, "Exploring New Routes for the Development of Functional Nanomaterials using Extreme Pressure", Processing and Properties of Advanced Ceramics and Composites II Ceramic Transactions **220**, 6 (2010)

61.) I.N. Demchenko, M. Chernyshova, T. Tyliczszak, J.D. Denlinger, K.M. Yu, D.T. Speaks, O. Hemmers, W. Walukiewicz, G. Derkachov and K. Lawniczak-Jablonska, Electronic structure of CdO studied by soft X-ray spectroscopy J.Elect. Spect. Rel. Phen. (2010)

62.) Jian Ma and Oliver Hemmers, Technoeconomic Analysis of Microalgae Cofiring Process for Fossil Fuel-Fired Power Plants J. Energy Resource. Technol. **133**, 011801, DOI:10.1115/1.4003729, (2011)

63.) P. Kalita, A. Cornelius, K. Lipinska, M. Lufaso, Z. Kann, S. Sinogeikin, O. Hemmers, and H. Schneider, Pressure Induced Phase Transitions in Mullite-Type  $\text{Bi}_2(\text{Fe}_{4-x}\text{Mn}_x)\text{O}_{10-d}$  Complex Oxides International Journal of Materials Research, **103**, 4 (2012)

64.) P. Kalita, H. Schneider, K. Lipinska, S. Sinogeikin, O. Hemmers, A. Cornelius, High-Pressure Behavior of Mullite: An X-Ray Diffraction Investigation Journal of American Ceramic Society, Volume 96, Issue 5, Pages: 1635–1642, (2013)

## **18. Publications – Books**

O. Hemmers, *Korrelationseffekte in kleinen Molekülen*. Vol. 3 in the series (studies of vacuum ultraviolet and x-ray processes, ed. U. Becker), AMS Press, New York (1993)

## **19. Publications – Contributed News Articles**

O. Hemmers, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, J.C. Levin, I.A. Sellin, and R.C.C. Perera: Photoelectron Spectroscopy and the Dipole Approximation Synch. Rad. News Vol. 9, No. 6, 40-45 (1996); Vol. 10, No. 3, 21 (1997)

## **20. Publications – Non-Refereed Journal Articles**

1.) B. Langer, A. Farhat, B. Nessar, N. Berrah, O. Hemmers, J.D. Bozek: Angle Resolved Study of the Xe  $4d \rightarrow 6p$  Resonant Auger Process with High Resolution Proceedings of the Workshop on Atomic Physics with Hard X-Rays from High Brilliance Synchrotron Light Sources, Argonne, Illinois, May 20-21, 1996

2.) B. Langer, A. Farhat, B. Nessar, N. Berrah, O. Hemmers, J.D. Bozek: Angle Resolved Resonant Raman Auger Spectroscopy of the Xe  $4d \rightarrow 6p$  Transition Application of Accelerators in Research and Industry, Denton 1996, edited by J.L. Duggan and I.L. Morgan (AIP Press, Woodbury, New York, 1997), pp. 161

3.) B. Langer, N. Berrah, A. Farhat, O. Hemmers, J.D. Bozek: Auger Resonant Raman Spectroscopy Used to Study the Angular Distributions of the Xe  $4d \rightarrow 6p$  Decay Spectrum Advanced Light Source Compendium of User Abstracts and Technical Reports 1993-1996, April 1997, p. 263



- 4.) H. Wang, P. Glans, O. Hemmers, S.B. Whitfield, D.W. Lindle, R. Wehlitz, I.A. Sellin, J.C. Levin, G.B. Armen, and R.C.C. Perera: An Autoionization Study of the Argon 2p Satellites Excited near the Argon 2s Threshold  
Advanced Light Source Compendium of User Abstracts and Technical Reports 1993-1996, April 1997, p. 188
- 5.) W.C. Stolte, Y. Lu, J.A.R. Samson, O. Hemmers, D.L. Hansen, P. Glans, S.B. Whitfield, H. Wang, and D.W. Lindle: The K-Shell Auger Decay of Atomic Oxygen  
Advanced Light Source Compendium of User Abstracts and Technical Reports 1993-1996, April 1997, p. 56
- 6.) R. Wehlitz, I.A. Sellin, O. Hemmers, S.B. Whitfield, P. Glans, H. Wang, D.W. Lindle, B. Langer, N. Berrah, J. Viefhaus, and U. Becker: Partial Cross Sections of Helium Satellites at Medium Photon Energies  
Advanced Light Source Compendium of User Abstracts and Technical Reports 1993-1996, April 1997, p. 221
- 7.) O. Hemmers, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, R. Wehlitz, J.C. Levin, I.A. Sellin, R.C.C. Perera, and D.W. Lindle: Photoelectron Spectroscopy and the Dipole Approximation  
Advanced Light Source Compendium of User Abstracts and Technical Reports 1993-1996, April 1997, p. 224
- 8.) R.C.C. Perera, W. Ng, G. Jones, D.L. Hansen, J. Daniels, O. Hemmers, P. Glans, S.B. Whitfield, H. Wang, and D.W. Lindle: First Results from the High-Brightness X-Ray Spectroscopy Beamline at ALS  
Advanced Light Source Compendium of User Abstracts and Technical Reports 1993-1996, April 1997, p. 312
- 9.) R. Wehlitz, I.A. Sellin, O. Hemmers, S.B. Whitfield, P. Glans, H. Wang, D.W. Lindle, B. Langer, N. Berrah, J. Viefhaus, and U. Becker: Making a Link from Ionization-Excitation to the Double Photoionization of Helium  
Book of Abstracts of Contributed Papers, Vol. 2, p. MO 070, Twentieth International Conference on the Physics of Electronic and Atomic Collisions, XX. ICPEAC, Vienna, Austria, 23-29 July, 1997
- 10.) O. Hemmers, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, J.C. Levin, I.A. Sellin, R.C.C. Perera, E.W.B. Dias, H.S. Chakraborty, P.C. Deshmukh, and S.T. Manson: Breakdown of the Independent Particle Approximation in High-Energy Photoionization  
Advanced Light Source Compendium of User Abstracts and Technical Reports 1997, July 1998, p. 208
- 11.) O. Hemmers, P. Glans, H. Wang, R. Wehlitz, J.C. Levin, I.A. Sellin, R.C.C. Perera, and D.W. Lindle: Beyond the Dipole Approximation: Angular-Distribution Effects in N<sub>2</sub> 1s Photoemission  
Advanced Light Source Compendium of User Abstracts and Technical Reports 1997, July 1998, p. 204
- 12.) O. Hemmers, S.B. Whitfield, P. Glans, H. Wang, D.W. Lindle, R. Wehlitz, and I.A. Sellin: High-resolution electron time-of-flight apparatus for the soft x-ray region  
Advanced Light Source Compendium of User Abstracts and Technical Reports 1998, August 1999
- 13.) O. Hemmers, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, J.C. Levin, I.A. Sellin, and R.C.C. Perera: Breakdown of the Dipole Approximation in Soft-X-Ray Photoemission  
Advanced Light Source Compendium of User Abstracts and Technical Reports 1998, August 1999
- 14.) D.L. Hansen, O. Hemmers, H. Wang, D.W. Lindle, P. Focke, I.A. Sellin, C. Heske, H.S. Chakraborty, P.C. Deshmukh, and S.T. Manson: Validity of the independent-particle approximation in x-ray photoemission: The exception not the rule  
Advanced Light Source Compendium of User Abstracts and Technical Reports 1998, August 1999



15.) O. Hemmers, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, R. Wehlitz, J.C. Levin, I.A. Sellin, R.C.C. Perera, and D.W. Lindle: Beyond the Dipole Approximation: Surprising New Results in Soft-X-Ray Photoemission  
ALS Activity Report, Science Highlights 1997-98, p. 41

16.) D.W. Lindle, O. Hemmers, H. Wang, P. Focke, I.A. Sellin, J.D. Mills, J.A. Sheehy, and P.W. Langhoff: Beyond the Dipole Approximation: Angular-Distribution Effects in the 1s Photoemission from Small Molecules  
AIP Conference Proceedings of the XXI. International Conference on the Physics of Electronic and Atomic Collisions (XXI ICPEAC), Sendai, Japan, July 22-27, 1999, p. 156

17.) O. Hemmers, H. Wang, D.W. Lindle, P. Focke, I.A. Sellin, J.D. Mills, J.A. Sheehy, and P.W. Langhoff: Beyond the Dipole Approximation: Angular-Distribution Effects in the 1s Photoemission from Small Molecules  
in *X-Ray and Innershell Processes*, edited by R. W. Dunford et. al (American Institute of Physics, Melville, NY, 2000) Proceedings of the Eighteenth International Conference on X-ray and Inner-Shell Processes (X-99), Chicago, IL, USA, August 23-27, 1999, p. 222

18.) O. Hemmers, S. Oblad, P. Glans, H. Wang, S.B. Whitfield, R. Wehlitz, I.A. Sellin, D.W. Lindle, A. Derevianko, and W.R. Johnson: Electric-octupole and pure-electric-quadrupole effects in soft-x-ray photoemission  
Advanced Light Source Compendium of User Abstracts and Technical Reports 1999, August 2000

19.) D.L. Hansen, W.C. Stolte, I. Dominguez-Lopez, G. Öhrwall, L. Dang, M.M. Sant'Anna, O. Hemmers, R.C.C. Perera, and D.W. Lindle: Relaxation dynamics of H<sub>2</sub>O and H<sub>2</sub>S following excitation of 1s core electrons  
Advanced Light Source Compendium of User Abstracts and Technical Reports 1999, August 2000

20.) D.W. Lindle and O. Hemmers: Time-of-Flight Photoelectron Spectroscopy of Atoms and Molecules  
Proceedings of the Pan American Advanced Studies Institute (PASI), Angra dos Reis, Brazil, April 27-May 7, 2000 edited by H. Bryant and C. Cisneros

21.) O. Hemmers and D.W. Lindle: Non-Dipolar Effects in Soft-X-Ray Photoemission Proceedings of the Pan American Advanced Studies Institute (PASI), Angra dos Reis, Brazil, April 27-May 7, 2000 edited by H. Bryant and C. Cisneros

22.) O. Hemmers and D.W. Lindle: Photoelectron Spectroscopy and the Dipole Approximation  
Proceedings of the Sixteenth International Conference on the Application of Accelerators in Research and Industry (CAARI), Denton, TX, USA, November 1-4, 2000, edited by J.L. Duggan and I.L. Morgan (AIP Press, Woodbury, New York, 2001), p. 189

23.) O. Hemmers, H. Wang, G. Snell, M.M. Sant'Anna, I.A. Sellin, N. Berrah, D.W. Lindle, P.C. Deshmukh, N. Haque, and S.T. Manson: Dynamical Relativistic Effects in Photoionization: Spin-Orbit-Resolved Angular Distributions of Xenon 4d Photoelectrons near the Cooper Minimum  
Advanced Light Source Compendium of User Abstracts and Technical Reports 2001, August 2002

24.) O. Hemmers, M. Blackburn, T. Goddard, P. Glans, H.Wang, S.B. Whitfield, R.Wehlitz, I.A. Sellin, and D.W. Lindle: First Separate Measurements of the Nondipole Parameters  $\gamma$  and  $\delta$  Showcase Neon 2p Photoemission  
Advanced Light Source Compendium of User Abstracts and Technical Reports 2001, August 2002

25.) N. Mannella, B.S. Mun, S.-H. Yang, A.W. Kay, F.J. Garcia de Abajo, E. Arenholz, A.T. Young, Z. Hussain, H. Wang, O. Hemmers, D.W. Lindle, M.A. Van Hove, and C.S. Fadley: Multi-Atom Resonant Photoemission Effects from Solid Surfaces and Free Molecules  
Advanced Light Source Compendium of User Abstracts and Technical Reports 2001, August 2002

- 26.) O. Hemmers, D.W. Lindle, H. Wang, P. Focke, I.A. Sellin, J.C. Arce, J.A. Sheehy, and P.W. Langhoff: Large Nondipole Effects in the Angular Distributions of K-Shell Photoelectrons from N<sub>2</sub>  
ALS Activity Report, Science Highlights 2002, p. 52, June 2003
- 27.) J. Dunn, R.F. Smith, A.J. Nelson, S.J. Moon, J. Nilsen, R. Keenan, T.W. Van Buuren, J.R. Hunter, J. Filevich, J.J. Rocca, M.C. Marconi, A. Ng, O. Hemmers, D.W. Lindle, and V.N. Shlyaptsev: Picosecond-Driven X-ray Lasers for Probing Matter Undergoing Rapid Changes  
Applications of High Field and Short Wavelength Sources X, Centre de Congrès "Casino Municipal" Biarritz, France October 12-15, 2003
- 28.) A.J. Nelson, J. Dunn, T.W. van Buuren, J. Hunter, R.F. Smith, O. Hemmers, D.W. Lindle: X-ray laser induced time-of-flight photoelectron spectroscopy  
Soft X-Ray Lasers and Applications V, Editor: Ernst E. Fill, Proc. SPIE 5197, 168, 2003
- 29.) O. Hemmers, R. Guillemin, D. Rolles, A. Wolska, D.W. Lindle, E.P. Kanter, B. Krässig, S.H. Southworth, R. Wehlitz, B. Zimmermann, V. McKoy, and P.W. Langhoff: Low-Energy Nondipole Effects in Molecular Nitrogen Valence-Shell Photoionization  
ALS Activity Report, Science Highlights 2006, p. 72, July 2007
- 30.) K. E. Lipinska-Kalita, C. Segre, P. E. Kalita, O. Hemmers, Y. Ohki, J. Cecil, M. Chavarcha: Novel Oxide Based Nanocomposites: Development and Structural Characterization  
Bull. Am. Phys. Soc. **53**, No. 2, 713, 2008
- 31.) K. Lipinska, P. Kalita, O. Hemmers, S. Sinogeikin, O. Shebanova, W. Yang, G. Mariotto: Structural Integrity and Microstructure of Na<sup>+</sup> Conducting Ceramics  
Bull. Am. Phys. Soc. **55**, No. 2, 993, 2010
- 32.) J. Ma and O. Hemmers: Thermo-economic Analysis of Microalgae Co-firing Process for Fossil Fuel-fired Power Plants, ASME 4th International Conference on Energy Sustainability, May 19-22, Phoenix, Arizona 2010
- 33.) P. Kalita, A. Cornelius, K. Lipinska, O. Hemmers, S. Sinogeikin, M. Murshed and T. Gesing: New Structural Phase Transitions in PbMBO<sub>4</sub> Complex Oxides: Raman Spectroscopy and X-ray Diffraction Studies, Bulletin of the American Physical Society, Volume 57, Number 1 2012
- 34.) P. Kalita, A. Cornelius, S. Sinogeikin, K. Lipinska, O. Hemmers, M. Lufaso, Z. Kann, H. Schneider: New Structural Phase Transition in Bi<sub>2</sub>(Fe<sub>4-x</sub>Mn<sub>x</sub>)O<sub>10-x</sub> Complex Oxides and its Implications in the Mullite Family of Materials; Bull. Am. Phys. Soc. **56**, No. 1, J17.1 2011
- 35.) P. Kalita, A. Cornelius, K. Lipinska, O. Hemmers, S. Sinogeikin, M. Murshed and T. Gesing: New Structural Phase Transitions in PbMBO<sub>4</sub> Complex Oxides: Raman Spectroscopy and X-ray Diffraction Studies. Bulletin of the American Physical Society, Volume 57, Number 1 2012

**21. Scientific Presentations – Invited Talks**

- 1.) „Photoelektronen-Spektrometrie an CO zwischen 20 und 1000 eV“  
*DPG-Frühjahrstagung, Freiburg, Germany, March 11-15, 1991*
- 2.) „Intrinsische Elektronenanisotropien beim C-KVV Augerzerfall von CO“  
*DPG-Frühjahrstagung, Hannover, Germany, March 23-27, 1992*
- 3.) „Anregungsabhängiges Verhalten der C-KVV Satelliten-Augerlinien von CO im Shape Resonanz Bereich“  
*DPG-Frühjahrstagung, Berlin, Germany, March 15-19, 1993*
- 4.) “Variation of the C (KVV) Auger angular distribution in the C(1s)  $\sigma^*$ -resonance of CO”  
*Sixteenth International Conference on X-Ray and Inner-Shell Processes (X-93), Debrecen, Hungary, July 12-16, 1993*
- 5.) “Electron and Ion Time of Flight Spectroscopy with Synchrotron Radiation”  
*Department of Chemistry, University of Nevada, Las Vegas, USA, February 24, 1995*
- 6.) “First Order Corrections of the Dipole Approximation for Angular-Distribution Effects in Valence Photoemission”  
*Department of Chemistry, University of Nevada, Las Vegas, USA, October 18, 1996*
- 7.) “First Order Corrections of the Dipole Approximation for Angular-Distribution Effects in Valence Photoemission”  
*Workshop on Atomic and Molecular Physics at the Advanced Light Source, Berkeley, CA, USA, October 23, 1996*
- 8.) “Non-Dipole Effects in Atoms and Molecules”  
*Joint Meeting of the APS/AAPT with DAMOP and CAM’97, Washington, D.C., USA, April 20, 1997*
- 9.) “Beyond the Dipole Approximation: Angular-Distribution Effects in the 1s Photoemission from Small Molecules”  
*Eighteenth International Conference on X-ray and Inner-Shell Processes (X-99), Chicago, IL, USA, August 24, 1999*
- 10.) “Non-Dipolar Effects in Soft X-Ray Photoemission”  
*Advanced Light Source Users’ Meeting, Berkeley, CA, USA, October 19, 1999*
- 11.) “Non-Dipolar Effects in Soft X-Ray Photoemission”  
*Pan American Advanced Studies Institute (PASI), Atoms and Molecules in a New Light, Angra dos Reis, Brasil, May 2, 2000*
- 12.) “Photoelectron Spectroscopy and the Dipole Approximation”  
*Sixteenth International Conference on the Application of Accelerators in Research and Industry (CAARI 2000), Denton, TX, USA, November 2, 2000*
- 13.) “Large Nondipole Effects in the Core-Level Threshold Regions of Small Molecules”  
*Seminar Talk, Lure, Paris, France, November 12, 2001*
- 14.) “Large Nondipole Effects in the Core-Level Threshold Regions of Small Molecules”  
*Seminar Talk, Fritz-Haber-Institut of the Max-Planck Society, Berlin, Germany, November 16, 2001*
- 15.) “High-Resolution Electron Time-of-Flight Spectroscopy”  
*Seminar Talk, Lawrence Livermore National Laboratory, Livermore, CA, December 13, 2002*

16.) "Macroscopic Effects in Nondipolar Photoemission: First Measurements of Drag Currents"  
*International Workshop on Photoionization (IWP), Campinas, Brazil, July 2005*

17.) Invited Presentation at Brookings in Washington D.C. on "Climate Research – Another Look and New Perspectives", November 6, 2012

18.) Poster presentation "Explore the Six Fundamentals UNLV Accelerated: High-Energy X-Ray Applications (HEXA)" and tour of the UNLV Accelerator Facility, UNLV-NSTec Symposium, March 28, 2014

## **22. Public Presentations – Invited Talks**

1.) "Latest Development in Backing Up Data"  
CEO-CFO group of Southern Nevada on January 15, 2004

2.) "Renewable Energy Projects at UNLV"  
NSHE Board of Regent's RED committee on January 18, 2007

3.) "Solar, Hydrogen, Bio-Fuels & Sustainability Projects at UNLV"  
CEO-CFO group of Southern Nevada on April 27, 2007

4.) "Solar Energy Initiatives in Nevada"  
*The Las Vegas Future Salon on July 13, 2007*

5.) Presentations on „UNLV's renewable energy (algae) research" at the CEO-CFO group of Southern Nevada in June 2008

6.) Presentation on "Biofuels-Sense and Nonsense" Las Vegas Southwest Rotary Club, July 21, 2008.

7.) Presentation on „Renewable Energy Technologies: Gaps, Challenges and Solutions" at the Global Commerce Forum's International Conference on Energy, Logistics & the Environment at the Mirage Hotel, Las Vegas, October 29, 2008

8.) Panelist in round-table discussion on "Reducing U.S. Dependence on Foreign Oil: Lessons from Abroad" at Renaissance Hotel, Las Vegas, November 14, 2008

9.) Key-note speaker at the AECOM Energy Forum on "Renewable Energy Technologies: Gaps, Challenges and Solutions" at the Phoenician, Phoenix, AZ on November 19, 2008

10.) Presenter and Panelist at the Global Commerce Forum's 2<sup>nd</sup> International Conference on Energy, Logistics & the Environment on "Renewable Energy Technologies and Gaps" Panel Discussion and Case Studies at the Mirage Hotel, Las Vegas, October 24, 2009

11.) Panelist in round-table discussion on "America's Portfolio: What is Nuclear Energy's Role?" at The Atomic Testing Museum, Las Vegas, March 4, 2010

12.) Presentation on "Renewable Energy Projects in Nevada" at the Global Commerce Forum's 3<sup>rd</sup> International Conference on Energy, Logistics & the Environment on "Renewable Energy Technologies and Gaps Panel" at the Grand Hyatt Hotel, Denver, October 8-9, 2010

13.) Organizer and Panelist of the Forum "Fukushima Daiichi Nuclear Power Plant Accident: What happened, could it happen here, and what are the implications to U.S. policy?" at the Barrick Museum Auditorium, Las Vegas, March 21, 2011



14.) Participated in round-table hosted by the Nevada Business Magazine, titled "Industry Focus: Alternative Energy", Reno, Nevada, January 12, 2011, Find article at: <https://www.nevadabusiness.com/2011/03/industry-focus-alternative-energy/>

15.) Organizer and Panelist commemorating the 25th anniversary of the Chernobyl nuclear plant disaster and a round-table discussion on "America's Portfolio: What is Nuclear Energy's Role?" at the Barrick Museum Auditorium, Las Vegas, April 26, 2011

16.) Attended the Young Professionals in Energy (YPE) Summit in Las Vegas, held April 23-25, 2012. The booth, entitled "Clean Energy Education and Research are Hot in Nevada," also featured UNR and DRI, and was in cooperation with the Nevada Institute for Renewable Energy Commercialization (NIREC)

17.) Participated in round-table hosted by the Nevada Business Magazine, titled "Industry Focus: Alternative Energy", Reno, Nevada, March 6, 2013, Find article at: <http://www.nevadabusiness.com/2013/04/industry-focus-alternative-energy-4/>

18.) Invited to participate in the "Alternative Energy Roundtable" discussion, Nevada Business Magazine, Reno, NV, February 12, 2014. Article published at: <http://www.nevadabusiness.com/2014/03/industry-focus-alternative-energy-5/>

19.) Moderator of the public panel to the 3<sup>rd</sup> anniversary of Fukushima Daiichi Nuclear Power Plant Accident, organized by the American Nuclear Society-Nevada Chapter, at the Auditorium of the National Atomic Testing Museum, Las Vegas, Nevada, April 24, 2014

20.) Presentation on "Why Climate Models Fail" at the Bob Maheu First Wednesday luncheon, Las Vegas Country Club, Las Vegas, Nevada, July 9, 2014

21.) Presentation on "Why Climate Models Fail" at the American Nuclear Society-Nevada Chapter, at the Science and Engineering Building at UNLV, Las Vegas, Nevada, July 10, 2014

22.) Presentation on "The Science of Climate Change" at the Nevada Legislative Committee on Energy, Las Vegas, Nevada, February 8, 2016

23.) Presentation on "Quantum Computing – Speed, Encryption, Security" Aasim Cyber Group, at the Innovation Center, Las Vegas, Nevada, February 25, 2016

24.) Presentation on "Clean Energy Projects at the UNLV Harry Reid Center", October 17, 2021, Cesar's Palace at the 14<sup>th</sup> International Conference on Climate Change (ICCC-14) in Las Vegas, NV, October 15-17, 2021

### **23. Scientific Presentations – Conferences**

#### **Eleventh International Conference on Atomic Physics (ELICAP), Paris, France, July 4-8, 1988**

1. U. Becker, O. Hemmers, B. Langer, H.-G. Kerkhoff, M. Kupsch, A. Sivasli, D. Szostak, and R. Wehlitz  
Probing Electron Correlations: Multi-Electron-Processes in Photoionization

#### **Symposium on the Auger Effect, Paris, France, March 30-31, 1989**

2. U. Becker, O. Hemmers, B. Langer, and R. Wehlitz  
Participator Auger decay following inner-valence photoionization - a new type of Auger transition

#### **Third European Conference on Atomic and Molecular Physics (ECAMP 3), Bordeaux, France, April 3-7, 1989**

3. U. Becker, O. Hemmers, B. Langer, A. Menzel, and R. Wehlitz  
Radiationless decay of excited inner-valence hole states in neon

4. U. Becker, O. Hemmers, H.-G. Kerkhoff, M. Kupsch, B. Langer, and R. Wehlitz  
Valence and inner-shell photoionization of CO between 30 and 1000 eV

**Ninth International Conference on Vacuum Ultraviolet Radiation Physics (VUV9), Honolulu, Hawaii, USA, July 17-21, 1989**

5. U. Becker, O. Hemmers, B. Langer, A. Menzel, J. Vieffhaus, and R. Wehlitz  
Photoelectron asymmetries and threshold behavior of conjugate shake-up satellites associated with 1s and 2s photoionization

**Sixteenth International Conference on the Physics of Electronic and Atomic Collisions (XVI. ICPEAC), New York, NY, USA, July 26-August 1, 1989**

6. U. Becker, O. Hemmers, B. Langer, A. Menzel, and R. Wehlitz  
Auger decay of valence vacancies in rare gases

**54. Physikertagung, München, Germany, March 12-16, 1990**

7. J. Vieffhaus, B. Langer, O. Hemmers, A. Menzel, R. Wehlitz und U. Becker  
Hochauflösende Untersuchung des Li 1s "Conjugate shake-up"- Übergangs

8. F. Heiser, A. Menzel, O. Hemmers, B. Langer, R. Wehlitz und U. Becker  
Bestimmung der Anisotropie-Koeffizienten verschiedener Xe 4d Augerübergänge

9. B. Langer, V. v. Garnier, O. Hemmers, A. Menzel, R. Wehlitz und U. Becker  
Zur Photoionisation der Cd 4d Schale

10. R. Wehlitz, O. Hemmers, B. Langer, A. Menzel und U. Becker  
Untersuchung von Valenz-Doppelionisationsprozessen mittels winkelaufgelöster Photoelektronenspektroskopie

**Fifteenth International Conference on X-Ray and Inner-Shell Processes (X-90), Knoxville, TN, USA, July 9-13, 1990**

11. B. Langer, V.v. Garnier, O. Hemmers, A. Menzel, R. Wehlitz, and U. Becker  
Angular Distributions of Photoelectrons and Electron Correlation Satellites of 4d Photoionization in Atomic Cadmium

12. B. Langer, J. Vieffhaus, O. Hemmers, A. Menzel, R. Wehlitz, and U. Becker  
Li 1s conjugate shake-up processes

**Twelfth International Conference on Atomic Physics (12. ICAP), Ann Arbor, MI, USA, July 29-August 3, 1990**

13. R. Wehlitz, O. Hemmers, B. Langer, A. Menzel, and U. Becker  
Energy- and angular-distribution of shake-off electrons of He near threshold

**DPG-Frühjahrstagung, Freiburg, Germany, March 11-15, 1991**

14. R. Wehlitz, O. Hemmers, B. Langer, A. Menzel und U. Becker  
Winkelverteilungs-Asymmetrien von Shake-off Elektronen in Schwellnähe



15. J.C. Allman, U. Becker, M. Domke, F. Heiser, O. Hemmers, G. Kaindl, L.J. Medhurst, O. Plotzke, A. Puschmann, D.A. Shirley, J. Viehhaus  
Nullvoltelektronen und Ionisationsspektroskopie im weichen Röntgenbereich

16. J.C. Allman, U. Becker, M. Domke, F. Heiser, O. Hemmers, G. Kaindl, L.J. Medhurst, O. Plotzke, A. Puschmann, D.A. Shirley, J. Viehhaus  
High-Resolution Zerovolt-Electron and Ion-Yield Spectroscopy with Soft X-Rays

17. O. Hemmers, B. Langer, A. Menzel, R. Wehlitz und U. Becker  
Photoelektronen-Spektrometrie an CO zwischen 20 und 1000 eV

**Seventeenth International Conference on the Physics of Electronic and Atomic Collisions (XVII. ICPEAC), Brisbane, Australia, July 10-16, 1991**

18. U. Becker, O. Hemmers, B. Langer, A. Menzel, and R. Wehlitz  
Evidence for Sequential Processes in Molecular Valence Double Ionization

19. U. Becker, J. Eiben, F. Heiser, O. Hemmers, and R. Wehlitz  
Molecular Orientation and Intrinsic Auger Anisotropy Following K-Shell Photoionization of CO

20. R. Wehlitz, O. Hemmers, B. Langer, A. Menzel, and U. Becker  
Two-Electron Emission in the Valence Photoionization of Rare Gases

**DPG-Frühjahrstagung, Hannover, Germany, March 23-27, 1992**

21. B. Langer, W. Mahler, O. Hemmers, A. Menzel, R. Wehlitz und U. Becker  
Anregungsenergieabhängiges Verhalten der Ar 3s und Xe 5s Korrelationssatelliten

22. A. Menzel, O. Hemmers, B. Langer, R. Wehlitz und U. Becker  
Winkelverteilungen der Zerfallselektronen von rumpfangeregtem HCl

23. O. Hemmers, J. Eiben, F. Heiser, R. Wehlitz und U. Becker  
Intrinsische Elektronenanisotropien beim C-KVV Augerzerfall von CO

**Fourth European Conference on Atomic and Molecular Physics (ECAMP 4), Riga, Latvia, April 6-10, 1992**

24. R. Wehlitz, O. Hemmers, B. Langer, A. Menzel, and U. Becker  
Electron-energy and -Angular Distributions in the Double Photoionization of Rare Gases

25. U. Becker, O. Hemmers, B. Langer, A. Menzel, and R. Wehlitz  
Evidence for Atomic Processes in Molecular Valence Double Ionization

26. B. Langer, W. Mahler, O. Hemmers, A. Menzel, R. Wehlitz, and U. Becker  
Photon Energy Dependent Behavior of the Valence Electron Correlation Satellites in Argon and Xenon

27. O. Hemmers, F. Heiser, J. Eiben, R. Wehlitz, and U. Becker  
Intrinsic Auger Anisotropies in the C-KVV Auger Decay of CO

28. A. Menzel, O. Hemmers, B. Langer, R. Wehlitz, and U. Becker  
Angular Distributions of Electrons in the Decay-Spectra of Core-excited HCl

**Tenth International Conference on Vacuum Ultraviolet Radiation Physics (VUV10), Paris, France, July 27-31, 1992**

29. U. Becker, O. Hemmers, B. Langer, I. Lee, A. Menzel, R. Wehlitz, and M. Ya. Amusia

**Multiplet-Changing Auger Transitions in Valence Double Photoionization**

30. B. Langer, O. Hemmers, A. Menzel, R. Wehlitz, and U. Becker  
He  $n = 2$  Satellite Production Reconsidered

31. A. Menzel, O. Hemmers, B. Langer, R. Wehlitz, and U. Becker  
Alignment Transfer in the Dissociation of Core-excited HCl

32. O. Hemmers, F. Heiser, J. Eiben, R. Wehlitz, and U. Becker  
Shape Resonance Induced Alignment Variation Observed via C-KVV Diagram and Satellite Auger Transitions of CO

**Thirteenth International Conference on Atomic Physics (13. ICAP), München, August 3-7, Germany, 1992**

33. B. Langer, J. Viehhaus, O. Hemmers, A. Menzel, R. Wehlitz, and U. Becker  
Observation of Parity Unfavoured Transitions in the Nonresonant Photoionization of Argon

**International Workshop on Photoionization (IWP-92), Berlin, Germany, August 24-28, 1992**

34. B. Langer, J. Viehhaus, O. Hemmers, A. Menzel, R. Wehlitz, and U. Becker  
Observation of Parity Unfavoured Transitions in the Nonresonant Photoionization of Argon

35. U. Becker, O. Hemmers, B. Langer, I. Lee, A. Menzel, R. Wehlitz, and M. Ya. Amusia  
Multiplet-changing Auger Transitions in Valence Double Photoionization

36. A. Menzel, O. Hemmers, B. Langer, R. Wehlitz, and U. Becker  
Alignment Transfer in the Dissociation of Core-excited HCl

**DPG-Frühjahrstagung, Berlin, Germany, March 15-19, 1993**

37. A. Menzel, O. Hemmers, B. Langer, R. Wehlitz und U. Becker  
Untersuchung der Valenz- und Innerschalen-Photoionisation von HCl

38. V. Dzidzonou, J. Viehhaus, O. Hemmers, B. Langer und U. Becker  
Untersuchung der Photoionisation von HgCl<sub>2</sub>

39. O. Hemmers, F. Heiser, J. Eiben, R. Wehlitz und U. Becker  
Anregungsabhängiges Verhalten der C-KVV Satelliten-Augerlinien von CO im Shape-Resonanz Bereich

40. R. Wehlitz, O. Hemmers, B. Langer, A. Menzel und U. Becker  
Die Elektronen-Winkelverteilung bei der Doppelionisation von He

**Fifteenth International Symposium on Molecular Beams (ISMB-15), Berlin, Germany, May 16-21, 1993**

41. U. Becker, F. Heiser, O. Hemmers, A. Menzel, and R. Wehlitz  
Ionization and fragmentation of core excited molecules

**Sixteenth International Conference on X-Ray and Inner-Shell Processes (X-93), Debrecen, Hungary, July 12-16, 1993**

42. O. Hemmers, F. Heiser, J. Eiben, R. Wehlitz, and U. Becker  
Variation of the C-KVV Auger Angular-Distribution in the C  $1s \sigma^*$  -Resonance of CO

43. A. Menzel, O. Hemmers, B. Langer, R. Wehlitz, and U. Becker  
Study of the Cl  $2p$  Excitation and Ionization in HCl

**Eighteenth International Conference on the Physics of Electronic and Atomic Collisions (XVIII. ICPEAC), Århus, Denmark, July 21-27, 1993**

44. R. Wehlitz, O. Hemmers, B. Langer, A. Menzel, and U. Becker  
Angular Distribution of Photoelectrons Following Double Ionization of He

**58. Physikertagung, Hamburg, Germany, March 14-18, 1994**

45. T. Liebsch, O. Plotzke, F. Heiser, U. Hergenbahn, O. Hemmers, R. Wehlitz und U. Becker  
Winkelaufgelöste Elektronenspektroskopie an  $C_{60}$

46. R. Wehlitz, J. Viefhaus, O. Hemmers und U. Becker  
Beobachtung ausgeprägter  $n$ -Abhängigkeiten beim Zerfall der Ne  $1s \rightarrow np$  Resonanzen

47. A. Menzel, O. Hemmers, B. Langer, J. Viefhaus, R. Wehlitz und U. Becker  
Elektronische Relaxation vs. schnelle Dissoziation beim Zerfall der Cl  $2p$  Anregungen von HCl und DCI

**1994 Annual Meeting of the Division of Atomic, Molecular, and Optical Physics (DAMOP), Washington, DC, USA, April 18-21, 1994**

48. U. Becker, N. Berrah, O. Hemmers, B. Langer, J. Viefhaus, R. Wehlitz, and S. B. Whitfield  
Pronounced  $n$ -Dependences of Auger Spectra after Ne  $1s \rightarrow np$  Excitations

**Gordon Research Conference on Electron Spectroscopy, New England College, New Hampshire, USA, July 3-8, 1994**

49. U. Becker, F. Heiser, O. Hemmers, and K. Wieliczek  
Angle resolved studies of photodissociation dynamics of small molecules

**Fourteenth International Conference on Atomic Physics (14. ICAP) Boulder, Colorado, USA, July 31-August 5, 1994**

50. U. Becker, N. Berrah, O. Hemmers, U. Hergenbahn, B. Langer, J. Viefhaus, R. Wehlitz, and S.B. Whitfield  
Double Ionization Following  $1s \rightarrow np$  Excitation of Atomic Neon

**European Conference on Atomic and Molecular Physics (ECAMP-5), Edinburgh, UK, April 3-7, 1995**

51. F. Heiser, N. Saito, K. Wieliczek, O. Hemmers, N. Berrah and U. Becker  
Angle resolved ionic fragmentation studies of small molecules

**1995 Annual Meeting of the Division of Atomic, Molecular, and Optical Physics (DAMOP), Toronto, Ontario, Canada, May 16-19, 1995**

52. B. Langer, O. Hemmers, O. Toader, J.D. Bozek, and N. Berrah  
Angle Resolved High Resolution Studies of the Xe  $4d^{-1} \rightarrow 5p^2np$  Resonances

53. A. Farhat, B. Langer, O. Hemmers, M. Humphrey, N. Berrah  
Photoionization with Excitation of the  $4s$  and  $4p$  Subshells in Krypton

54. N. Berrah, O. Toader, B. Langer, J.D. Bozek, D.W. Lindle, O. Hemmers  
Autoionization of Ar, Kr, and Xe near the  $ns$  threshold-determination of partial cross section and  $\beta$  parameter in  $ns\text{-}\epsilon p$  transitions



**Nineteenth International Conference on the Physics of Electronic and Atomic Collisions (XIX. ICPEAC), Whistler, Canada, July 26-August 1, 1995**

55. B. Langer, N. Berrah, J.D. Bozek, O. Hemmers, D.W. Lindle, and O. Toader  
High Resolution Angle Resolved Photoelectron Spectroscopy at the ALS: The  $Ar3s^{-1} \rightarrow np$  Resonances

56. F. Heiser, N. Saito, K. Wieliczek, O. Hemmers, N. Berrah and U. Becker  
Fragmentation dynamics of core excited molecules

57. N. Saito, F. Heiser, O. Hemmers, A. Hempelmann, K. Wieliczek, J. Viefhaus and U. Becker  
High resolution ionic fragmentation studies of small molecules

**Eleventh International Conference on Vacuum Ultraviolet Radiation Physics (VUV-11), Tokyo, Japan, August 27-September 1, 1995**

58. R.C.C. Perera, W. Ng, G. Jones, O. Hemmers, P. Glans, S. Whitfield, H. Wang, D.W. Lindle  
Results from the High-Brightness X-Ray Spectroscopy Beamline at ALS for 2-5 keV Region

59. F. Heiser, N. Saito, K. Wieliczek, O. Hemmers, N. Berrah and U. Becker  
Dissociation dynamics of small molecules

**National Synchrotron Radiation Instrumentation Meeting (SRI-95), Argonne, Illinois, USA, October 18-25, 1995**

60. W. Ng, G. Jones, R.C.C. Perera, D. Hansen, J. Daniels, O. Hemmers, P. Glans, S.B. Whitfield, H. Wang, and D.W. Lindle  
First Results from the High-Brightness X-Ray Spectroscopy Beamline at ALS

**Advanced Light Source Users' Association Annual Meeting, Berkeley, CA, October 23-24, 1995**

61. P. Glans, D. Hansen, O. Hemmers, H. Wang, S.B. Whitfield, D.W. Lindle, W.C. Stolte, J.A.R. Samson  
Ion Time-of-Flight Spectroscopy of  $CH_3Cl$

62. D.L. Hansen, P. Glans, O. Hemmers, H. Wang, S.B. Whitfield, D.W. Lindle, W. Ng, R.C.C. Perera, G. Fisher, W.C. Stolte, J.C. Levin  
Ion Time of Flight Mass Spectroscopy at Beamline 9.3.1

63. W.C. Stolte, J.A.R. Samson, D.L. Hansen, P. Glans, O. Hemmers, H. Wang, S.B. Whitfield, D.W. Lindle  
K-Shell Excitation and Photoionization of Atomic Oxygen

64. O. Hemmers, G. Fisher, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, J.C. Levin, and I.A. Sellin  
First Results of Non-Dipole Measurements on Beamline 8.0

**DPG-Frühjahrstagung, Rostock, Germany, March 18-22, 1996**

65. A. Hempelmann, F. Heiser, O. Hemmers, N. Saito, J. Viefhaus, K. Wieliczek, und U. Becker  
Hochaufgelöste Ionisations- und Nullvolt spektroskopie kleiner Moleküle

**1996 Annual Meeting of the Division of Atomic, Molecular, and Optical Physics (DAMOP), Ann Arbor, MI, USA, May 15-18, 1996**

66. A. Farhat, B. Langer, N. Berrah, O. Hemmers, J.D. Bozek  
Angle Resolved Study of the  $Xe 4d \rightarrow 6p$  Resonant Auger Process with High Resolution

67. R. Wehlitz, I.A. Sellin, O. Hemmers, S.B. Whitfield, D.W. Lindle, B. Langer, N. Berrah, J. Viefhaus, and U. Becker  
Ionization-Excitation of Helium at High Photon Energies

68. O. Hemmers, G. Fisher, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, J.C. Levin, and I.A. Sellin  
Non-Dipolar Angular Distributions of Ne 2s and 2p Valence Photoelectrons

69. W.C. Stolte, Y. Lu, J.A.R. Samson, D.L. Hansen, S.B. Whitfield, P. Glans, H. Wang, O. Hemmers, D.W. Lindle  
Effects of Post-Collision Interaction for the Auger decay of the Oxygen K-Shell

**Seventeenth International Conference on X-Ray and Inner-Shell Processes (X-96), Hamburg, Germany, September 9-13, 1996**

70. O. Hemmers, R. Wehlitz, G. Fisher, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, J.C. Levin, I.A. Sellin, and D.W. Lindle  
Non-Dipole Effects in Ne and Xe below 1.2 keV

71. H. Wang, P. Glans, O. Hemmers, S.B. Whitfield, and D.W. Lindle  
An Autoionization Study of Argon 2p Satellites Excited near the Argon 2s Threshold

72. N. Berrah, B. Langer, A. Farhat, O. Hemmers, J.D. Bozek  
Angle Resolved High Resolution Studies of the Xe  $4d_{5/2} \rightarrow 6p$  Resonance

**Advanced Light Source Users' Association Annual Meeting, Berkeley, CA, October 21-22, 1996**

73. O. Hemmers, S.B. Whitfield, P. Glans, H. Wang, D.L. Hansen, G. Fisher, D.W. Lindle, R. Wehlitz, J.C. Levin, I.A. Sellin, R.C.C. Perera, E.W.B. Dias, H.S. Chakraborty, P.C. Deshmukh, S.T. Manson  
Non-Dipole Effects in Ne and Xe below 1.2 keV

74. R. Wehlitz, I.A. Sellin, O. Hemmers, S.B. Whitfield, P. Glans, H. Wang, D.W. Lindle, B. Langer, N. Berrah, J. Viefhaus, U. Becker  
Photon energy dependence of ionization-excitation in helium at medium energies

75. H. Wang, G.B. Armen, P. Glans, O. Hemmers, R. Wehlitz, S. B. Whitfield, and D. W. Lindle  
An Autoionization Study of Argon 2p Satellites Excited near the Argon 2s Threshold

**1997 Joint Meeting of the APS/AAPT with DAMOP and CAM'97, Washington, D.C., USA, April 18-21, 1997**

76. R. Wehlitz, I.A. Sellin, O. Hemmers, S.B. Whitfield, P. Glans, H. Wang, D.W. Lindle, B. Langer, N. Berrah, J. Viefhaus, and U. Becker  
Partial Photoionization Cross-Sections of Helium Satellites at Medium Photon Energies

77. S.T. Manson, E.W.B. Dias, H.S. Chakraborty, P.C. Deshmukh, O. Hemmers, G. Fisher, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, J.C. Levin, I.A. Sellin, and R.C.C. Perera  
Breakdown of the Independent Particle Approximation in High-Energy Photoionization

**International Workshop on Photoionization (IWP-97), Chester, England, July 16-21, 1997**

78. S.T. Manson, E.W.B. Dias, H.S. Chakraborty, P.C. Deshmukh, O. Hemmers, G. Fisher, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, J.C. Levin, I.A. Sellin, and R.C.C. Perera  
Breakdown of the Independent Particle Approximation in High-Energy Photoionization

**Twentieth International Conference on the Physics of Electronic and Atomic Collisions (XX. ICPEAC), Vienna, Austria, July 23-29, 1997**

79. S.T. Manson, E.W.B. Dias, H.S. Chakraborty, P.C. Deshmukh, O. Hemmers, G. Fisher, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, J.C. Levin, I.A. Sellin, and R.C.C. Perera  
Breakdown of the Independent Particle Approximation in High-Energy Photoionization

**Advanced Light Source Users' Association Annual Meeting, Berkeley, CA, October 13-14, 1997**

80. O. Hemmers, P. Glans, H. Wang, D.W. Lindle, R. Wehlitz, J.C. Levin, I.A. Sellin, R.C.C. Perera  
Beyond the Dipole Approximation: Angular-Distribution Effects in Molecular Nitrogen

81. O. Hemmers, P. Glans, D.L. Hansen, H. Wang, S.B. Whitfield, D.W. Lindle, E.W.B. Dias, H.S. Chakraborty, P.C. Deshmukh, S.T. Manson, R. Wehlitz, J.C. Levin, I.A. Sellin, and R.C.C. Perera  
Breakdown of the Independent Particle Approximation in High-Energy Photoionization

**Nevada Science and Technology Symposium, Univ. of Nevada, Las Vegas, Nevada, January 9, 1998**

82. D.W. Lindle, O. Hemmers, P. Glans, H. Wang, R. Wehlitz, J.C. Levin, I.A. Sellin  
Beyond the Dipole Approximation: Angular-Distribution Effects in N<sub>2</sub>

**1998 Annual Meeting of the Division of Atomic, Molecular, and Optical Physics (DAMOP), Santa Fe, NM, USA, May 27 - 30, 1998**

83. J. York, S.B. Whitfield, P. Glans, D.L. Hansen, O. Hemmers, H. Wang, D.W. Lindle, R. Wehlitz, I.A. Sellin  
Non-dipole Effects in the Photoionization of the Xe  $n = 4$  and  $n = 5$  Subshells

84. O. Hemmers, P. Glans, H. Wang, D.W. Lindle, R. Wehlitz, J.C. Levin, I.A. Sellin, R.C.C. Perera  
Beyond the Dipole Approximation: Angular-Distribution Effects in N<sub>2</sub>

**Twelfth International Conference on Vacuum Ultraviolet Radiation Physics (VUV-12), San Francisco, California, USA, August 3-7, 1998**

85. H. Wang, P. Glans, O. Hemmers, S.B. Whitfield, D.W. Lindle, R. Wehlitz, I.A. Sellin, G.B. Armen, J.C. Levin, R.C.C. Perera  
An Angle-Resolved Autoionization Study of the Argon 2p Satellites Excited Near the Argon 2s Threshold

86. O. Hemmers, H. Wang, P. Glans, R. Wehlitz, P. Focke, J.C. Levin, I.A. Sellin, R.C.C. Perera, P.W. Langhoff, J.A. Sheehy, J.D. Mills, D.W. Lindle  
Beyond the Dipole Approximation: Angular-Distribution Effects in 1s Photoemission from Small Molecules

**Advanced Light Source Users' Association Annual Meeting, Berkeley, CA, October 22-23, 1998**

87. D.L. Hansen, O. Hemmers, H. Wang, D.W. Lindle, H.S. Chakraborty, P.C. Deshmukh, S.T. Manson:  
High-Energy Valence Photoionization of Argon  
Effect of Interaction with 3s Photoionization Channels

88. O. Hemmers, H. Wang, P. Glans, W. Stolte, R. Wehlitz, P. Focke, J.C. Levin, I.A. Sellin, R.C.C. Perera, P.W. Langhoff, J.A. Sheehy, J.D. Mills, D.W. Lindle: Beyond the Dipole Approximation  
Angular-Distribution Effects in 1s Photoemission from Small Molecules

**1999 Centennial Meeting of the American Physical Society, Atlanta, GA, USA, March 20-26, 1999**

89. W.R. Johnson, A. Derevianko, K.T. Cheng, V.K. Dolmatov, S.T. Manson, O. Hemmers, S. Oblad, P. Glans, S.B. Whitfield, H. Wang, D.W. Lindle, R. Wehlitz, I.A. Sellin  
RPA studies of nondipolar angular-distribution asymmetry parameters in the  $n = 2$  shell of neon



90. W.C. Stolte, D.L. Hansen, H. Wang, O. Hemmers, D.W. Lindle, I.D. Lopez, A. Rizvi, A.S. Schlachter, M.S. Lubell  
Production of oxygen anions in the K-shell photoionization of CO

91. D.L. Hansen, O. Hemmers, H. Wang, D.W. Lindle, H.S. Chakraborty, P.C. Deshmukh, and S.T. Manson:  
High-Energy Valence Photoionization of Argon  
Effect of Interaction with 3s Photoionization Channels

92. O. Hemmers, H. Wang, D.W. Lindle, P. Focke, I.A. Sellin, J.A. Sheehy, J.D. Mills, and P.W. Langhoff:  
Beyond the Dipole Approximation  
Angular-Distribution Effects in the 1s Photoemission from Small Molecules

**Twentyfirst International Conference on the Physics of Electronic and Atomic Collisions (XXI. ICPEAC), Sendai, Japan, July 22-27, 1999**

93. A. Hempelmann, N. Saito, F. Heiser, O. Hemmers, K. Wieliczek, J. Viehhaus, and U. Becker  
Evidence for Fragmentation Channel Dependent Linewidth Narrowing in K-Shell Photoexcitation Spectroscopy of N<sub>2</sub> and CO

94. O. Hemmers, P. Glans, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, I.A. Sellin, A. Derevianko, and W.R. Johnson  
First and Second Order Corrections to the Dipole Approximation observed in neon below 1000 eV

**Berkeley Lab Center for Science and Engineering Education, Summer Student Poster Session, Berkeley, CA, USA, August 4, 1999**

95. M. Blackburn, F. Schlachter, and O. Hemmers  
Hard Exams? (In Atomic & molecular Spectroscopy)

**Eighteenth International Conference on X-Ray and Inner-Shell Processes (X-99), Chicago, IL, USA, August 23-27, 1999**

96. O. Hemmers, H. Wang, D.W. Lindle, P. Focke, I.A. Sellin, J.A. Sheehy, J.D. Mills, and P.W. Langhoff:  
Beyond the Dipole Approximation  
Angular-Distribution Effects in the 1s Photoemission from Small Molecules

97. O. Hemmers, P. Glans, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, I.A. Sellin, A. Derevianko, and W.R. Johnson  
First and Second Order Corrections to the Dipole Approximation observed in neon below 1000 eV

98. P.R. Focke, O. Hemmers, H. Wang, I.A. Sellin, J.C. Levin, and D.W. Lindle  
Angular Distribution of Xe M-NN Auger Decay following 834 eV Photoionization

**Advanced Light Source Users' Association Annual Meeting, Berkeley, CA, October 18-20, 1999**

99. O. Hemmers, P. Glans, H. Wang, S.B. Whitfield, D.W. Lindle, R. Wehlitz, I.A. Sellin, A. Derevianko, W.R. Johnson  
Comprehensive Photoelectron Angular Distributions Study of the Valence Shells in Neon

100. P.R. Focke, O. Hemmers, H. Wang, I.A. Sellin, J.C. Levin, and D.W. Lindle  
Angular Distribution of Xe M-NN Auger Decay Following 834 eV Photoionization

**2000 Annual Meeting of the Division of Atomic, Molecular, and Optical Physics (DAMOP), Storrs, Ct, USA, June 14 - 17, 2000**

101. P.W. Langhoff, J.C. Arce, J.A. Sheehy, O. Hemmers, H. Wang, D.W. Lindle, P. Focke, I.A. Sellin  
On the angular distributions of electrons photoejected from fixed-in-space and randomly oriented molecules

**Southern Nevada Summer Research Experience Programs, UNLV-EPSCoR, Summer 2000**

102. M. Lotrakul, O. Hemmers, and D.W. Lindle  
Dipole/Nondipole Angular-Distribution Effects in CO by Time-of-Flight Photoelectron Spectroscopy with Synchrotron Radiation

**Eighth International Conference on Electronic Spectroscopy & Structure (ICES8), Berkeley, CA, USA, August 8-12, 2000**

103. H.Wang, O. Hemmers, P. Focke, M.M. Sant'Anna, D. Lukic, M. Grush, I.A. Sellin and D.W. Lindle  
Observation of Non-Dipolar Effects of Xenon *4d* Photoelectrons in the Vicinity of Cooper Minimum

104. H. Wang, G. Snell, O. Hemmers, B. Langer, M.M. Sant'Anna, N. Berrah, and D.W. Lindle  
Dipolar Angular Distributions and Branching Ratio of Xenon *4d* Photoelectrons in the Photon Energy Range of 100-250 eV

105. H. Wang, O. Hemmers, P. Focke, M.M. Sant'Anna, D. Lukic, C. Heske, R.C.C. Perera, I.A. Sellin, and D.W. Lindle  
Non-Dipolar and Dipolar Angular Distribution of S *2s* and *2p* of SF<sub>6</sub> Core-Level Photoionization in the Vicinity of F *1s* Excitation

**Advanced Light Source Users' Association Annual Meeting, Berkeley, CA, October 16-18, 2000**

106. D.L. Hansen, W.C. Stolte, M.N. Piancastelli, I. Dominguez Lopez, A. Rizvi, O. Hemmers, H.Wang, A.S. Schlachter, M.S. Lubell, and D.W. Lindle  
Post-Collision Interaction Moderated Anion Formation Following Photofragmentation of CO

107. H.Wang, O. Hemmers, P. Focke, M.M. Sant'Anna, D. Lukic, M. Grush, I.A. Sellin, and D.W. Lindle  
Observation of Non-Dipolar Effects of Xenon *4d* Photoelectrons in the Vicinity of Cooper Minimum

108. H. Wang, G. Snell, O. Hemmers, B. Langer, M.M. Sant'Anna, N. Berrah, and D.W. Lindle  
Dipolar Angular Distributions and Branching Ratio of Xenon *4d* Photoelectrons in the Photon Energy Range of 100-250 eV

109. H. Wang, O. Hemmers, P. Focke, M.M. Sant'Anna, D. Lukic, C. Heske, R.C.C. Perera, I.A. Sellin, and D.W. Lindle  
Non-Dipolar and Dipolar Angular Distribution of S *2s* and *2p* of SF<sub>6</sub> Core-Level Photoionization in the Vicinity of F *1s* Excitation

110. P.W. Langhoff, J.C. Arce, J.A. Sheehy, O. Hemmers, H. Wang, P. Focke, I.A. Sellin, and D.W. Lindle  
On the angular distributions of electrons photoejected from fixed-in-space and randomly oriented molecules

**2001 Annual Meeting of the Division of Atomic, Molecular, and Optical Physics (DAMOP), London, Ontario, Canada, May 16-19, 2001**

111. O. Hemmers, S.T. Manson, M. Sant'Anna, P. Focke, H. Wang, I.A. Sellin, and D.W. Lindle  
Relativistic effects on interchannel coupling in atomic photoionization: the photoelectron angular distribution of Xe *5s*

**Twentysecond International Conference on the Physics of Electronic and Atomic Collisions (XXII. ICPEAC), Santa Fe, NM, USA, July 18-24, 2001**

112. O. Hemmers, M. Lotrakul, G. Öhrwall, S.W. Yu, D. Lukic, I.A. Sellin, and D.W. Lindle

Large Nondipole Effects in the Core-Level Threshold Regions of Small Molecules

**Berkeley Lab Center for Science and Engineering Education, Summer Student Poster Session, Berkeley, CA, USA, August 7, 2001**

113. Monica Pangilinan, Sierra Laidman, Alfred Schlachter, Oliver Hemmers, Dennis Lindle, Gunnar Öhrwall, Sung Woo Yu, Renaud Guillemin, Wayne Stolte  
Light at the End of the Tunnel (Exploring the Limitations of the Dipole Approximation)

114. Sierra Laidman, Monica Pangilinan, Alfred Schlachter, Oliver Hemmers, Dennis Lindle, Gunnar Öhrwall, Sung Woo Yu, Renaud Guillemin, Wayne Stolte  
Let there be Light (Beamline 8.0.1 and a Time-of-Flight Apparatus)

**The Thirteenth International Conference on Vacuum Ultraviolet Radiation Physics (VUV-13), Trieste, Italy, July 23-27, 2001**

115. O. Hemmers, M. Lotrakul, G. Öhrwall, S.W. Yu, D. Lukic, I.A. Sellin, and D.W. Lindle  
Large Nondipole Effects in the Core-Level Threshold Regions of small Molecules

116. G. Öhrwall, O. Hemmers, S.W. Yu, M. Lotrakul, D. Lukic, I.A. Sellin, and D.W. Lindle  
Nondipole Effects in Core-Electron Photoemission Angular Distributions of small Molecules

**VUV-13 Satellite Meeting "Decay Processes in Core-Excited Species" Rome, Italy, July 30 - Aug 2, 2001**

117. G. Öhrwall, O. Hemmers, S.W. Yu, R. Guillemin, M. Lotrakul, D. Lukic, I.A. Sellin, and D.W. Lindle  
Non-Dipole Effects in Atomic and Molecular Photoemission

**Advanced Light Source Users' Association Annual Meeting, Berkeley, CA, October 15-17, 2001**

118. O. Hemmers, M. Lotrakul, G. Öhrwall, S.W. Yu, D. Lukic, I.A. Sellin, and D.W. Lindle  
Large Nondipole Effects in the Core-Level Threshold Regions of small Molecules

**2002 Annual Meeting of the Division of Atomic, Molecular, and Optical Physics (DAMOP), Williamsburg, VA, USA, May 29-June 1, 2002**

119. E.P. Kanter, B. Krässig, S.H. Southworth, R. Guillemin, O. Hemmers, D.W. Lindle, N.L.S. Martin, and R. Wehlitz  
Dipole-forbidden Photoionization through the He  $2p^2\ ^1D_2$  Autoionizing Resonance

120. O. Hemmers, R. Guillemin, G. Öhrwall, M. Lotrakul, S.W. Yu, D.W. Lindle, P.C. Deshmukh, S.T. Manson, and I.A. Sellin: Relativistic Effects on Dipole and Nondipole Interchannel Coupling in Atomic Photoionization  
The Photoelectron Angular Distributions of Xe 5s and 5p

121. O. Hemmers, D.W. Lindle, M. Blackburn, T. Goddard, P. Glans, H. Wang, S.B. Whitfield, R. Wehlitz, and I.A. Sellin  
First Separate Measurements of the Nondipole Parameters  $\gamma$  and  $\delta$ : Showcase Neon 2p Photoemission

122. O. Hemmers, M. Lotrakul, G. Öhrwall, R. Guillemin, S.W. Yu, D.W. Lindle, D. Lukic, and I.A. Sellin  
Large Nondipole Effects in the Core-Level Threshold Regions of Small Molecules

123. N.L.S. Martin, E.P. Kanter, B. Krässig, S.H. Southworth, R. Guillemin, O. Hemmers, D.W. Lindle, and R. Wehlitz  
Resonant Non-Dipole Parameters for He  $2l2l'$  Autoionizing Resonances

124. R. Guillemin, O. Hemmers, D.W. Lindle, E. Shigemasa, K. Le Guen, D. Ceolin, C. Miron, N. Leclercq, P. Morin, M. Simon, and P.W. Langhoff  
Non-Dipolar Electron Angular Distributions from Fixed-in-Space Molecules

**Symposium in Honor of C.E. Brion (85th Canadian Society for Chemistry Conference and Exhibition):  
Electron and VUV Photon Impact Methods, Vancouver, British Columbia, Canada, June 4-5 2002**

125. D.W. Lindle, W.C. Stolte, O. Hemmers, G. Öhrwall, D.L. Hansen, L.T.N. Dang, M.M. Sant'Anna, A.S. Schlachter, I. Dominguez-Lopez, M.N. Piancastelli, and M. Lubell  
Anionic Photofragmentation of Core-Excited Small Molecules

126. D.W. Lindle, O. Hemmers, M. Lotrakul, G. Öhrwall, R. Guillemin, S.W. Yu, D. Lukic, and I.A. Sellin  
Nondipole Angular-Distribution Effects in Photoemission from Atoms and Molecules

**Nineteenth International Conference on X-Ray and Inner-Shell Processes (X-02), Rome, Italy, June 24-28, 2002**

127. O. Hemmers, D.W. Lindle, M. Blackburn, T. Goddard, P. Glans, H. Wang, S.B. Whitfield, R. Wehlitz, and I.A. Sellin  
First Separate Measurements of the Nondipole Parameters  $\gamma$  and  $\delta$ : Showcase Neon  $2p$  Photoemission

128. O. Hemmers, M. Lotrakul, G. Öhrwall, R. Guillemin, S.W. Yu, D.W. Lindle, D. Lukic, and I.A. Sellin  
Large Nondipole Effects in the Core-Level Threshold Regions of Small Molecules

129. R. Guillemin, O. Hemmers, D.W. Lindle, E. Shigemasa, K. Le Guen, D. Ceolin, C. Miron, N. Leclercq, P. Morin, M. Simon, and P.W. Langhoff  
Non-Dipolar Electron Angular Distributions from Fixed-in-Space Molecules

**International Workshop on Photoionization (IWP-02), SPring-8, Hyogo, Japan, August 22-26, 2002**

130. O. Hemmers, R. Guillemin, G. Öhrwall, M. Lotrakul, S.W. Yu, D.W. Lindle, P.C. Deshmukh, S.T. Manson, and I.A. Sellin  
Relativistic Effects on Dipole and Nondipole Interchannel Coupling in Atomic Photoionization: The Photoelectron Angular Distributions of Xe  $5s$  and  $5p$

131. O. Hemmers, D.W. Lindle, M. Blackburn, T. Goddard, P. Glans, H. Wang, S.B. Whitfield, R. Wehlitz, and I.A. Sellin  
First Separate Measurements of the Nondipole Parameters  $\gamma$  and  $\delta$  Showcase Neon  $2p$  Photoemission

132. O. Hemmers, M. Lotrakul, G. Öhrwall, R. Guillemin, S.W. Yu, D.W. Lindle, D. Lukic, and I.A. Sellin  
Large Nondipole Effects in the Core-Level Threshold Regions of Small Molecules

133. R. Guillemin, O. Hemmers, D.W. Lindle, E. Shigemasa, K. Le Guen, D. Ceolin, C. Miron, N. Leclercq, P. Morin, M. Simon, and P.W. Langhoff  
Non-Dipolar Electron Angular Distributions from Fixed-in-Space Molecules

134. R. Guillemin, D. Rolles, S.W. Yu, O. Hemmers, and D.W. Lindle  
Non-Dipolar Electron Angular Distributions from Nitrous Oxide

**2003 Annual Meeting of the Division of Atomic, Molecular, and Optical Physics (DAMOP), Boulder, CO, USA, May 20-24, 2003**

135. R. Guillemin, O. Hemmers, D.W. Lindle, H. Wang, W.C. Stolte, S.-W. Yu, A. Wolska, I. Tran, A. Hudson, J. Baker, D. Rolles  
Nearest-neighbor-Atom Core-Hole Transfer effect: Interatomic core-to-core electron correlation in molecules

136. O. Hemmers, R. Guillemin, D.W. Lindle, J. Baker, A. Hudson, M. Lotrakul, W. Stolte, I.C. Tran, A. Wolska, S.W. Yu, E.P. Kanter, B. Krässig, S.H. Southworth, R. Wehlitz, M.Ya. Amusia, L.V. Chernysheva, K.T. Cheng, W.R. Johnson, D. Rolles, S.T. Manson  
Dramatic nondipole effects in low-energy photoionization: experimental and theoretical study of Xe 5s

**Ninth International Conference on Electronic Spectroscopy & Structure (ICESS9), Uppsala, Sweden, June 30- July 4, 2003**

137. O. Hemmers, R. Guillemin, E.P. Kanter, B. Krässig, D.W. Lindle, S.H. Southworth, R. Wehlitz, J. Baker, A. Hudson, M. Lotrakul, D. Rolles, W.C. Stolte, I.C. Tran, A. Wolska, S.-W. Yu, M. Ya Amusia, K.T. Cheng, L.V. Chernysheva, W.R. Johnson, S.T. Manson  
Dramatic nondipole effects in low-energy photoionization: experimental and theoretical study of Xe 5s

138. R. Guillemin, O. Hemmers, D. Rolles, S.-W. Yu, A. Wolska, I. Tran, A. Hudson, J. Baker and D.W. Lindle  
Nearest-neighbor-Atom Core-Hole Transfer: Interatomic core-to-core electron correlation in molecules

**Twentythird International Conference on Photonic Electronic and Atomic Collisions (XXIII. ICPEAC), Stockholm, Sweden, July 23-29, 2003**

139. O. Hemmers, R. Guillemin, D.W. Lindle, J. Baker, A. Hudson, M. Lotrakul, W. Stolte, I.C. Tran, A. Wolska, S.-W. Yu, E.P. Kanter, B. Krässig, S.H. Southworth, R. Wehlitz, M. Ya Amusia, L.V. Chernysheva, K.T. Cheng, W.R. Johnson, D. Rolles, S.T. Manson  
Dramatic nondipole effects in low-energy photoionization: experimental and theoretical study of Xe 5s

140. D. Rolles, R. Guillemin, S.-W. Yu, O. Hemmers and D.W. Lindle  
Giant nondipole effect due to intramolecular interchannel coupling in K-shell photoionization of Nitrous oxide

**Advanced Light Source Users' Association Annual Meeting, LBNL, Berkeley, CA, October 6-8, 2003**

141. O. Hemmers, R. Guillemin, D.W. Lindle, J. Baker, A. Hudson, M. Lotrakul, W. Stolte, I.C. Tran, A. Wolska, S.-W. Yu, E.P. Kanter, B. Krässig, S.H. Southworth, R. Wehlitz, M. Ya Amusia, L.V. Chernysheva, K.T. Cheng, W.R. Johnson, D. Rolles, S.T. Manson  
Dramatic nondipole effects in low-energy photoionization: experimental and theoretical study of Xe 5s

142. R. Guillemin, O. Hemmers, D. Rolles, S.-W. Yu, A. Wolska, I. Tran, A. Hudson, J. Baker and D.W. Lindle  
Nearest-neighbor-Atom Core-Hole Transfer: Interatomic core-to-core electron correlation in molecules

**2004 ANS (American Nuclear Society) Student Conference, University of Wisconsin at Madison, WI, April 1-3, 2004**

143. C.P. Rodrigo, G.W.C. Silva, O. Hemmers, D.L. Perry, and D.W. Lindle  
Evaluation of Fluorapatite as a Waste Form

144. G.W.C. Silva, D.L. Perry, A.L. Johnson, O. Hemmers, and D.W. Lindle  
Characterization of the thermal stability of Apatites containing different cations

**Graduate and Professional Student Research Forum, University of Nevada, Las Vegas, April 17, 2004**

145. G.W.C. Silva, D.L. Perry, A.L. Johnson, O. Hemmers, and D.W. Lindle  
Characterization of the thermal stability of Apatites containing different cations

**The 35th Annual Meeting of the Division of Atomic, Molecular and Optical Physics(DAMOP), Tucson, AZ, USA, May 25-29, 2004**

146. O. Hemmers, R. Guillemin, A. Wolska, D.W. Lindle, D. Rolles, K.T. Cheng, W.R. Johnson, H.L. Zhou, S.T. Manson  
Nondipole effects in the photoionization of Xe 4d: Evidence for quadrupole satellites

147. O. Hemmers, R. Guillemin, I. Bashta, A. Wolska, D.W. Lindle, D. Rolles, B. Krässig, E. Kanter, S. Southworth, R. Wehlitz, P. Langhoff, V. McKoy, B. Zimmermann  
Nondipole effects in valence shell photoionization of nitrogen at low photon energies

148. A. Hudson, R. Guillemin, W.C. Stolte, O. Hemmers, D.W. Lindle  
Polarized Cl K- $\alpha$  Emission from Freon 13

**The Fourteenth International Conference on Vacuum Ultraviolet Radiation Physics (VUV-XIV), Cairns, Australia, July 19-23, 2004**

149. O. Hemmers, R. Guillemin, A. Wolska, D.W. Lindle, D. Rolles, K.T. Cheng, W.R. Johnson, H.L. Zhou, and S.T. Manson  
Nondipole effects in the photoionization of Xe 4d: Evidence for quadrupole satellites

150. O. Hemmers, R. Guillemin, A. Wolska, I. Bashta, D.W. Lindle, D. Rolles, B. Krässig, E. Kanter, S. Southworth, R. Wehlitz, P. Langhoff, V. McKoy, and B. Zimmermann  
Nondipole effects in valence shell photoionization of nitrogen at low photon energies

151. R. Guillemin, O. Hemmers, D. Rolles, S.-W. Yu, A. Wolska, I. Tran, A. Hudson, J. Baker, and D.W. Lindle  
Nearest-Neighbor-Atom Core-Hole Transfer in Isolated Molecules

152. A.C. Hudson, R. Guillemin, W.C. Stolte, O. Hemmers, and D.W. Lindle  
Polarized Cl K- $\alpha$  Emission from Freon 13

**Advanced Light Source Users' Association Annual Meeting, LBNL, Berkeley, CA, October 16-18, 2004**

153. O. Hemmers, R. Guillemin, A. Wolska, D.W. Lindle, D. Rolles, K.T. Cheng, W.R. Johnson, H.L. Zhou, and S.T. Manson  
Nondipole effects in the photoionization of Xe 4d: Evidence for quadrupole satellites

154. O. Hemmers, R. Guillemin, A. Wolska, I. Bashta, D.W. Lindle, D. Rolles, B. Krässig, E. Kanter, S. Southworth, R. Wehlitz, P. Langhoff, V. McKoy, and B. Zimmermann  
Nondipole effects in valence shell photoionization of nitrogen at low photon energies

155. D. Rolles, R. Guillemin, O. Hemmers, S.-W. Yu, A. Wolska, and D.W. Lindle  
Nearest-Neighbor-Atom Core-Hole Transfer in Isolated Molecules

156. A.C. Hudson, R. Guillemin, W.C. Stolte, O. Hemmers, and D.W. Lindle  
Polarized Cl K- $\alpha$  Emission from Freon 13

**American Nuclear Society (ANS) Student Conference, Columbus, OH, April 2005**

157. G.W.C. Silva, O.A. Hemmers, and D.W. Lindle  
Characterization of the Thermal Stability of Zinc-containing Fluorapatite

158. C.P. Rodrigo, O.A. Hemmers, and D.W. Lindle  
Characterization of Fluorapatite as a Waste Form

**Annual Meeting of the Division of Atomic, Molecular, and Optical Physics (DAMOP), Lincoln, Nebraska, May 2005**



159. O. Hemmers, R. Guillemin, D. Rolles, A. Wolska, S.-W. Yu, D.W. Lindle, and S.T. Manson  
Study of Spin-orbit-resolved Angular-Distribution Components of Xe 5p

160. O.A. Hemmers, W.C. Stolte, R. Guillemin, D. Rolles, and D.W. Lindle  
First Measurements of Macroscopic Drag Currents under the Action of Photon Flux

161. A. Hudson, W.C. Stolte, R. Guillemin, O.A. Hemmers, P.W. Langhoff, and D.W. Lindle  
Cl K- $\alpha$  Resonant X-ray Raman Scattering from CF<sub>3</sub>Cl

162. M. Simon, L. Journal, S. Carniato, R. Taieb, I. Minkov, F. Gel'mukhanov, H. Ågren, R. Guillemin, W.C. Stolte, A. Hudson, O. Hemmers, and D.W. Lindle  
Cl K- $\alpha$  and Cl K- $\beta$  Resonant X-ray Raman Emission from HCl

**International Conference on X-Ray and Inner-Shell Processes (X-05), Melbourne, Australia, July 2005**

163. A. Hudson, W.C. Stolte, R. Guillemin, O.A. Hemmers, P.W. Langhoff, J.D. Mills, and D.W. Lindle  
Cl K- $\alpha$  Resonant X-ray Raman Scattering from CF<sub>3</sub>Cl and CF<sub>2</sub>Cl<sub>2</sub>

**International Workshop on Photoionization (IWP), Campinas, Brazil, July 2005**

164. A. Hudson, W.C. Stolte, R. Guillemin, O.A. Hemmers, P.W. Langhoff, J.D. Mills, and D.W. Lindle  
Cl K- $\alpha$  Resonant X-ray Raman Scattering from CF<sub>3</sub>Cl and CF<sub>2</sub>Cl<sub>2</sub>

165. O. Hemmers, R. Guillemin, D. Rolles, A. Wolska, S.-W. Yu, D.W. Lindle, and S.T. Manson  
Study of Spin-orbit-resolved Angular-Distribution Components of Xe 5p

166. O.A. Hemmers, W.C. Stolte, R. Guillemin, D. Rolles, and D.W. Lindle  
First Measurements of Macroscopic Drag Currents under the Action of Photon Flux

**Advanced Light Source Annual Users' Meeting, Berkeley, CA, October 2005**

167. A. Hudson, W.C. Stolte, R. Guillemin, O.A. Hemmers, P.W. Langhoff, J.D. Mills, and D.W. Lindle  
Cl K- $\alpha$  Resonant X-ray Raman Scattering from CF<sub>3</sub>Cl and CF<sub>2</sub>Cl<sub>2</sub>

168. O. Hemmers, R. Guillemin, D. Rolles, A. Wolska, S.-W. Yu, D.W. Lindle, and S.T. Manson  
Study of Spin-orbit-resolved Angular-Distribution Components of Xe 5p

169. O.A. Hemmers, W.C. Stolte, R. Guillemin, D. Rolles, and D.W. Lindle  
First Measurements of Macroscopic Drag Currents under the Action of Photon Flux

**Annual Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP), Knoxville, Tennessee, May 16-20, 2006**

170. P.C. Deshmukh, O. Hemmers, R. Guillemin, A. Wolska, D.W. Lindle, D. Rolles, S.-W. Yu, and S.T. Manson  
First Observation of a Quadrupole Cooper Minimum in the Photoionization of Xe 5p

**International Conference on Electronic Spectroscopy and Structure (ICCESS10), Foz do Iguacu, PR, Brazil, August 28 - September 1, 2006**

171. D. Céolin, M.N. Piancastelli, R. Guillemin, W.C. Stolte, S.-W. Yu, O. Hemmers, and D.W. Lindle  
Fragmentation of methyl chloride studied by partial positive and negative ion yield spectroscopy

**Advanced Light Source Annual Users' Meeting, Berkeley, CA, October 9-11, 2006**

172. P.C. Deshmukh, O. Hemmers, R. Guillemin, A. Wolska, D.W. Lindle, D. Rolles, S.-W. Yu, and S.T. Manson

First Observation of a Quadrupole Cooper Minimum in the Photoionization of Xe 5p

173. D. Céolin, M.N. Piancastelli, R. Guillemin, W.C. Stolte, S.-W. Yu, O. Hemmers, and D.W. Lindle  
Fragmentation of methyl chloride studied by partial positive and negative ion yield spectroscopy

**UNLV Undergraduate Student Research Projects, August 9, 2007**

174. K. Bowen, O. Hemmers, D.W. Lindle

The role of bond length in the nondipole effect in x-ray molecular photoionization

**UNLV 2007 Inaugural Energy Symposium, Las Vegas, NV, August 15-17, 2007**

175. O. Hemmers, K. Lipinska-Kalita, D. Lindle, I. Demchenko, and W.C. Stolte  
Synchrotron X-Ray Spectroscopy Studies for H<sub>2</sub> Storage

176. O. Hemmers, K. Lipinska-Kalita, R. Kaushal, and C. Silva  
Biofuels for Transport: Solving Issues with Condensed Matter Physics Tools

**Pahrump Fall Festival, Pahrump, NV, October 4 – 7, 2007**

177. O. Hemmers, K. Lipinska-Kalita, R. Kaushal, and C. Silva  
Biofuels for Transport: Solving Issues with Condensed Matter Physics Tools

**Advanced Light Source Annual Users' Meeting, Berkeley, CA, October 4-6, 2007**

178. O. Hemmers, K. Lipinska-Kalita, D. Lindle, I. Demchenko, and W.C. Stolte  
Synchrotron X-Ray Spectroscopy Studies for H<sub>2</sub> Storage

**National Clean Energy Summit, Las Vegas, NV, August 19, 2008**

179. O. Hemmers, C. Bae, and K. Lipinska-Kalita  
New Technologies for Future Biodiesel Production

**UNLV 2008 Renewable Energy Symposium, Las Vegas, NV, August 20, 2008**

180. O. Hemmers, C. Bae, and K. Lipinska-Kalita  
New Technologies for Future Biodiesel Production

**Advanced Light Source Annual Users' Meeting, Berkeley, CA, October 13-15, 2008**

181. I.N. Demchenko, Lawniczak-Jablonska, T. Tyliczszak, N.R. Birkner, W.C. Stolte, M. Chernyshova, and O. Hemmers  
XANES studies of newly synthesized nanostructured manganese oxides

182. I.N. Demchenko, E. Piskorska-Hommel, D. Hommel, W.C. Stolte, and O. Hemmers  
The local environment around In atoms in InGaN layers grown by MBE

**The 14th International Conference on X-ray Absorption Fine Structure, Camerino, Italy, July 26-31, 2009**

183. E. Piskorska-Hommel, I.N. Demchenko, T. Yamaguchi, W.C. Stolte, W. Yang, O. Hemmers  
Polarization dependent studies of InGaN layers by means of XANES

**Advanced Light Source Annual Users' Meeting, Berkeley, CA, October 15-17, 2009**

184. I.N. Demchenko, M. Chernyshova, J.D. Denlinger, K.M. Yu, D. Speaks, P. Olalde-Velasco, O. Hemmers, W. Walukiewicz, A. Derkachova and K. Lawniczak-Jablonska  
Full multiple scattering analysis of X-ray absorption near edge structure at the O K- and Cd L<sub>3</sub>- edges in CdO thin layer combined with X-ray emission spectroscopy investigation

**41st Annual Meeting of the Division of Atomic Molecular and Optical Physics, May 25-29, 2010, Houston, Texas**

185. K.P. Bowen, W.C. Stolte, J.A. Young, I.N. Demchenko, R. Guillemin, O. Hemmers, M.N. Piancastelli, D.W. Lindle  
Nondipole photoemission from chiral enantiomers of camphor

**The 10<sup>th</sup> jubilee International School and Symposium on Synchrotron Radiation in Natural Science, Szklarska Poreba, Poland, June 6-11, 2010**

186. I.N. Demchenko, T. Tyliszczak, M. Chernyshova, K.M. Yu, J.D. Denlinger, D. Speaks, P. Olalde-Velasco, O. Hemmers, W. Walukiewicz, G. Derkachov, and K. Lawniczak-Jablonska  
Modification of the local structure of oxygen in CdO under irradiation

**37th International Conference on Vacuum UltraViolet and X-ray Physics, University of British Columbia, Vancouver, BC, Canada, July 11 – 16, 2010**

187. K.P. Bowen, W.C. Stolte, J.A. Young, I.N. Demchenko, R. Guillemin, O. Hemmers, M.N. Piancastelli, D.W. Lindle  
Nondipole photoemission from chiral enantiomers of camphor

188. I.N. Demchenko, J.D. Denlinger, M. Chernyshova, K.M. Yu, D. Speaks, P. Olalde-Velasco, W.C. Stolte, O. Hemmers, W. Walukiewicz, A. Derachaova, K. Lawniczak-Jablonska  
Electronic structure of CdO studied by soft X-ray spectroscopy

189. W.C. Stolte, I.N. Demchenko, O. Hemmers  
Full multiple scattering analyses of XANES and X-ray emission studies of AgCl near the Cl K-edge

**5th International Workshop on Mullite & Mullite-type Materials, Avilés, Spain, May 8th - 11th, 2011**

190. P. Kalita, A. Cornelius, K. Lipinska, S. Sinogeikin, M. Lufaso, Z. Kann, O. Hemmers, and H. Schneider  
Pressure Induced Phase Transitions in Mullite-Type Bi<sub>2</sub>(Fe<sub>4-x</sub>Mn<sub>x</sub>)O<sub>10-x</sub> Complex Oxides

**2011 DOE Hydrogen Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, Arlington, VA, May 9-13, 2011**

191. K. Lipinska and O. Hemmers  
Glasses and Nanocomposites for Hydrogen Storage

**2011 DOE Biomass Program Review Integrated Biorefineries Platform IBR & Infrastructure, Washington D.C. Feb. 1-3, 2011**

192. K. Lipinska, O. Hemmers and S. Balagopal  
Development of Biofuels Using Ionic Transfer Membranes – Phase II

**APS March Meeting, Boston, MA, Feb, 28-March 2, 2012**

193. P. Kalita, A. Cornelius, K. Lipinska, O. Hemmers, S. Sinogeikin, M. Murshed and T. Gesing  
New Structural Phase Transitions in PbMBO<sub>4</sub> Complex Oxides

**2012 DOE Hydrogen Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, Arlington, VA, May 9-13, 2012**

194. K. Lipinska and O. Hemmers  
Glasses and Nanocomposites for Hydrogen Storage

**2013 DOE Bioenergy Technologies Office (BETO) Project Peer Review Technology Area Review: Biofuels, May 20-23, 2013**

195. K. Lipinska, S. Balagopal, O. Hemmers, and C. Bae  
Development of Biofuels Using Ionic Transfer Membranes Phase III

**APS March Meeting, Baltimore, MD, March 18-22, 2013**

196. P. Kalita, A. Cornelius, K. Lipinska, O. Hemmers, S. Sinogeikin, R. Fisher, H. Schneider  
Mullite Ceramics at Extreme Conditions

**In the Media**

**UNLV Security Studies**, KNPR's State of Nevada, AIR DATE: November 13, 2008  
<http://www.knpr.org/son/archive/detail2.cfm?SegmentID=4731>

**Now that's green energy**, Las Vegas Sun Tuesday, Feb. 24, 2009  
<http://www.lasvegassun.com/news/2009/feb/24/now-s-green-energy/>

**Algae Energy**, KNPR's State of Nevada, AIR DATE: March 10, 2009  
<http://www.knpr.org/son/archive/detail2.cfm?SegmentID=5093>

**Biofuel**. KNPR's State of Nevada, AIR DATE: April 9, 2010  
<http://www.knpr.org/son/archive/detail2.cfm?SegmentID=6816>

**Experts Call New Fuel Plant a Win-Win, Residents Not So Sure**, Channel 8 Now – Las Vegas, Posted: Feb 05, 2014 5:44 PM PST  
<http://www.8newsnow.com/story/24647463/experts-call-new-fuel-plant-a-win-win-residents-not-so-sure>

**Meetings Attended**

Invited to attend the SciTech Hookup event, held at the World Market Center on October 24, 2012.

8<sup>th</sup> Cyber Security and Information Intelligence Research Workshop, Oak Ridge National Laboratory, January 8 – 10, 2013.

Coalition of EPSCoR/IDeA States' Annual Meeting will take place in Washington, DC on March 11-12, 2013. Visit of the NNSA to explore the infrastructure that may be used in the extreme cyber test bed initiative, March 14, 2013.

Louisiana Tech University, Cyber Security Meeting (TMNL) in Ruston, LA, March 20, 2013  
Attended the AUVSI's Unmanned Systems North America 2013 Conference August 12-15, 2013  
Washington, D.C.

Invited to attend the SciTech Hookup event, held at the World Market Center on October 25, 2013.

Attended the 9<sup>th</sup> International Conference on Climate Change (ICCC-9) in Las Vegas, NV, July 7-9, 2014

Attended and Presented at the 14<sup>th</sup> International Conference on Climate Change (ICCC-14) in Las Vegas, NV, April 16-17, 2021

# EXHIBIT D

# EXHIBIT D



DECLARATION OF EXPERT G DONALD ALLEN

G DONALD ALLEN declares, under penalty of perjury, that the following is true and correct.

1. I am a Professor Emeritus in the Department of Mathematics at Texas A&M University and also an author of numerous works pertaining to mathematics, politics, as well as to government agencies, including classified work.
2. Prior to my retirement in 2017, I taught Mathematics at both the undergraduate and graduate levels for 46 years. I developed many graduate courses in problem-solving and related subjects. I developed the online masters program in mathematics, first in the USA, beginning in 2001, and various computer codes relating to numerical analysis.
3. I have published more than 80 research articles related to operator theory, functional analysis, mathematics education, nutronics, political systems, and some philosophy topics. I've also reviewed dozens of mathematical papers submitted for publication. As well, I've published books in linear algebra, history of mathematics, and calculus. In addition, prior to retirement I was a Principal Investigator (PI) or co-PI on more than \$10 million in grant funding.
4. I have reviewed, mathematically, the reports by Edward Solomon furnished to me which mathematically analyzes the June 14, 2022, Republican gubernatorial primary in Clark County, Nevada, as well as other races.

5. In my expert opinion, these reports demonstrate clear and convincing evidence that the election results analyzed in these reports were not produced by accurate counting of the votes cast, but were instead artificially contrived according to a predetermined plan or algorithm.
6. In the paragraphs below, we summarize the salient points of the report by Mr. Solomon, simplifying his notation, and clarifying how relatively simple it is to manipulate election outcomes using voting algorithms. Yet, the problem has two parts. The first is to establish the election is incorrect. However, the important component is to estimate what the vote total should be.
7. The basic configuration for Candidate A and Candidate B where there are only mail-in and election-day votes. Assume the proportion of the mail-in votes for Candidate A is  $h$ . Therefore the proportion of mail-in votes for Candidate B is  $1 - h$ . Actual vote totals can be computed by multiplying the total number of mail in votes. Similarly, the proportion of election day votes for Candidate A is  $k$  and the proportion of election-day votes for Candidate B is  $1 - k$ . Again, the total votes for each is obtained by multiplying by the total number of election-day votes. Now let  $M$  be the number of mail-in ballots and  $K$  be the number of votes on election day. Then, the proportion of votes for Candidate A is

$$\frac{hM + kK}{M + K}$$

If voting has been algothmized by adjusting the proportion of  $k$  to a new proportion  $r$  the vote total will be the same but the net proportion can be made to whatever, say  $r < 0.5$ , it is only required to solve the equation

$$\frac{(1-h)M + (1-k)K}{M + K} = 1 - r$$

for  $k$ . This is done to favor Candidate B. A similar equation is to favor Candidate A. This new value is merely programmed to change votes to obtain the desired proportion.

Programming this is remarkably simple. Going into any election, if the mail-in data is known, and a good estimate of  $K$  is known, the equation has a unique solution. If accurate poll data is known, and it generally is, then all we need is  $M$  and we can use the poll estimates to reflect the proportions and then estimate what value  $k$  should be to obtain the desired proportion  $r$  to be programmed in.

All this is for just one voting station and literally could not be detected. However, if the same or similar proportion obtains over hundreds of precincts, then error is ascertained. That is, plotting the values of  $h$  and  $k$  of actual election results will reveal that  $k$  seems to be constant over all voting stations or precincts

8. If there is some control over the total number of mail-in ballots, say by supplementing mail-in ballots after the election-day ballots are counted, then both  $h$  and  $k$  can be manipulated, to a value where the equation above is solved for  $h$  to determine the number of ballots that need to be added. In the absence of both proportions, then poll numbers must be used to fix  $h$  and then estimate  $k$  based on the desired proportion  $r$ .
9. If all mail-in ballots total are known beforehand, and if algorithms are applied as above with differing values of  $k$ , massive evidence of error can be detected by noting the proportion of votes for Candidate B generally computes to the same total proportion over the spectrum of reporting stations.

10. In each of these cases, the algorithmic is clear and essentially proved. Please note that while a mathematical proof is desired, we are working with field data, and therefore must be replaced with statistical proof for example as applied to forensic psychology.
11. Another, more complex example of algorithmic error, is absolutely clear and convincing when the computed proportions between Candidates A and B do not add up to one. These values we never see, as all reported numbers are lumped together for presentation. Even in the case of newly discovered ballots, we often see total vote proportions change as the count is reported, though this is less indicative of error.
12. How to estimate the votes Candidate A would have if the algorithm flaws did not occur? For this, we use a statistical argument and assume the mail-in proportions, which are assumed to be known and correct are the same as the election-day voting proportions. Alternatively, we know an established relationship between the two. From this, we can back-project to what the values of  $k$  should have been for each precinct. These in turn can be averaged in a weighted scheme (by numbers of voters) to gain the average value of  $k$ . Using the standard deviation we estimate the range of all  $k$  values within two standard deviations and compute the expected vote count. In this way, the number of votes lost to Candidate A can be estimated. Alternatively, precinct by precinct poll numbers could be used, thus canceling the effects of mail-in voters that are known to behave in different ways from election day voters. Such are standard methods in statistical analysis. In this particular case, they apply to the Gilbert and Sheriff's election results. Solomon uses a geometrical argument, rotating actual results to assumed slope one expectations.

*G. Donald Allen*

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G. Donald Allen

**EXHIBIT E**

**EXHIBIT E**



July 6, 2022

**CURRICULUM VITA: G. Donald Allen**

**CURRENT OFFICE ADDRESS AND CONTACT POINTS**

Professor of Mathematics  
Department of Mathematics  
Texas A&M University  
College Station, Texas 77843-3368

Office: Room 221C Blocker Building

Phone: [REDACTED]

Email: [REDACTED]

Homepage: <http://www.math.tamu.edu/~dallen>

[REDACTED]  
[REDACTED]  
[REDACTED]

Citizenship: U.S.A.

<b>Degree</b>	<b>Major</b>	<b>University</b>	<b>Year</b>
	Mathematics	University of Wisconsin, Madison	1971
	Mathematics	University of Wisconsin, Milwaukee	1966
	Mathematics	University of Wisconsin, Milwaukee	1965

**SERVICE: UNIVERSITY SERVICE AND COMMITTEES**

- SYMCOMP2019 (PC member)
- 2015 Pearson Scholarship for Higher Education, Judge, July 2015
- Appointed to the Advisory Board, Global STEMx Education Conference, September 19-21, 2013. See, <http://stemxcon.com/page/2013-global-advisory-board>
- Appointed, Assessment and Effective Teaching 2013, Easy Chair Conferences, 2013-. Information Technology Working Group (ITWG), 2000- founding member.
- Co-director IT Lab, College of Science, 2001- present.
- Appointed, (Southwest Educational Research Association), Instruction, learning and cognition section, co Division Chair 2008-2009.
- Member, Teacher Quality Grants Instructional Leaders Community, 2007-2009.
- Consulting Editor, Thomson Higher Education, 2006-2007.
- Math TEKS Connections (MTC) - Geometry Advisory Board, funded through the TEA, 2006-2007. Chair, GK-12 Educational Outreach Institutionalization Committee, 2007 - 2010.
- Member, STEPS Management Team (College of Engineering), 2006 - 2008.
- Member, Camtasia Steering Committee, November 2005 - 2008.
- Member, Sigma Xi educational outreach committee, William Klemm, Chair, July 2005 - 2008.

- Member, Committee on Academic Freedom, Responsibility, and Tenure (CAFRT), Preliminary Screening Committee, Vice-Chair, 2005-2006.
- Member, Quality Enhancement Plan (QEP) Council, College of Science, 2004 - 2007.
- Member, President's Executive Committee Task Force for Enhancing the Undergraduate Experience, Jim Eddy, Chair, 2004 -2005.
- Grass Roots P-16 Consortium, (Statewide) 2005 - present.
- Regents Scholar Mentor program (11/29/2004 - 2007).
- Member, NSF PEER Distance Learning Community group, a component of the Partnership for Environmental Education and Rural Health, (See, [http://peer.tamu.edu/DLC/NSF\\_Resources.asp](http://peer.tamu.edu/DLC/NSF_Resources.asp)), 2004 - 2008.
- Member, Regent Initiative, Academy for Educator Development Advisory Committee, TAMUS, 2004 -2005.
- Member, College of Science University Curriculum Committee, Sept 2004 - 2007.
- Member, College of Science Quality Enhancement Plan Council, (members: Dr. Michael Hall, Chemistry/Dean's Office (Chair) Dr. Vincent Cassone, Biology Dr. Donald Allen, Mathematics Dr. Lewis Ford, Physics Dr. Michael Speed, Statistics), 2004-2007.
- Member, Clinical Faculty Review Committee for TLAC (Department of Teaching Learning and Culture, College of Education), 2004-2005.
- Member, NSF G-K12 Fellows steering committee, (Larry Johnson, Dept of Vet Science, Chair), 2004-2009.
- Member, NSF G-K12 Fellows Recruiting and Selection Committee, (Vince Cassone, Dept of Biology, Chair), 2004 -2009.
- Member, Distance Education Review Committee, (Provost's office) F. Michael Speed, chair, 2003-2004.
- Co-director Information Technology (IT) Lab, College of Science, (2001-present)
- Member, Distance Education Coordinators in the Office of Distance Education, 2002 - 2005.
- Committee on Academic Freedom, Responsibility, and Tenure, (CAFRT) 2002-2005.
- Member, Computational Kinetics Theory Group, (Primary interest is in mathematical models and numerical solutions to the Transport Equation, particularly related to neutron kinetics and vehicular traffic flow modeling. The CKTG is headed by Dr. Paul Nelson who is affiliated with the Math, Computer Science, and Nuclear Engineering, Departments at Texas A&M University. ) 1997 -2004.
- Office of Distance Education Faculty Advisory Committee, (2002 - )
- Committee on Academic Freedom, Responsibility, and Tenure, (CAFRT) 2002-2005
- Faculty Search Committee, Department of Teaching, Learning, and Culture, 2002
- Reviewer for Distance Education RPF for online course development (Oct/Nov 2001)
- APC Faculty Workstation Committee (TAMU), 2001- (Pierce Cantrell, Chair)
- AdHoc Committee on Intellectual Property, 2000. (C. Roland Haden, Chair)
- Faculty Workstation Committee (TAMU), 2001 - 2005 .
- Texas A&M University ad hoc Intellectual Property Committee (TAMU), 2000-2001.
- University Laboratory Renovation Committee (TAMU), (William Perry, chair),1999- 2001.
- Member, Faculty Senate 1999 . Academic Affairs Committee 1999-2000.
- Member, Faculty Senate 1985-1987, 1999-2002. Chair, Personnel and Welfare Committee 1986-87.
- Faculty Senate, 1999-2002.

- Member, Faculty Senate 1999-. Academic Affairs Committee 1999-.
- Faculty Senate, 1999-2002.
- Faculty Advisory Council, College of Science, vice-chair (1997-98) chair (1998-1999), 1996-1999.
- Mentors, 1990-current.
- Mentors Executive Committee, 1996-1997, an oversight group for the welfare of student life, Texas A&M University, 1990-1998.
- University recruiting representative to University of Minnesota, Carleton University, St. Olaf's College, Oct. 25-27, 1988.
- College of Science Faculty Advisory Committee, 1983-1985.
- University Faculty Advisory Committee, 1978.

#### DEPARTMENTAL SERVICE AND COMMITTEES:

- Associate Department Head for Operations: from 1981-1983 and 1992-1994, 2006 -2011.  
Duties include:
  - Scheduling and assigning courses
  - Supervising over twenty-five lecturers
  - Liaison with students
  - Administering complaint issues
  - Attending Executive Committee meetings
  - Liaison with other administrative units
  - Curriculum development
  - General administrative duties
  - Administering IEEF (Institutional Enhancement Equipment Fee) funds
- Executive Committee, 1994-1995, 1997-1999, 2006-2011.
- Honors Committee, 2005 - 2012.
- Undergraduate Studies Committee, 2006 - 2011.
- Texas Math Talent Search, (Peter Kuchment, chair), 2004-2010.
- Undergraduate Studies Committee, (2004 - 2008), Chair.
- Scholarship Committee (2004-2008), Chair.
- Undergraduate Recruiting Committee, 2004.
- Graduate Studies Committee (2003-2004).Teaching Evaluation Committee, 2002-2003.
- Committee to develop an undergraduate mathematics major with an Information Technology specialty, 2002.
- Promotion & Tenure policy review committee, 2001, Chair.
- Information Technology Working Group, founding member, 1999 - .
- Department of Mathematics, Executive Committee, 1999 - 2001
- Undergraduate Committee, Department of Mathematics, 1996 2000.
- Chair, Faculty Advisory Council, College of Science, 1998-1999, Chair 1999
- Member, Faculty Advisory Council, College of Science, 1996-1998.
- Member, Undergraduate Studies Committee, 1996-1999.
- Member, Subcommittee P, Department of Mathematics, 1992.

- Chair, Committee on Computer Software, Department of Mathematics, 1992.
- Chair, Committee on Space, Department of Mathematics, 1992.
- Committee on Academic Freedom, Tenure and Responsibility, 1991-1993, TAMU.
- Course Coordinator of Math 151, Math 152, Math 142, and other for various years.
- Department Head Search Committee, Department of Mathematics 1983.
- Graduate Studies Committee, 2002-2004.
- Undergraduate Studies Committee, 1998-2002.
- Undergraduate Advisor 1986-1992.
- Library Committee, 1971-1976.
- Promotion and Tenure Committee, 1975-1978.
- Colloquium Committee, 1976-1977.

#### OTHER SERVICE AND COMMITTEES

- Executive Steering Committee - ICTCM (International Conference on Technology in Collegiate Mathematics) 2000 - present.
- Grass Roots P-16 Consortium, (Statewide) 2005 - present.
- Member, Teacher Quality Grants Instructional Leaders Community, 2007-2010.
- Consulting Editor, Thomson Higher Education, 2006-2007.
- Math TEKS Connections (MTC) - Geometry Advisory Board, funded through the TEA, 2006-2007.
- Member, Assessment Strand Speakers Committee, ICTCM, 2005 - 2006.
- Chair, Review Committee for Nicholls State University, appointed by the State of Louisiana Board of Regents, June 8-12, 2003.
- Co-chair. Multimedia Speakers Committee, ICTCM, Oct 30, 2001- Nov2, 2003.
- Regent's Initiative, Academy for Educator Development, member. 2002 - 2006.
- Strategic Planning Process, a district planning project of the College Station Independent School District, 1998-1999.
- Urban Systemic Initiative, Coalition of 8 ISD's in San Antonio. Pre-grant preparation. (Amount requested, \$15M.) September 1994-August 1995.
- Judge, Brazos Valley Regional Science Fair, March 1996-2001, College Station Team Projects, Chair.
- Judge, Regional Science Bowl, at Texas A&M University, February, 1998-2000. Judge, Department of Energy Science Bowl, 1998, College Station, TX.
- Participant in the Conservation and Sustainable Development Initiative, Futurescapes II, TAMU April 13-14, 1989.
- Judge, Brazos Valley Regional Science and Engineering Fair, 1989-1999.
- Judge for the National Council of Teachers of Mathematics at the Brazos Valley Regional Science and Engineering Fair, 1991-1993.
- Participant in the Academic Administrator and Development Seminar, Texas A&M University, April 19-21, 1993.

#### IN THE PROFESSION - PART I

- 2006-2011, Associate Head, Department of Mathematics
- 1995- Professor, Texas A&M University

- 1994-1995 Associate Dean, University of Texas---San Antonio, Texas (on leave)
- 1992-1994 Associate Head for Operations, Mathematics, Texas A&M
- 1988- Professor of Mathematics, Texas A&M.
- 1981-83 Associate Head, Mathematics, Texas A&M
- 1976-88 Associate Professor of Mathematics, Texas A&M.
- 1974 ONR Research Support Contract N0014-680A-0303-0003(Summer) R.E. Schapery, P.I.
- 1973 NSF Research Support, Contract GP 38486. College (Summer) of Science (TAMU) Research support.
- 1972 Research Support, Texas A&M University. (Summer)
- 1971-76 Assistant Professor, Department of Mathematics, Texas A&M University, College Station, Texas.

#### IN THE PROFESSION – PART II

- Editorial Board, MDPI journals, Basil, Switzerland, 2020-.
- Editorial Board, Journal of Contemporary Mathematics, 2019-
- Editorial Board-Mathematics and Humanities Engineering, 2018 -
- Editorial Board, SAS Journals 2019 -
- Editorial Board, Journal of Advances in Sports and Physical Education, 2016
- Editorial Board, International Journal on Recent and Innovation Trends in Computing and Communication (IJRITCC), 2017-
- Editorial Board, Austin Mathematics 2014-
- Editorial Board, Advanced Emergency Medicine, 2017-.
- Associate Editor, School Science and Mathematics Journal, 2005-2009
- Associate Editor, Focus on Mathematics Pedagogy and Content - a newsletter for math teachers,
- Youtube.com channel on Numerical Analysis, 2012-.
- Editor, *The Math/Science-Online Newsletter* 1999 – 2004.
- Associate Editor (Reviews) College Mathematics Journal, 1999-2005
- Associate Editor, Transport Theory and Statistical physics, 1990-1997.
- Member, Computational Kinetics Theory Group, (Primary interest is in mathematical models and numerical solutions to the Transport Equation, particularly related to neutron kinetics and vehicular traffic flow modeling. The CKTG is headed by Dr. Paul Nelson who is affiliated with the Math, Computer Science, and Nuclear Engineering, Departments at Texas A&M University. ) 1997 -2003
- Member, Society for Industrial and Applied Mathematics
- Associate Member, Center for Approximation Theory, Texas A&M, 2002-2008.
- Editor, *The Math/Science-Online Newsletter*
- Editorial Review Board for AACE/SITE Journal
- Member, Mathematical Association of America
- Referee for numerous journals.
  - a) Asian Research Journal of Mathematics (ARJM)
  - b) Athens Journal of Sciences (AJS)
  - c) Academia Letters

- d) Science & Education
- e) Journal School Science and Mathematics
- f) College Mathematics Journal
- g) The Texas Journal of Science
- h) Mathematical Modeling and Analysis Science and Education
- i) School Science and Mathematics
- j) Journal of STEM Education
- k) Transport Theory and Statistical Physics
- l) Journal of Mathematical Sociology
- m) Discrete and Continuous Dynamical Systems and Differential Equations
- n) SIAM J. Math. Anal.
- o) Athens Journal of Education
- p) SOAOJ, Mathematics and Humanities Engineering Open Access Open Journal (MHEOAOJ)
- q) SYMCOMP2019 (PC member, reviewer)

#### CONSULTING

1. Reviewer for UConn SPARK Technology Commercialization Fund, 2019
2. MTC geometry grant, 2007 (TEA Award number is 050245247110001).
3. WebALT (Web Alternative Learning Technologies), 2006- 2010.
4. Thomson Higher Education, Consulting Editor, 2006-2008.
5. Department of Mathematics, University of Idaho, online calculus project, funded through a Congressional earmark. June 13-20, 2005
6. TAMUS/Teacher Education Agency on professional development materials, 2004-2005.
7. Wiley (2003-2004) Q&A work for Boyce-DiPrima, Ordinary Differential Equations
8. LSU - Eunice, LA, SACS (Southern Association of Colleges and Schools) pre accreditation consultation team, March 29-31, 2004. Aerospace Academy for Engineering and Teacher Education, an education-industry-government collaboration, <http://www.aerospaceacademy.org/index-ie.html>. 2002-2003
9. Bowling Green University (2002) - Creating an online masters degree
10. University of Houston (2001-2002)- Putting mathematics courses online; developing an online masters program.
11. Addison-Wesley-Longman, 1999 - 2002.

#### RECENT GRANTS

1. Texas Higher Education Coordinating Board (THECB), Algebra, ~\$98,000, 2012-2014. *Investigations in Secondary Mathematics and Science*. Co-PI with Nite, S. B.
2. Texas Higher Education Coordinating Board (THECB), Algebra, ~\$98,000, 2012-2014. *Investigations in Secondary Mathematics and Science*. Co-PI with Nite, S. B., Texas Higher Education Coordinating Board, Funded \$589,000, 2/1/2014 - 4/30/2016
3. Halliburton Corporation, Mathematics All Around Us: Oil and Gas Applications, \$27,716, 2011-2012
4. Developmental Education Demonstration Project Evaluation 2011-2012: Co-Pi with Jim Dyer, M. M. Capraro. Awarded April, 2011 to Texas Higher Education Coordinating Board, Awarded \$399,998, co-Investigator, 6/10/11 10/31/12.
5. National Science Foundation (NSF), Preservice Teacher Effectiveness for Algebra I, Gerald



- Kulm, PI, September 1, 2010 - August 31, 2015, \$1,778,741, co-PI.
6. National Science Foundation (NSF), Retention through Remediation in PreCalculus, \$1,980,712, STEP Proposal # 0856767, June 15, 2009 - June 14, 2014, PI.
  7. West Sabine Independent School District, Mathematical Instructional Coaches Pilot Program (TEA - Texas Education Agency) - West Sabine ISD, \$26,125, 4/1/2009-5/31/2011, amended to \$28,125 on April 11, 2011, PI.
  8. Gladewater Independent School District, Mathematical Instructional Coaches Pilot Program, \$42,000, PI.
  9. Texas Education Agency (TEA), Professional Development Activities for Teachers and Administrators: Mathematics College and Career Readiness Standards, TEA Funding Source #10450967, TAMU-RF #0902074, \$500,000, August 14, 2009 - February 28, 2011.
  10. Texas Higher Education Coordinating Board (THECB), Design & Pilot of Framework & Tools for CCRS/ Texas Educator Preparation Demonstration Sites, \$500,000, September 1, 2009 - August 31, 2010 (Proposal 09-1202 "TAMU Educator Preparation Collaborative for Enhancing College and Career Readiness in Texas").
  11. Texas Higher Education Coordinating Board (THECB), Algebra I-II Focus on Alignment, Total Award Amt: \$190,000, May 1, 2009 - May 31, 2011, supplement of \$28,900 awarded on 5/4/2010. Total \$218,900. PI
  12. Texas Education Agency via El Paso Independent School District, Math Coaches Service provider contract, \$56,600, November 25, 2008- May 31, 2010, PI.
  13. NSF: "Continuing GK-12 Fellows Integrate Science/Math in Rural Middle Schools," PI and Co PIs: Larry Johnson, James Kracht, W. R. Klemm, G. Donald Allen, Rajesh Miranda, and James Lindner. \$1,547,601, Award No. DGE-0638738, Proposal No. DGE-0638738, February 1, 2007 and expires January 31, 2010.
  14. THECB/Dana Center, Teacher Quality Grant - Algebra I, TAMU Account 02-421104 \$84,990, May 1, 2008 May 31, 2009, PI.
  15. THECB/Dana Center, Teacher Quality Grant - Algebra I, TAMU Account 02-421104 \$76,000, May 1, 2008 - May 31, 2009, PI.
  16. THECB/Dana Center, Teacher Quality Grant Algebra II, TAMU Account 02 421104 \$77,000, May 1, 2008 - May 31, 2009, PI.
  17. THECB (Texas Higher Education Coordinating Board): "Course Redesign for Math 1324," PI and director: G. Donald Allen, \$349,827, July 20, 2007 - August 31, 2009, TAMRF #0701594.
  18. THECB (Texas Higher Education Coordinating Board): "Course Redesign for Math 1324," PI and director: G. Donald Allen, \$349,827, July 20, 2007 August 31, 2009, TAMRF #0701594.
  19. National Science Foundation Award No. DUE-0336591 Title: "Retention Through an Applied Physics, Engineering, and Mathematics (PEM) Model" Award Amount: \$1,999,999.00 PI and Current Co-PI's: Drs. Jo W. Howze, Arun R. Srinivasa, Michael S. Pilant, Timothy P. Scott, and William H. Bassichis Funding Period: 9/15/2003 8/31/2008, co-PI.
  20. National Science Foundation, ITEST grant, National Middles School Aerospace Scholars. (NaMAS), evaluator. Sharon Sledge, PI, Award No. ESI-0422698, \$1,193,506, January 1, 2005 - August 31, 2008, evaluator.
  21. Texas Education Agency (TEA), Math Coaches Program, Approved Service Provider for the Mathematics Instructional Coaches Pilot Program, in response to RFP 701-08-021 / RFP

701-08-040, 2008-09.

22. THECB: "High Quality Algebra II Instruction," \$88,197, June 1, 2007 - August 31, 2008.
23. TEA, 21st Century Community Learning Centers Program, Department of Education through the Texas Education Agency, with Covington ISD, \$200,000, June 1, 2006 - May 31, 2008.
24. MTA/MTC - Math TEKS Awareness, Texas Education Agency through the TAMU College of Education, Sept 1, 2005 - June 30, 2007, co-Investigator, (three months salary), co-Investigator.
25. THECB/Dana Center, Teacher Quality Grant, Algebra II, TAMU Account 02-421104 \$84,990, May 1, 2006 - May 31, 2007.
26. Texas Education Agency (TEA RFP 701-05-006 - Grant#056944087110059), Improving student Achievement through Professional Development, \$143,839, August 15, 2005-September 30, 2006, PI's G. Donald Allen, Cathy Ezrailson.
27. Texas Education Agency (TEA RFP 701-05-006) - Snook, \$100,500, August 31, 2005, September 30, 2006.
28. Texas Education Agency (TEA RFP 701-05-006) - Pasadena, TOOLS - The Teaching of Ongoing Learning Strategies, \$150,000, August 31, 2005, September 30, 2006, co-PI.
29. Texas Education Agency (TEA RFP 701-05-006) - Mathis ISD, \$150,000, August 31, 2005, September 30, 2006, co-PI.
30. P-16 Educational Improvement Consortium (PEIC) program, a Texas Education Agency funded program administered through the College of Education and the Department of Teaching Learning and Culture. TAMU, \$12,388, July 1-July 31, 2005.
31. Office of Distance Education, TAMU, The Computational Masters Degree, July 20, 2005 - July 19, 2007, \$150,000.
32. Texas Higher Education Teacher Quality Grant -Type B, "Assuring excellence in algebra II instruction," June 1, 2005 - August 31, 2006, co-PI's G. Donald Allen, \$81,687.
33. Texas Higher Education Teacher Quality Grant -Type B, "Assuring excellence in middle school mathematics instruction," June 1, 2005 - August 31, 2006, co-PI's G. Donald Allen, and Dianne Goldsby, \$81,500.
34. Texas Higher Education Teacher Quality Grant -Type B, "Assuring excellence in pre-calculus instruction," August 1, 2004 - January 31, 2006, co-PI's G. Donald Allen and Dianne Goldsby, \$79,993.
35. Star Schools Project - Math Star Extension Grant to Los Angeles County Office of Education, US Department of Education, 84-203F, Donald Lake and Edna Murphy, co-directors, \$9.221m, June 15, 2004 - June 15, 2007; portion funding to Texas A&M with collaborators G. Donald Allen and Deborah Jolly, \$154,000.
36. Texas Higher Education Teacher Quality Grant -Type B, "Pre-Calculus," March 12, 2004 - July 31, 2005, co-PI's G. Donald Allen and Sharon Sledge, \$80,000.
37. Texas Higher Education Teacher Quality Grant -Type A, "Pre-Calculus - Practices of Good Teaching through Content, Technology, and Interaction," January 9, 2004 - January 31, 2005, PI's G. Donald Allen and Michael Pilant, \$295,391.
38. NSF: "Fellows Integrate Science/Math in Rural Middle Schools," PI and Co-PIs: Larry Johnson, James Kracht, W. R. Klemm, Vincent Cassone, Rajesh Miranda, and James Lindner. \$1,210,000, January 1, 2004 - December 31, 2006. (I am co-Investigator on this award.)
39. Collaborative Research Grants: Project Year 5, Online assessment for teachers, Texas A&M University System, \$18,630, 2003-2004, co-PIs, G. Donald Allen and Dianne Goldsby.

40. Quality Enhancement Program, Making assessment a part of the curriculum, Texas A&M University, \$6,500. 2003-04.
41. Regents' Initiative for Excellence in Education. Collaborative Research project. "Group Perceptions of Pre-service and In-service Teachers, College/University Faculty and Administrators on Math/Science Teacher Preparation", with Larry Kelly, Dianne Goldsby, and Dawn Parker, 2003-04, \$8,000.
42. Math/Physics Modeling Team Project. Funded through the Information Technology Center. January 10, 2001 - December 31, 2002, \$80,000. (Joint with Raytcho Lazarov and Joseph Pasciak.)
43. Texas A&M University, "Advanced Technology Mediated Instructional Laboratory", January 1, 2001, \$20,000, with Michael Pilant.
44. Texas A&M University, "Masters in Mathematics Education Using Distance Learning Protocols", September 1, 1999 to August 31, 2001, \$150,000.
45. Texas A&M University System, Regents' Initiative for Excellence in Education. Collaborative Research project. "Group Perceptions of Pre-service and In-service Teachers, College/University Faculty and Administrators on Math/Science Teacher Preparation", with Larry Kelly, Dianne Goldsby, and Dawn Parker, 2003, \$8,000.
46. Texas A&M University, "Advanced Technology Mediated Instructional Laboratory", January 1, 2001, \$20,000, with Michael Pilant. National Science Foundation: "Workshop on the efficacy of Maple in the Classroom", part of a contract with SRI, \$135,000, April, 1998. (Joint with David Sanchez, Math)
47. Electronic and Learning Incentives Program, sponsored by the Academy for Advanced Telecommunications and Learning Technologies, TAMU. \$5,000. July 1, 1997-Dec 31, 1997.
48. National Science Foundation: "Novel Methods for the solution of the transport equation", September 1, 1994 to August 31, 1998, \$315,000. CCR 9302782 (joint with Paul Nelson and Marvin Adams)
49. Electronic and Learning Incentives Program, sponsored by the Academy for Advanced Telecommunications and Learning Technologies, TAMU. \$5,000. July 1, 1997-Dec 31, 1997.
50. National Science Foundation, Second Texas-Mexico Workshop on Numerical Particle Transport, 1992, \$7,000, with Paul Nelson.
51. Development of Numerical Techniques to Measure Migration of Radio nuclides Through Porous Materials. Cray Research, Inc, 1992-1993.
52. Texas Advanced Research Program, Studies of the Transport Equation: An International Effort, \$58,609, 1990-1992.
53. National Science Foundation: "Third Texas-Mexico Workshop on Numerical Particle Transport", May 1, 1995 to April 30, 1996, \$7,943.
54. DOD/D of AF/AFSC, System Impact of Hit Assessment for NPB (Neutral Particle Beam) Discrimination, \$50,000, 1990-1991.

#### PUBLICATIONS - PAPERS PUBLISHED

- 1) G.D. Allen, "On embedding set functions into covariance functions" Trans. AMS, 179 (1973) 23-33.
- 2) G.D. Allen, "Extensions of Kolmogorov's Theorem for continuous covariances", Proc. AMS, Vol. 39 (1973) 214 216.

- 3) G.D. Allen and S. Cambanis, "Some remarks on Kolmogorov's Theorem" Proc. of the Symposium on Vector Valued Measures (1972) Academic Press.
- 4) G.D. Allen, C.K. Chui, W.R. Madych, F.J. Narcowich and P.W. Smith, "Pade Approximation and orthogonal polynomials", Bull. Austral. Math Soc. 10 (1974) 263-271.
- 5) G.D. Allen, "Pade approximation and Gaussian quadrature" Bull. Austral. Math. Soc. 11 (1974) 63-71.
- 6) G.D. Allen "Pade approximation of Stieltjes Series" J. Approx. Theory, 14 (1975) 302-316.
- 7) G.D. Allen, "On the multiplicity and spectral type of class of stochastic processes", SIAM J. of Appl. Math., 29 (1975).
- 8) G.D. Allen and F.J. Narcowich, "On the representation and approximation of a class of operator-valued analytic functions", Bull. AMS 81 (1975) 410-413.
- 9) G.D. Allen, "Convergence of the diagonal operator-valued Pade approximants to the Dyson expansion", Comm. Math. Phys. 45 (1975) 153-157.
- 10) G.D. Allen "On the structure of certain bounded linear operators" Proc. AMS, 53 (1975) 404.
- 11) G.D. Allen, F.J. Narcowich and J.P. Williams, "An operator version of a theorem of Kolmogorov" Pac. J. of Math., 61 (1975) 305-312.
- 12) G.D. Allen and F.J. Narcowich, "R-Operators. A representation theory and applications", Indiana J. of Math. 25 (1976) 945-963.
- 13) G.D. Allen and G.S. Brockway, "On the mechanical constitution of damageable materials", J. of Eng. Scie., to appear.
- 14) G.D. Allen and L.C. Shen, "On the structure of principal ideals of operators", Trans. of AMS, 238 (1978) 253-270.
- 15) G.D. Allen and J.D. Ward, "Hermitian liftings of  $B\mathcal{O}_p$ " J. of Operator Theory 1 (1979).
- 16) G.D. Allen, "Duals of Lorentz Spaces", Pac. J. Math. 77 (1978) 287-291.
- 17) G.D. Allen and J.D. Ward, "A Simultaneous lifting theorem in Hilbert spaces", Trans AMS 250 (1980), 379-387.
- 18) G.D. Allen, D.A. Legg, J.D. Ward, Hermitian Liftings in Orlicz Sequence Spaces, Pac. J. Math. 86 (1980) 379-387.
- 19) G.D. Allen and J.D. Ward, Hermitian lifting in  $B\mathcal{O}_p$ , Proc. AMS 80 (1980) 71-77.
- 20) G.D. Allen, Locally Continuous Operators in **Prediction Theory and Harmonic Analysis**, V. Mandrekar and H. Salehi, Editors, North Holland, 1984.
- 21) Locally Continuous Operators II, Indiana U. Math. Journal, 38 (1989) 711-743.
- 22) Similarity Theory for Nest Algebras on  $L_p$ , with D.R. Larson, J.D. Ward and G. Woodward, J. of Functional Analysis, 92 (1990) 49-76.
- 23) Power Majorization and Majorization of Sequences, Results in Mathematics, 12 (1988) 211-222.
- 24) G.D. Allen, K.T. Andrews, and J.D. Ward, A Note on the Similarity of  $L_p$  nests, Acta Mathematica Hungarica, to appear.
- 25) G.D. Allen, C.K. Chui & W.L. Perry, 2nd Ed. Elements of Calculus, Brooks/Cole Publishing Co. 1989, Monterey, California.
- 26) G.D. Allen and Paul Nelson, On Generalized Finite Difference Methods for Approximation Solutions to Integral Equations, in *Advances in Numerical Partial Differential Equations and Optimization*, Proceedings of the Fifth Mexico-United States Workshop on Numerical Analysis, SIAM, 1991, pp. 112-140.

- 27) G. D. Allen and Paul Nelson, Convergence of Inner Iterations for Closed LOF Methods, submitted, SIAM J. of Numerical Analysis.
- 28) G. D. Allen, Toward a Dynamics for Power and Control in Society, *Journal of Mathematical Sociology*, 22 (1992) pp. 1-38.
- 29) G. D. Allen and W. W. Pitt, Monolithic Waste Forms---An Underrated and Under-Utilized Technology, Proceedings of the Symposium on Waste Management, Tuscon AZ, March 2-6, 1992, American Nuclear Society, 1992.
- 30) G. D. Allen and W. W. Pitt, Accounting for Boundary Layer Effects in the Modeling of Leaching from Monolithic Waste Forms, Proceedings of the Second Interagency Symposium on Stabilization of Soils and Other Materials, Metairie, LA., November 2-5, 1992, U. S. Corps of Army Engineers, 1992, pp.6:3-12.
- 31) G. D. Allen, Smoothness and super convergence for approximate solutions to the one dimensional monoenergetic transport equation, in *Advances in Numerical Partial Differential Equations and Optimization*, Proceedings of the Sixth Mexico-United States Workshop on Numerical Analysis, Kluwer Academic Publishers, 1993 pp. 1-14.
- 32) G. D. Allen, Dapeng Xin, and Dan G. Zollinger, A method to determine moisture diffusivity in concrete from measured moisture profiles, *Advanced Cement Based Material*, 2, (1995), 34-39.
- 33) G. D. Allen, Dynamic Models for Competitive-Cooperative Species, *Proceedings of the International Conference on Dynamical Systems and Differential Equations*, 1997, 1-20.
- 34) G. D. Allen, A hierarchical model for power systems. Stability, *J. Math. Soc.*, to appear.
- 35) G. D. Allen, The Web-Based Mathematics Course, a survey of the required features for an on-line math course and experiences in teaching one, *Syllabus Magazine*, with M. Stecher and P. Yasskin, Nov/Dec 1998.
- 36) G. D. Allen, WebCalC I, a description of the WebCalC project, it's history and features, to appear in the Proceeding of the ICTCM Conference, Nov 1998, Addison-Wesley-Longman, Reading. with M. Stecher and P. Yasskin.
- 37) G. D. Allen, Internet Based Drills and Quizzes, techniques for constructing math drills in subjects from algebra to calculus, to appear in the Proceeding of the ICTCM Conference, Nov 1998, Addison-Wesley-Longman, Reading. with M. Stecher and P. Yasskin.
- 38) G. D. Allen, Jeff Morgan and Sayed El Attar, Asymptotically short term behavior of solutions to one dimensional diffusion processes, with Jeff Morgan and Sayed El Attar, *Journal of Analysis and Applications*, 240 (1999) 145-162.
- 39) G. D. Allen, David Sanchez, Jim Herod, Mark Holmes, Vince Ervin, Robert Lopez, Joe Marlin, Strategies and Guidelines for Using a Computer Algebra System in the Classroom, with David Sanchez, et.Al., to appear, *International Journal of Engineering Education*, 15, no. 6, 1999, pp. 411-416.
- 40) G. D. Allen and Paul Nelson, Linear One-Cell Functional Methods for the Two Dimensional Transport Equation. Part I. The Nodal Formulation, *Ann. Nucl. Sci. and Eng.* (25 pages)
- 41) G. D. Allen, WebCalC --- Two Years Later, *Computers in Schools*, 17, p17-30, 2001.
- 42) Online Choices for Online Courses. A survey of the issues of developing an online course. Included is a discussion of various development products. To appear in the Proceedings of the 13th ICTCM Conference, Atlanta GA. November 16, 2000. URL:  
://www.math.tamu.edu/webcalc/allen/onlinechoices121100.htm
- 43) G. D. Allen, The Distance Education Degree Program for The Master of Mathematics with a Teaching Option at Texas A&M University, Proceedings of the AACE Conference: SITE

- 2001--Society for Information Technology and Teacher Education International Conference, Orlando, Florida; March 5-10, 2001 with M. Pilant.
- 44) G. D. Allen, Online Calculus, in *Using Information Technology in Mathematics Education*, D. James Tooke, Norma Henderson, Eds., Haworth Press, New York, 2001.
  - 45) Online Calculus, The Course and Survey Results, *Computers in the Schools*, 17, p.17-30, 2001.
  - 46) G. D. Allen, Michael Pilant and Jon Pitts, On building a quality masters degree program, *Proceedings of the 2003 DEC (Distance Education Conference) conference*, January 21-24, 2003.
  - 47) G. D. Allen, C. Ezrailson and C. Loving, Analyzing Dynamic Pendulum Motion in an Interactive Online Environment Using Flash, *Science and Education Journal Special Issues*, to appear 2004.
  - 48) G. D. Allen, Making Animations, to appear, to appear in the *Proceeding of the 15th ICTCM Conference*, Baltimore, Md. November 16-18, 2003.
  - 49) Can an Online Mathematics Course Work?, *College Mathematics Journal*, 34, No. 4, 2003, pp. 270-279.
  - 50) Analyzing Dynamic Pendulum Motion in an Interactive Online Environment Using Flash, *Science and Education Journal Special Issues*, Volume 13 Nos. 4-5 June 2004, with C Ezrailson and C. Loving.
  - 51) *The Pendulum: Scientific, Historical, Philosophical and Educational Perspectives*, Springer, Dordrecht. Reprint of the first article.
  - 52) Analyzing Dynamic Pendulum Motion in an Interactive Online Environment Using Flash, *Science and Education Journal Special Issues*, in Matthews, M.R., Gauld, C.F. & Stinner, A. (eds.): 2005,
  - 53) The Impact of Web-Based Assessment and Practice on Students Mathematics Learning Attitudes. *Journal of Computers in Mathematics and Science Teaching*. 25 (3), pp. 251-279. Chesapeake, VA: AACE, with Nguyen, D., Hsieh, Y. (2006).
  - 54) A Crash Course on Testing and Assessment, 2006, *Proceedings of the 17th ICTCM Conference*, October 28-November 1, 2004, 2006.
  - 55) Interactive Mathematics QuizMaker and the Online Mathematics Placement Exams, 2006, *Proceedings of the 17th ICTCM Conference*, October 28-November 1, 2004, with Diem Nguyen, 2006.
  - 56) Using and Validating a Triadic Instrument, *Academic Exchange Quarterly The Triadic Survey Instrument*, with Dianne Goldsby, Summer 2007, ISSN 1096-1453 Volume 11, Issue 2.
  - 57) Pre-Service Teacher Perceptions of Teaching Fractions through a Survey, Essay, and Mathematical Misconceptions, *Proceedings of the 20th International Conference on Technology in Collegiate Mathematics*, Addison-Wesley, 2009, with Dianne Goldsby.
  - 58) RETENTION THROUGH REMEDIATION: ENHANCING CALCULUS I SUCCESS, *ICTCM*, *Proceedings of the 23rd International Conference on Technology in Collegiate Mathematics*, Pearson, 2012. with Sandra Nite, Jennifer Whitfield.
  - 59) Pre-Service Teacher Perceptions of Mathematics/Science Teacher Preparation, with Dianne Goldsby, Larry Kelly, and Dawn Parker *Journal of Mathematics Pedagogy and Content*, (6), 2014.
  - 60) Constructing and Role-playing Student Avatars in a Simulation of Teaching Algebra for Diverse Learners, iwth Ma, tingting; Brown, Irving; Kulm, Gerald; Davis, Trina; Lewis,



- Chance; Allen, Donald to appear in *Urban Education*, 2014.
- 61) Challenges to Computing, Recent and Innovation Trends in Computing and Communication (IJRITCC), Volume 2 Issue 11, 16 November 2014.
  - 62) Preservice Mathematics Teachers' Effectiveness In Addressing In Algebra, with Ayse Tugba Oner, S. Enrico Indiogine, Gerald Kulm, and Haiping Hao, School Science and Mathematics Association (SSMA)(2014), to appear.
  - 63) The Remarkable Number "1", *Science & Education*: Volume 23, Issue 9 (2014), Page 1845-1852.
  - 64) Confusion Theory and Assessment, *IJSET - International Journal of Innovative Science, Engineering & Technology*, Vol. 1 Issue 10, December 2014, with Dianne Goldsby.
  - 65) Challenges to Computing, Recent and Innovation Trends in Computing and Communication (IJRITCC), Volume 2 Issue 11, 16 November 2014.
  - 66) Preservice Mathematics Teachers' Effectiveness In Addressing In Algebra, with Ayse Tugba Oner, S. Enrico Indiogine, Gerald Kulm, and Haiping Hao, School Science and Mathematics Association (SSMA)(2014), to appear.
  - 67) Allen, G. Donald, Unfairness in Testing - Random Effects, Proceedings of the ICTCM 2016 meeting, March 2017.
  - 68) Nite, S. B., Morgan, J., Allen, G. D., Capraro, R. M., Capraro, M. M., & Pilant, M. (2015, October). A bridge to engineering: A personalized precalculus (bridge) program. *2015 IEEE Frontiers in Education Conference Proceedings*, Paper presented at the 45th Annual Frontiers in Education Conference: Launching a New Vision in Engineering Education. El Paso, TX (2053-2058).
  - 69) Nite, S. B., Allen, G. D., Bicer, A., Morgan, J., & Barroso, L. R. (2017, June). College Freshman Beliefs About Studying and Learning Mathematics: Results from a Summer Engineering Calculus Bridge Program. Proposal accepted to *2017 American Society for Engineering Education Annual Conference & Exposition*, Columbus, Ohio.
  - 70) Nite, S. B., Allen, G. D., Bicer, A., & Capraro, R. M. (2017, April). Strengthening precalculus skills in a summer program for engineering students. Paper accepted to *2017 AERA Annual Meeting, Knowledge to Action: Achieving the Promise of Equal Education Opportunity*. San Antonio, Texas.
  - 71) Nite, S. B., Allen, G. D., Bicer, A., & Capraro, R. M. (2017, April). Precalculus program for prospective engineering students. Paper accepted to *2017 NCTM Research Conference*. San Antonio, Texas.
  - 72) Nite, S. B., Allen, G. D., Bicer, A., & Morgan, J. (2016, June). Student engagement in a summer bridge program for engineering calculus success. *Electronic Proceedings of the 2016 Hawaii University International Conferences Science, Technology Engineering, Art, Math & Education Conference*. Honolulu, HI: Hawaii University International Conferences.
  - 73) Nite, S. B., Allen, G. D., Bicer, A., & Capraro, R. M. (2017, April). Strengthening precalculus skills in a summer program for engineering students. Paper accepted to *2017 AERA Annual Meeting, Knowledge to Action: Achieving the Promise of Equal Education Opportunity*. San Antonio, Texas.
  - 74) Nite, S. B., Allen, G. D., Bicer, A., & Capraro, R. M. (2017, April). Precalculus program for prospective engineering students. Paper submitted to *2017 NCTM Research Conference*. San Antonio, Texas.
  - 75) Nite, S. B., Allen, G. D., Morgan, J., Bicer, A., & Capraro, R. M. (2016, June). Engineering calculus bridge program success: Comparing variation results. In *Proceedings of the American Society for Engineering Education 2016*, Paper ID# 16610 presented at ASEE's 123rd National Conference and Exposition. New Orleans, LA: American Society for Engineering Education, Washington DC.
  - 76) Nite, S. B., Allen, G. D., Bicer, A., & Morgan, J. (2016, June). Student engagement in a summer bridge program for engineering calculus success. *Electronic Proceedings of the 2016 Hawaii University International Conferences Science, Technology Engineering, Art, Math & Education Conference*. Honolulu, HI: Hawaii University International Conferences.

- 77) Effective Technology for a Calculus Bridge Program: Bringing Education Home, Australian Association for Engineering Education Conference, Dec 7-0, 2015, <http://aaee2015.exordo.com>, with Jim Morgan, Sandra Nite, Robert Capraro.
- 78) Allen, G. Donald, THE VALIDITY AND RELIANCE OF BIG DATA PROJECTS, ICTCM Proceedings, 2015.
- 79) Morgan, J., Nite, S. B., Allen, G. D., Capraro, M. M., Capraro, R. M., & Pilant, M. (2015, April). Improving engineering calculus success through a summer program. In C. A. Shoniregun & G. A. Akmayeva. IICE-2015 Proceedings. Ireland International Conference on Education, Dublin, Ireland: Infonomics Society.
- 80) Allen, G. Donald, What can the Classroom Learn from the MOOC, Proceedings of the 25th Annual ICTCM Conference, 2015.
- 81) Allen, G. Donald, with Sandra B. Nite, Jim Morgan, Robert M. Capraro, and Mary M. Capraro, Improving Success in Engineering Calculus: Design of a Bridge Program, Proceedings of the AAEE2014 Conference Wellington, New Zealand, 2014.
- 82) Allen, G. Donald and Sandra Nite, Increasing Success in Calculus II with a Bridging Program, Hawaii Education and STEM Conference, Honolulu, Hawaii, (June 16-18, 2014), 10 pages.
- 83) Allen, G. Donald, USING A MATH PLACEMENT EXAM TO DEVELOP A PERSONALIZED PRECALCULUS PROGRAM, with Sandra Nite, M. Pilant, Proceedings of the 25th Annual ICTCM Conference, 2014.
- 84) THE ICTCM: TEACHING PORTAL TO THE 21ST CENTURY, with Sharon Sledge, Proceedings of the 25th Annual ICTCM Conference, 2014.
- 85) Allen, G. D with Sandra Nite, Ali Bicer, James Morgan, Luciana Borroso, Results from a Summer Engineering Calculus Bridge, Proceedings of the 2017 ASEE Annual Conference & Exposition, College Freshman Beliefs About Studying and Learning.
- 86) Nite, S. B., Allen, G. D., Bicer, A., & Capraro, R. M. (2017, April). Precalculus program for prospective engineering students. Paper accepted to 2017 NCTM Research Conference. San Antonio, Texas.
- 87) Hierarchy of Knowledge from Data to Wisdom, *International Journal of Current Research in Multidisciplinary (IJCRM)*, Vol 2, 1, 2017, 15-23.
- 88) Allen, G. Donald, Simulations for the EPL Using Competitive Balance Models, *Journal of Sports and Physical Education*, e-ISSN: 2347-6737, p-ISSN: 2347-6745, Volume 4, Issue 2, (Mar. – Apr. 2017), PP 33-43. <http://www.iosrjournals.org/iosr-jspe/papers/Vol-4Issue2/G04023343.pdf>, DOI: 10.9790/6737-0402334.
- 89) Allen G.D. (2017) How do we define the Number “1?”. In: Allen G.D., Ross A. (eds) *Pedagogy and Content in Middle and High School Mathematics*. Sense Publishers, Rotterdam.

#### BOOK

- Allen G.D. and Amanda Ross (eds) (2017) *Pedagogy and Content in Middle and High School Mathematics*. Sense Publishers, Rotterdam.

#### OTHER WRITINGS

- 1) Your Bicameral Brain, LinkedIn, 2022
- 2) Quantum Miracles. LinkedIn, 2020
- 3) Allen, Don, Personalized Remediation Programs and Mini-Bridging, TeXMATYC Newsletter, 2014.
- 4) Allen, G. Donald, Multiple Representations IV, Estimating Pi, *Journal of Mathematics*

- Pedagogy and Content, (6), 2014.
- 5) Allen, G. Donald, Multiple Representations III, Journal of Mathematics Pedagogy and Content, (6), 2014.
  - 6) Allen, G. Donald, Multiple Representations II, Journal of Mathematics Pedagogy and Content, (5), 2013.
  - 7) Allen, G. Donald, Multiple Representations I, Journal of Mathematics Pedagogy and Content, (5), 2013.
  - 8) Allen, G. Donald, Impossible Problems, Journal of Mathematics Pedagogy and Content, (5), 2013.
  - 9) Allen, G. Donald, To Solve a Problem, Journal of Mathematics Pedagogy and Content, (5), 2013.
  - 10) Allen, G. Donald, American Presidents and Their Math, Journal of Mathematics Pedagogy and Content, (5), 2013.
  - 11) Allen, G. Donald, The Evil Twins – Testing and Stress, Journal of Mathematics Pedagogy and Content, (5), 2013.
  - 12) Allen, G. Donald, Let's Make War - Just for Fun, Journal of Mathematics Pedagogy and Content, (5), 2013.
  - 13) Allen, G. Donald, Can Online Education Work?, Journal of Mathematics Pedagogy and Content, (5), 2013.
  - 14) Allen, G. Donald, Teaching is a Balancing Act, Journal of Mathematics Pedagogy and Content, (4), 2012.
  - 15) Allen, G. Donald, Optimization - With and Without Calculus, Journal of Mathematics Pedagogy and Content, (4), 2012.
  - 16) Allen, G. Donald, How Do We Define the Number “1?” , Journal of Mathematics Pedagogy and Content, (4), 2012.
  - 17) Allen, G. Donald, Math Teacher Demographics in Texas, Journal of Mathematics Pedagogy and Content, (4), 2012.
  - 18) ODE Architect - A Review, Syllabus 14, 2001, 53.
  - 19) What do we do until MathML? An exploration of various math-online alternatives. in The Math/Science Online Newsletter, Winter 2000.

#### PAPERS SUBMITTED

Linear One-Cell Functional Methods for the Two Dimensional Transport Equation. Part I. The Nodal Formulation, Ann. Nucl. Sci. and Eng. with Paul Nelson. (25 pages)

#### CONFERENCE PROCEEDINGS

Allen, G. Donald, USING A MATH PLACEMENT EXAM TO DEVELOP A PERSONALIZED PRECALCULUS PROGRAM, with Sandra Nite, M. Pilant, Proceedings of the 25th Annual ICTCM Conference, 2014.

THE ICTCM: TEACHING PORTAL TO THE 21ST CENTURY, with Sharon Sledge, Proceedings of the 25th Annual ICTCM Conference, 2014.

Allen, G. Donald, and Goldsby, Dianne. Using Technology to Make New Assessment Instruments, Proceedings of the 18th International Conference on Technology in Collegiate Mathematics, Addison-Wesley, Boston. (2007).

A Crash Course on Testing and Assessment, 2006, Proceedings of the 17th ICTCM Conference, October 28-November 1, 2004, 2006.

Interactive Mathematics QuizMaker and the Online Mathematics Placement Exams, 2006, Proceedings of the 17th ICTCM Conference, October 28-November 1, 2004, with Diem Nguyen, 2006.

The Distance Education Degree Program for The Master of Mathematics with a Teaching Option At Texas A&M University, to appear in the Proceedings of the AACE Conference: SITE 2001-- Society for Information Technology and Teacher Education International Conference, Orlando, Florida; March 5-10, 2001. with M. Pilant.

Online Choices for Online Courses. A survey of the issues of developing an online course. Included is a discussion of various development products. Proceedings of the 13th ICTCM Conference, Atlanta GA, Addison-Wesley, 2000, 11-16.

WebCalC I, a description of the WebCalC project, it's history and features, Proceeding of the ICTCM Books and Monographs.

#### WORKSHOPS, EVENTS, ORGANIZED OR GIVEN

1. Workshop on Technology, Mathematics, and Mathematics Education, Nairobi, Kenya, August 11-18, 2010. In association with the Africa MathScience, Technology, Research & Education Foundation <http://distance-ed.math.tamu.edu/kenya-tz2010/>
2. ICTCM, Camtasia, full day, March 12, 2009.
3. GK-12 Special Workshop for Math Fellows, June 10 and June 13, 2008, College Station, TX,
4. Presentation, Misconceptions in Mathematical Understanding, CAMT (Conference for the Advancement of Mathematics Teaching), San Antonio, TX, July 9-11, 2008
5. Presentation, Cengage Regional Meeting, Dallas, TX, March 14, 2008
6. Workshop. ICTCM - Using Flash, Boulder Co, July 27-30, 2003. Principal speaker.
7. Presentation, All About Quadratics, CAMT (Conference for the Advancement of Mathematics Teaching), Henry B. Gonzales Convention Center, San Antonio, TX, June 28-30, 2007.
8. Co-chaired. P-16 Grassroots Initiative meeting and workshop, College Station, TX, March 7, 2007, Texas A&M University, College Station, TX.
9. TCCTA/TEXMATYC Workshop on Trends in College Algebra, (Allen presides), February 24, 2007, Austin, TX.
10. TAMU/Snook ISD. Half day workshop on using the digital camera, Excel, and digitizing software to situations and problems related to mathematics, April 15, 2006.

11. TAMU/Snook ISD. Half day workshop on digital devices as related to mathematics, April 8, 2006.
12. TAMU/TEA (Texas Education Agency)/PEIC (P-16 Educational Improvement Consortium), Fractions, Measurement and Scaling for professional development, March 4, 2006.
13. TAMU/Pasadena ISD, Developing 5E lessons applied to topics of measurement (eight hours), Pasadena, TX, February 25, 2006.
14. Pre-conference workshop Visual Algebra and Pre-calculus, (Six hours), TexMATYC/TCCTA Conference. (Invited) Houston, TX February 23 25, 2006.
15. TAMU/Pasadena ISD, Fractions, Measurement and Proportion for professional development, Pasadena, TX, October 29, 2005.
16. TAMU/TEXMatyc (Texas Math Association of Two Year College), Maple for the Classroom, October 28, 2005.
17. TAMU/Snook ISD, Using the TI-Navigator equipment, Snook, TX, October 15, 2005.
18. TAMU/TEA (Texas Education Agency)/PEIC (P-16 Educational Improvement Consortium), Fractions, Measurement and Scaling for professional development, October 8, 2005.
19. University of Idaho, Gateway Mathematics Group, Using Scientific Notebook and Camtasia, Moscow, ID, June 13-17, 2005.
20. Maple - in the Classroom, an online workshop given to Texmatyc instructors, April 9, 2004.
21. Teacher Quality Grant professional development workshops - series A conducted on Algebra II Sept 18, Oct. 16, Nov 13 and Dec. 4; series B conducted on Sept 25, Oct. 23, Nov 13, Dec 11, Jan 19, Feb 5, Feb 19. (eight hours each).
22. Teacher Quality Grant Type B Workshops (funded by THECB), July 6-9,12-13, 19-23, 2004; Houston TX.
23. Teacher Quality Grant Type A workshops (funded by THECB), May 13, Ft. Worth, May 14-15, Houston, May 20-21, 2004, Houston, TX.
24. ICTCM (International Conference on Technology in Collegiate Mathematics) - Mathematical Theory of Assessment - Using technology for assessment, Workshop. Tomball, TX, May 17-20, 2004.
25. ITLAB, brief afternoon workshop to Math faculty on the use of Flash MX, Texas A&M University, October 16, 2003.
26. College of Science - Open House, September 6, 2003, presentation on distance education , online masters of mathematics program.
27. ICTCM (International Conference on Technology in Collegiate Mathematics) - Using Flash for mathematics instruction, Workshop. Westminster, Co, July 27-30, 2003.
28. Conference for the Advancement of Mathematics Teaching - Math goes to hollywood. Houston Texas, July 17,2003
29. Math Camp - presentation to 45 junior high school students on the use of mathematics in Hollywood produced movies, July 11, 2003, College Station, TX
30. Philosophy Group - presentation to a group of philosophers and sociologist on the application of Flash to interactive logic proofs, June 2, 2003, College Station, TX
31. ICTCM (International Conference on Technology in Collegiate Mathematics) - Visual algebra, applying digital and visual technologies toward learning algebraic concepts, Workshop. Murfreesboro, TN, May 19-22, 2003.
32. Second Texas-Mexico Workshop on Numerical Particle Transport, College Station, TX,

Sept 2-4, 1992, co-organizer.

33. Third Texas-Mexico Workshop on Numerical Particle Transport, Mexico D.F., March 11-13, 1996, co-organizer.

34. Calculus Reform and Maple in the Classroom, April 3-4, 1998, sponsored by the National Science Foundation and conducted by SRI International. The meeting assembled a group of educators, many with extensive experience in calculus reform, more with teaching mathematics with Maple, and evaluation experts. co-organized with David Sanchez (See Funding.)

35. ICTCM Short Course. I was the principal speaker for a week long workshop on Web developments and placing math on the Web. Class notes. Colorado State University, Ft Collins, CO, Math 22-25, 2000 <http://www.academicsolutions.com>

36. University of Houston, Online Choices. Mini-short course for the UH Provost's office, October 17, 2000.

37. North Harris Community College, Web Calculus and other online courses, October 17, 2000.

38. ICTCM summer workshops in College Station and Madison, WI. I was the principal speaker for a week long workshop on Web developments and placing math on the Web.

39. Workshop on Internet editors. Sept 6-7 and 13-14, 2002. An ITWG - College of Science ITLAB project.

40. IT Lab, College of Science: Workshop on Flash, June 21, 2002.

41. IT Lab, College of Science: Workshop on Dreamweaver, August 29, 2001.

42. ICTCM Short Course. Principal speaker for a week long workshop on advanced multimedia applications. South Mountain College, Phoenix, AZ, May 19-23, 2002.

43. NASA Making Connections Workshop, Using digital imaging technology. San Jacinto Community College, Houston, TX. July 20, 2002.

44. NASA Making Connections Workshop, Using computer algebra systems, San Jacinto Community College, Houston, TX. August 17, 2002.

45. BVMUG - Brazos Valley Macromedia Users Group. Presentation on various software tools. Microage Corporation, College Station, TX. November 19, 2002.

46. Workshop. ICTCM - Visual Algebra, Murfreesboro, TN, May 19-22, 2003. Principal speaker.

#### OTHER EVENTS (RECENT)

1. Presentation, Stemhouse in Vietnam, February 12, 2019.

2. Panelist, Mathematics Matters in Education Workshop, April 1-3, 2017, Texas A&M University, College Station, TX

3. Invited Presentation, A Bridge to Engineering: A Personalized Precalculus (Bridge) Program, Frontiers in Education, October 21-24, 2015, El Paso, TX, with Sandra Nite, Jim Morgan, Robert Capraro.

4. Contributed Presentation, Confusion Matrices and Preservice Teacher Knowledge, ICTCM (International Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV, with Dianne Goldsby.

5. Contributed Presentation, The End of Computing, ICTCM (International Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV.

6. Invited Presentation, "A Fast and Furious Bridge to Calculus II – ONLINE!," AMATYC 40th Annual Conference, Gaylord Opryland Resort in Nashville, TN, November 13-16, 2014, with Sharon Sledge. Also

presented at ICTCM (International Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV).

7. Poster Session, The Impact of Placement Exams on Retention for Engineering Mathematics, ICTCM (International Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV, with Mike Pilant and Jennifer Whitfield.
8. Invited Presentation, The Remarkable Number One, 8th Annual International Conference on Mathematics & Statistics: Education & Applications, Athens, Greece, July 1-2, 2014.
9. Invited Presentation, Online courses in economics, a primer, International Business School of New York, September 24-27, 2014.
10. Invited Presentation, "Understanding Distance Education", European School of Economics, August 12-17, 2014
11. Invited Presentation, "Increasing Calculus II Success with a Bridging Program," 2014 Hawaii University International Conference, June 10-12 at the Ala Moana Hotel, with Sandra Nite.
12. Invited Presentation, Impossible Problems and MOOCs, ICTCM (International Conference on Teaching Collegiate Mathematics) 26th annual meeting, March 21-23, 2014.
13. Invited Presentation, Student Characteristics That Help Predict Success in Calculus: Results from a Summer Precalculus Program, ICTCM (International Conference on Teaching Collegiate Mathematics) 26th annual meeting, with Sandra Nite, March 21-23, 2014.
14. Invited Presentation, "Personalized Precalculus Program – A Summer Bridge Program", TCCTA Annual Meeting, San Antonio, TX, February 7, 2014.
15. Invited Presentation, Using a bridging program for Calculus Instruction, North Carolina State, January 15, 2014.
16. Invited Presentation, Pre-session, presented to the pre-session of the ICTCM (International Conference on Teaching Collegiate Mathematics) in San Antonio, March 7, 2013. All day workshop.
17. Invited Presentation, MOOCs and what they imply, TCCTA annual meeting in San Antonio, TX, February 7, 2014.
18. Invited Presentation, The Precalculus Program, North Carolina State University, November 20, 2013.
19. Invited Presentation (via Webinar), Advancing an Online Project in the Assessment and Effective Teaching of Calculus, with Mika Seppala and Eamonn Kelly, November 14, 2013. [The meeting is held in Adobe ConnectPro on Thursday 14 November, 18:00-19:00 EEST (Finland)/08:00-09:00 (California, USA)]
20. Invited Presentation, Understanding the predictive results of testing, University of Sao Paulo, Brazil, November 12, 2013.
21. Invited Presentation. Understanding MOOCs and online delivery, NSF SAVI conference on big data, October 24-27, 2013, Helsinki, Finland.
22. Invited Presentation, Misconceptions in Mathematics, Teacher Quality Annual Technical Meeting, Lost Pines, Resort, Bastrop, TX, April 2, 2013,
23. Invited Presentation, Triadic Surveys on Teacher Preparation, ICTCM (International Conference on Teaching Collegiate Mathematics) annual meeting, March 23, 2013.
24. Invited Presentation, Math Assessment Testing, ICTCM annual meeting, March 22, 2013.
25. Invited Presentation. Assessment and Teaching, NSF SAVI meeting, Tallahassee, FL, March 14-15, 2013.
26. Attended. NSF CADRE grant meeting, Washington DC. June 13-15, 2012.
27. Invited speaker, Innovations in Learning and Education Collaborative Workshop with Finnish researchers, Embassy of Finland. Washington DC, June 7-8, 2012.
28. Attended, Current Research on Community College Transfer Success, Hilton Hotel and Conference Center, May 29, 2012.
29. Chair, Math Education and Teacher Prep, ICTCM program committee, 2012.



30. Attended, ICTCM (International Conference on Technology in Collegiate Mathematics) Executive Steering Committee Meeting. March 22, 2012, Orlando, FL.
31. Attended, Teacher Quality Grants annual meeting, The Hyatt Regency Lost Pines Resort and Spa, 575 Hyatt Lost Pines Road, Lost Pines, TX, US, April 4-5, 2012
32. Chair, Math Education and Teacher Prep, ICTCM program committee, 2011.
33. Attended. NSF STEP annual grant meeting, Washington DC. March 11-13, 2012.
34. Member, Developmental Education Advisory Board, Texas Education Agency, October 28, 2011.
35. Invited participant, STEP Leadership Workshop at the University of Oregon on October 16-18, 2011
36. Attended, Texas Partners in P-16 Mathematics, Charles A. Dana Center, Austin, TX, May 2, 2011. (Co-Founder)
37. Attended, TAMU Collaborative summer Institute, June 20, 2011, Koldus, 110.
38. Invited Presentation, Mathematics Education in Kenya, TAMU, April 25, 2011.
39. Invited Presentation, Test Item Dependencies, AMUSE seminar, TAMU, April 20, 2011.
40. Attended, NSF Annual STEP Conference, Omni Shoreham Hotel, Washington DC, March 17-18, 2011.
41. Presentation to the MSC Jordan Institute for International Awareness, "Islamic Contributions to Mathematics," November 10, 2010, Texas A&M University.
42. Attended. Annual meeting, Texas Partners in P-16 Mathematics, Charles A. Dana Center, Austin, TX, October 21, 2010.
43. Consultant. Professional Development Summit, October 19-20, 2010, Airport Hilton Hotel, Austin, TX.
44. Attended. CBMS Forum on Content-Based Professional Development for Teachers of Mathematics on October 10-12, 2010 at the Hyatt Regency Hotel in Reston VA.
45. Interview. Visiting ABET team (Dr. James Miller, Univ of Rhode Island) for College of Engineering accreditation process, September 27, 2010.
46. Presentation. Misconceptions in Mathematics, AP pre-Calculus Institute, College Station, TX, July 25, 2009.
47. Presentation. The MS Online program in mathematics, AP Calculus Institute, College Station, TX, July 23, 2010.
48. Presentation. Early Mechanical Calculators, AP Pre-Calculus Institute, College Station, TX, July 29, 2009.
49. Presentation. The MS Online program in mathematics, AP Calculus Institute, College Station, TX, July 21, 2009.
50. Presentation. The National Math Panel, Gladewater ISD, Gladewater, TX, July 14, 2009.
51. Attended. Teacher Quality Grants Technical Assistance Meeting, Airport Hilton, Austin, TX, October 30, 2008.
52. Attended. National Math Panel Faculty Forum, Marriott Wardman, Washington, DC, October 6-7, 2008.
53. Attended. College Board AP, Connect to College Success, Renaissance Hotel, Chicago, October 3-5, 2008.
54. Presentation. The MS Online program in mathematics, AP Calculus Institute, College Station, TX, July 16, 2008.
55. Panelist for Session 3. Mathematics Education in China and the United States, July 1-3, 2008, College Station TX. Also moderator for Session 5.

56. Attended. Joint PIC/IAB Directors meeting of the Institute for Mathematics and Applications (IMA), Minneapolis, MN, June 12, 2008.
57. Presentation, Research on teaching and learning fractions, to the GK-12 teachers, June 3 and 5, 2008, College Station, TX.
58. Participated, Comparability study between TExES tests and Praxis tests, supported by the Educational Testing Service and the Texas Education Agency, San Antonio, TX, April 10-11, 2008.
59. Panelist, ICTCM, "Evaluating online courses/programs." March 5-8, 2008.
60. Attended, Enhancing Education, System wide Success, 2008 Teaching with Technology Conference, Texas A&M University, February 12, 2008.
61. Panelist, On e-content, at the JEM, Joining Educational Mathematics, an EU-funded thematic network for Mathematics Education, January 31 - February 2, 2008.
62. Attended, Southwest Regional NSF GK-12 Conference College Station, Texas -- November 9-10, 2007
63. Invited, Improving Science and Math Education: Texas Confronts the Gathering Storm, A dinner and forum sponsored by The Academy of Medicine, Engineering and Science of Texas and Rice University's James A. Baker III Institute for Public Policy, funded by Dow Chemical and the Greater Texas Foundation, October 12, 2007, Houston Tx.
64. Attended, AMS Committee on Education Annual Meeting, October 25-27, 2007, Washington, DC.
65. Attended, Teacher Quality Grant workshop and Dana Center Annual Higher Ed Meeting, Airport Austin Hilton, October 18-20, 2007, Austin, TX.
66. Attended, Course Redesign Workshop, Texas Higher Education Coordinating Board, October 15, 2007, Austin, TX.
67. Presentation. Focus Group for the Governor's Commission for a College Ready Texas, Meeting of Business Leaders and Faculty to Discuss College Readiness Standards September 7, 2007, 12:30 pm – 5:00 pm Austin Airport Hilton, Austin Texas.
68. Discussed, college readiness to the Governor's Commission for a College Ready Texas, (by phone), August 14, 2007.
69. Presentation. (Brief) The MS Online program in mathematics, AP Calculus Institute, College Station, TX, August 2, 2007.
70. Appointed and Attended. TQ Instructional Leadership e-Group meeting, Austin, TX, June 10-11, 2007. (By invitation with expenses.)
71. Attended. MSRI Workshop Critical Issues in Education: Teaching Teachers Mathematics, May 30-June 1, 2007, MSRI, Berkeley, CA.
72. Attended. MTC (Math TEKS Connections) Geometry Project Workshop, Austin, TX., May 22, 2007.
73. Reviewed. Department of Mathematics Self Study for Texas A&M University in Corpus Christi, May 9-11, 2007.
74. Attended. Texas Higher Education Coordinating Board, Conference on Course Redesign, May 2, 2007, Austin, TX. (Invited.)
75. SERA program committee, Instruction, learning and cognition section, 2007-2008.
76. Attended. DEVELOPING INFORMAL SCIENCE PARTNERSHIPS CHARLES WALTER, CEO, FORT WORTH MUSEUM OF SCIENCE & HISTORY 22 FEBRUARY 2007 2:30 p.m. 601 Rudder, College Station, TX.
77. Presentation. Problem Solving: Survey of the 9-12 modules for the MTC project, January 13-

- 14, 2007, Airport Hilton, Austin, TX.
78. Co-chaired. P-16 Grassroots Initiative meeting, College Station, TX, March 7, 2007
79. Presided. TCCTA/TEXMATYC special session on Trends in College Algebra, (Allen presides), February 24, 2007, Austin, TX.
80. Attended. DEVELOPING INFORMAL SCIENCE PARTNERSHIPS CHARLES WALTER, CEO, FORT WORTH MUSEUM OF SCIENCE & HISTORY 22 FEBRUARY 2007 2:30 p.m. 601 Rudder, College Station, TX.
81. Presentation. Problem Solving: Survey of the 9-12 modules for the MTC project, January 13-14, 2007, Airport Hilton, Austin, TX.
82. Co-chaired. P-16 Grassroots Initiative meeting, Austin, TX, December 6, 2006
83. Appeared. "STRATEGIES FOR TEACHING MATH ONLINE" , NOVEMBER 30, 2006, video interview on e-Learning, a StarLink Production, interview taping on November 10, 2006, <http://www.starlinktraining.org/programs/programs2007/nov30.asp>. followed by a telephone conference call with viewers.
84. Attended. Online Educa Berlin 2006 and the WebALT: Web Advanced Learning Technologies Workshop, Berlin, Germany, October 28-December 1, 2006, See: <http://www.online-educa.com/> and [http://webalt.math.helsinki.fi/webalt-OEB/content/program/index\\_eng.html](http://webalt.math.helsinki.fi/webalt-OEB/content/program/index_eng.html). (Expenses paid.)
85. Presentation. The TAMU Mathematics Department Online Placement Examination - Preliminary Results. Presented to the Texas A&M Academic Operations Committee (AOC), November 1, 2006.
86. Co-chaired. P-16 Grassroots Initiative meeting, Austin, TX, October 12, 2006
87. Pre-conference workshop Visual Algebra and Pre-calculus, (Six hour workshop), TexMATYC/TCCTA Conference. (Invited) Houston, TX February 23-25, 2006.
88. Presentation. e-Learning in 2020, at the Information Technology Working Group seminar, September 13, 2006, College Station, TX.
89. Selected. Math TEKS Connections - Geometry Advisory Board. August 30, 2006. First meeting, Crown Plaza Hotel, Austin, TX, September 30, 2006.
90. Testified. On College Readiness, before the Texas Higher Education Coordinating Board and the Texas Education Agency, September 22, 2006, Austin, TX.
91. Attended regular Math and Education meetings, TLAC, Spring 07.
92. Presentation. Using animations in mathematics & Math Goes to Hollywood,
93. Presented to Summer Honors Invitational Program (SHIP) participants, Texas A&M University, July 10, 2006.
94. Presentation. The CO-STEM Highway to Equal Education Access, STEM finalist grant presentation to the Texas Education Agency (TEA), Austin, TX, June 20, 2006.
95. Presentation. To PEER student group, Math Goes to Hollywood, at the TAMU Vet School, June 15, 2006.
96. Attended. Joint PIC/IAB meeting of the Institute for Mathematical Analysis (IMA), Minneapolis, MN, June 12, 2006.
97. Attended, MTC research project meeting (Math TEKS Connections), Texas A&M University, June 1, 26, July 16, 25, September 12,20, 2006.
98. Presentation. On the new calculus placement exam to the College of Engineering committee of advisors, May 31, 2006.
99. Appeared. KBTX-TV news show on the LOTTO, May 17,18, 2006. Joe Brown, newscaster.
100. Participated - co hosted. The grass-roots P-16 Consortium at the Charles Dana Center,

- May 11, 2006. (Co-organizers, Mel Griffin, Linda, Zientek, and Gloria White)
101. Appeared. 15 Magazine Television show, hosted by Sharon Colson, Topic: The Texas Math Talent Search, taped on May 3. Showed on May 11, 13, 14.
  102. Presentation. Math Goes to Hollywood. Presented to 18 students from Leakey Tx, April 27, 2006.
  103. Participated. THECB panel on online professional development, Texas A&M University, April 11, 2006.
  104. Organized, Math Summit between UH, UT, and TAMU, March 31, 2006, Texas A&M. Discuss the combined efforts of the three campus on technology mediated mathematics teaching and education projects.
  105. Attended regular Math and Education meetings, TLAC, Spring 06.
  106. Attended. Sigma Xi colloquium on K-12 education, Texas A&M University, March 28, 2006.
  107. Participated. GK-12 Fellowship NSF grant national meeting, Washington DC, March 24-26, 2006.
  108. Presentation. Fractions, TAMU/TEA (Texas Education Agency)/PEIC (P-16 Educational Improvement Consortium), March 4, 2006.
  109. Attended, MTA research project, Center for Distance learning Research, (Brief) Presentation on visualizing middle school math, Bryan, TX, Feb 18, 2006.
  110. Reviewed MTM3 project in Algebra II, TAMU-Commerce & ESC IV, Houston. February 6, 2006
  111. Attended, MTA research project, Center for Distance learning Research, (Brief) Presentation on visualizing middle school math, Bryan, TX, Jan 2, 2006.
  112. Attended, MTA research project, Center for Distance learning Research, Presentation on the 5E method, Bryan, TX, November 19, 2005.
  113. Attended, GK-12 Southwest Regional Conference, College Station TX, October 22, 2005.
  114. Attended TAMU-Mathematics Talent Contest, October 22, 2005.
  115. Attended TAMU/TEA (Texas Education Agency)/Mathematics TAKS Awareness, funded grant planning meeting, CDLR, Bryan, TX, October 22, 2005.
  116. Attended, NSF Workshop on Math Majors, Washington DC, August 12-13, 2005.
  117. Presentation. Using mathematics to make animations, Summer Honors Invitational Program, sponsored by the Office of Honors Programs and Academic Scholarships, June 20, 2005.
  118. Attended, Designing for Excellence and Achievement in Algebra I, (San Antonio), June 2-4, 2005.
  119. Attended The Mathematical Knowledge for Teaching (K-8): Why, What and How?, May 25-28, 2004.
  120. Attended, Charles A. Dana Center, TexMATYC, TAMU meeting in Austin on funding strategies for professional development courses, May 12, 2005.
  121. Attended Partnerships in Teacher Education Luncheon, hosted by College of Education and Human Development, Texas A&M University, March 8, 2005.
  122. Attended GK-12 Fellowship NSF grant national meeting, Washington DC, March 3-6, 2005.
  123. Presentation. Math goes to Hollywood, Presented at Aggieland Saturday, Texas A&M University, College Station, Tx. February 27, 2005.

124. Presentation. Research problems in assessment, presented to Dr. David Larson's Math 489 - Research Problems class, February 24, 2005.
125. Presentation. Thwarted Innovation: What Happened to e-learning and Why. Information Technology Working Group (ITWG) seminar, December 7, 2004.
126. Attended, Workshop for the Teacher Quality Grants Program - Type B Grants, Texas Higher Education Coordinating Board (THECB), Austin, TX, November 19, 2004.
127. Attended, ICTCM, (International Conference on Technology in Collegiate Mathematics) Executive Steering Committee Meeting. New Orleans, Oct 27, 2004.
128. Attended, Academy Advisory Committee meeting at the 8th Annual 8th Annual Conference on School-University Partnerships, Sept 26-27, 2004, in San Antonio.
129. Attended, Math Star annual directors meeting, Los Angeles, CA, Sept 22-24, 2004. (See <http://mathstar.lacoe.edu/welcome.html>)
130. Attended, 2004 Science & Mathematics, Excellence for All Students Conference, August 13, 2004, 8:00am - 4:30pm, Bryan-College Station, TX.
131. Attended, Workshop for the Teacher Quality Grants Program - Type A Grants, Texas Higher Education Coordinating Board (THECB), Austin, TX, August 4, 2004.
132. Attended, 5th Annual Chancellor's Invitational Conference for The Academy for Educator Development, Houston, TX, June 24-26, 2003. Chaired discipline-focus group meeting. Attended Regents II special meeting.
133. Attended, REU seminar at the offices of the Vice President for Research, TAMU, June 23, 2004.
134. Attended, "Dialog 2004: DMS and the Mathematical Sciences Community," Washington, DC, April 30-May 1, 2004.
135. Attended, "Accessing NASA's Educational and Research Funding Opportunities" workshop, at the UTSA - San Antonio, TX, April 26, 2004.
136. Participant, Teacher Quality Grants Executive Session, THECB/TEA organizers, Region VI service Center, Huntsville, TX, April 7, 2004.
137. Presentation, Mathematics Education Seminar, TLAC, Texas A&M University, March 11, 2004.
138. Attended MSRI (Mathematical Sciences Research Institute), Assessment Issues Conference, Berkeley, CA, March 7-10, 2004.
139. Panel Discussion Participant, Distance Education Forum, Evans Library, Texas A&M University, February 26, 2004.
140. Participant, Teacher Quality Grants Executive Session, THECB/TEA organizers, Region VI service Center, Huntsville, TX, February 25, 2004.
141. Presentation, Texas A&M, Using 3D Rendering Software, Information Technology Working Group, Texas A&M University, February 24, 2004.
142. Attended Texas A&M 4th Annual Assessment Conference, College Station, TX, February 2-3, 2004.
143. Attended Texas A&M Assessment Workshop given by Thomas Angelo at TAMU , College Station, TX, February 2, 2004.
144. Attended QEP (Quality Enhancement Program) luncheon and mini-conference , Texas A&M, January 29, 2004.
145. Attended WebCT Vista Workshop, TAMU, January 5-9, 2004.
146. Attended New Teacher Quality Grants Program Workshop sponsored by the Texas Higher Education Coordinating Board, Austin, TX, November 14, 2003.

147. Attended, Wexford Institute annual meeting, Reno NV November 1, 2003.
148. Attended, ICTCM, (International Conference on Technology in Collegiate Mathematics) Executive Steering Committee Meeting. Chicago, Oct 29, 2003.
149. Attended Maple Days Workshop, Texas A&M University, November 7-8, 2003. Robert Lopez from Maplesoft speaker.
150. Participant in PT3\*L3 Pre-Conference Institute at the American Evaluation Association (AEA) Annual Conference. Sponsored by the Wexford Institute, Reno, NV, November 3-4, 2003.
151. Participant in Ninth Annual October Pre service Mathematics Conference, Lakeway Inn and Resort, Austin, TX, October 23-25, 2003. Sponsored by the Charles A. Dana Center of The University of Texas, Austin, TX.
152. Regularly attended, Approximation Theory Seminar, Mathematics Department, TAMU, 2001-2004.
153. Participant in BVMUG, Macromedia, Microage, College Station, TX. June 17, 2003.
154. Participant in 3rd Annual Assessment Conference, February 10-11, 2003, Texas A&M University, College Station, TX.
155. Attended Sixth Annual Conference on School-University Partnerships, Omni Hotel, San Antonio, TX, October 13-15, 2002.
156. Attended Regents Initiative Conference and Workshop, Houston, TX (Greenspoint Wyndom) June 13-15, 2002.
157. Participated: e-Math video taping, Wimberley, TX, July 15, 2002: The emath Project.

#### AWARDS

- Nominated, to participate in the Texas College Readiness Project in the area of Mathematics, supported by the Educational Policy Improvement Center (EPIC), 2008.
- Appointed, Maplesoft Academic Advisory Board (MAAB), February, 2008-2012.
- Appointed Ambassador for Maple, 2016-.
- History of Mathematics has been selected as one of the best educational resources on the Web by StudySphere, June 20, 2006.
- Fellow, Texas A&M University Academy of Educator Development, 2003-present.
- Elected to membership in Merlot - Multimedia Educational Resource for Learning and Online Teaching. (MERLOT is a cooperative of individual members and institutions of higher education interested in improving teaching and learning.), February 13, 2004
- Selection for the Academic Keys Who's Who in Sciences Higher Education (WWSHE): <http://sciences.academickeys.com/>, 2004.
- Flash Demos for Understanding Statistics can help students learn to create histograms, compile pie charts, and demonstrate the mean, variance, and correlation of self-selected data points. [www.math.tamu.edu/dallen/flash-demo](http://www.math.tamu.edu/dallen/flash-demo)
- Web Bytes - December 2003, December 6, 2003.
- My Web sites on visual understanding of statistics and physics featured in the Math Forum Newsletter: "The Math Forum @ Drexel publishes a newsletter once a week and we have chosen your site, Flash Demos for Understanding Statistics, to feature in our October 13, 2003 issue."
- Reception honoring Editors of Scholarly Journals, TAMU University Libraries, October 1, 2003.
- Web site referenced by the International Center for Scientific Research, December 17, 2002

- TAMU, Department of Mathematics, Service award. December 13, 2002.
- Appointed as a member of the Academy for Educator Development, a part of the Regents' Initiative for Excellence in Education. (January 7, 2002)
- My History of Mathematics web site was recognized by the Sci/Links page of the NSTA. Here are the criteria for selection. Certificate.
- My history of mathematics Web site was recognized and linked to by the Ethnomathematics Digital Library of the Pacific Resources for Education and Learning. May 4, 2003.
- Recognition for serving more than 10 years as judge of the Brazos Valley Regional Science Fair, awarded 2001.
- TAMU Mentors Program recognition for giving a presentation in the Lessons Learned seminar, March 3, 2000.
- TAMU, Department of Mathematics, Service award. December, 2000.
- Texas A&M University, Department of Mathematics service award, 1999 and 2001;
- Web site referenced by the International Center for Scientific Research, December 17, 2002
- TAMU, Department of Mathematics, Service award. December 13, 2002.
- Appointed as a member of the Academy for Educator Development, a part of the RRegents' Initiative for Excellence in Education. (January 7, 2002)
- My History of Mathematics web site was recognized by the Sci/Links page of the NSTA. Here are the criteria for selection. Certificate.
- Recognition for serving more than 10 years as judge of the Brazos Valley Regional Science Fair, awarded 2001.
- TAMU Mentors Program.recognition for giving a presentation in the Lessons Learned seminar, March 3, 2000.
- TAMU, Department of Mathematics, Service award. December, 2000.

#### ADDRESSES AND RECOGNITION

- 1) Rocky Mountain Mathematics Consortium on Nonlinear Functional analysis, Santa Fe, New Mexico, July, 1971.
- 2) Fourth International Federation on Information Processing, Santa Monica, California, October, 1971.
- 3) American Mathematical Society Winter Meeting, Las Vegas, Nevada, January, 1972. (Ten-minute talk)
- 4) Conference on P.D.E., Lubbock, Texas, May, 1972.
- 5) Rocky Mountain Mathematics Consortium on Stochastic Processes and Stochastic Differential Equations, Edmonton, Alberta, Canada, July, 1972.
- 6) Symposium on Vector and operator Valued Measures and Applications, Alta, Utah, August, 1972. (Invited address)
- 7) American Mathematical Society Winter Meeting, Dallas, Texas, January, 1973.
- 8) U.S. Army Mathematics Research Center, Conference on Non-Linear Elasticity, Madison, Wisconsin, April, 1973.
- 9) Invited Lectures on Spectral Multiplicity at the University of Mexico City, June 1973.
- 10) American Mathematical Society Winter Meeting, San Francisco, California, January, 1974. (ten-minute talk)
- 11) Integration in Function Spaces with Applications, June 3-7, 1974 at the University of



- Connecticut, invited talk.
- 12) American Math Society Winter Meeting, Washington, D.C., January 1975. (ten-minute talk)
  - 13) Conference and Workshop on Pettis Integration, University of Illinois, March 15-17, 1975.
  - 14) Symposium on the Calculus of Variations and Optimal Control, September 22-24, 1975, University of Wisconsin.
  - 15) American Math Society Winter Meeting, San Antonio, Texas, January, 1976.
  - 16) University of Florida, Gainesville, invited address, August 1976.
  - 17) Conference on Riesz Spaces Oberwolfach, Germany, July 1977, invited address.
  - 18) AMS Winter Meeting, Biloxi, Miss., January 1978.
  - 19) AMS Summer Meeting, Ann Arbor, Mich., August 1980.
  - 20) University of Texas, San Antonio, Special Session address, June 1981.
  - 21) Great Plains Operator Theory Conference, University of Kansas, September 1981.
  - 22) Conference on Riesz Spaces and Operator Theory, Oberwolfach, Germany, July 1982, invited address.
  - 23) Conference on Sequence Spaces, St. Lawrence University, June 1985.
  - 24) Fifth International Symposium on Approximation Theory, College Station, TX, January 1986.
  - 25) Southwest Texas State University, invited address, February 1986.
  - 26) Great Plains Operator Theory Conference, University of Kansas, May 1987.
  - 27) University of Wisconsin - Milwaukee, Department of Mathematics, invited address Oct. 1988.
  - 28) University of Minnesota, Dept. of Political Science, Oct. 1988, invited address.
  - 29) Fifth IIMAS Workshop on Numerical Analysis, Merida, Yucatan, Mexico, Jan. 1989, invited address.
  - 30) Instituto de Investigaciones en Matematicas Aplicadas y en Sistemas, Jan. 9-10, 1989, invited address.
  - 31) Great Plains Operator Theory Symposium, University of Houston, May 4-7, 1989.
  - 32) UT-A&M Informal Regional Functional Analysis Seminar, July 23-24, 1989, Texas A&M University, invited address.
  - 33) First Mexico-Texas Workshop on Numerical Particle Transport, March 22-23, 1990. UNAM, Mexico City, Mexico, invited address.
  - 34) II Simposium de Fisica Aplicada, Monterrey Mex. Sept. 1990, invited address.
  - 35) IMSL, Houston, TX. August 9, 1991, invited address.
  - 36) 12th International Conference on Transport Theory, Albuquerque, New Mexico, Aug 12-16, 1991, invited address.
  - 37) III Simposium Internacional de Fisica Aplicada, Monterrey, N.L., Mexico, October 17-19, 1991, invited address.
  - 38) Seventh Texas International Symposium on Approximation Theory, Austin, TX January 3-7, 1992, contributed talk.
  - 39) Sixth IIMAS-UNAM Workshop on Numerical Analysis and Optimization, Oaxaca, Mexico, January 7-11, 1992, invited talk.
  - 40) International Symposium on Numerical Transport Theory, Moscow, Russia, May 26-30, 1992, invited talk.
  - 41) Second Texas-Mexico Workshop on Numerical Particle Transport, College Station, TX, Sept 2-4, 1992, invited talk.
  - 42) Second Interagency Symposium on Stabilization of Soils and Other materials, New Orleans,

- November 2-5, 1992, invited talk.
- 43) Center for Approximation Theory, Annual Symposium, College Station, TX., March 12-13, 1993, invited (35 min) talk.
  - 44) Third Texas-Mexico Workshop on Numerical Particle Transport, Mexico March 13-15, 1996, invited.
  - 45) International Conference on Dynamical Systems and Differential Equations, Springfield, MO., May 29-June 1, 1996. Invited 40 minutes
  - 46) SIAM National Meeting, Minisymposium on Transport Problems, Kansas City, MO, July 21-24, 1996. Invited 20 minutes
  - 47) Closed linear functional methods for the two dimensional transport equation, Center for Approximation Theory Annual symposium, April 25, 1997. 40 minutes
  - 48) Hermite-Legendre Interpolation, University of Wisconsin --- Madison Centenary Conference, June 1, 1997.
  - 49) The Charles A. Dana Center, Multimedia Demonstration and Consultation, Austin, TX May 7, 1997. invited (35 min) talk.
  - 50) Gulf Coast Consortium of Community Colleges, Houston (June 19-20, 1998) Workshop on SNB WebCalc
  - 51) CAMT (Conference for the Advancement of Mathematics Teaching), San Antonio, TX July 22-24, 1998 WebCalc
  - 52) ICTCM, 11th Annual International Conference on Technology in Collegiate Mathematics, Nov 19-22, 1998 WebCalc (two talks)
  - 53) A Faculty Forum: Getting started using technology, Texas A&M University, August 25, 1998
  - 54) Invited Presentation, A Faculty Forum: Getting Started Using Technology, sponsored by Office of Distant Education, Texas A&M University, Title: The WebCalc Project - An Internet-Based Calculus Course, August 25, 1998
  - 55) Invited Presentation, CAMT (Conference for the Advancement of Mathematics Teaching), San Antonio, TX, July 22-24, 1998 The WebCalc Project (Repeated twice) (one hour.)
  - 56) Invited Presentation, CAMT (Conference for the Advancement of Mathematics Teaching), Dallas, TX, July 8-12, 1999 The WebCalc Project --- Two Years of Experience. (one hour.)
  - 57) Invited Presentation, CAMT (Conference for the Advancement of Mathematics Teaching), Dallas, TX, July 8-12, 1999, The Present and Future of Online Mathematics Education. (one hour.)
  - 58) Invited Pre-session. ICTCM, November 4, 1999, San Francisco, CA. Panelist for an all day session on Internet-based mathematics education.
  - 59) ICTCM Summer Workshop of math-on-Web, Ft. Collins, Co May 21-24, 2000.
  - 60) Principal speaker at the ICTCM Pre-session, November 15, 2000, Atlanta, GA.
  - 61) AACE Conference: SITE 2001--Society for Information Technology and Teacher Education International Conference, Orlando, Florida; March 5-10, 2001.
  - 62) ICTCM Summer Workshop of Math-on-Web, College Station, TX May 22-25, 2001.
  - 63) Invited Presentation. CAMT (Conference for the Advancement of Mathematics Teaching), The Texas A&M online masters program. San Antonio, TX, July 29, 2001.
  - 64) Preparing online assessments. A complete JavaScript program. San Antonio, TX, July 30, 2001.
  - 65) ICTCM Summer Workshop of Math-on-Web, Madison, WI July 29-Aug 1, 2001.
  - 66) Invited Presentation. Mississippi-Louisiana MATYC Conference at LSU-Eunice. Creating

- online assessment instruments. September 22, 2001.
- 67) Invited Presentation. ICTCM, November 1, 2001, Baltimore, MD. Moderator for an all day session on Internet-based mathematics education.
  - 68) Invited Presentation. ICTCM, November 2, 2001, Baltimore, MD, Professional Development workshop of creating Web-based assessments. (2.5 hours)
  - 69) Invited panelist . 2nd Annual Assessment Conference "Measuring what Matters Most", Texas A&M University, Feb 11-12, 2002
  - 70) Invited Presentation. The 15th annual ;Science, Technology & YOUth Symposium, "Math Goes to Hollywood", Texas A&M University, March 2-3, 2002.
  - 71) Invited Presentation. The dynamics of political power, Cal State Poly Pomona, Pomona, CA, March 10, 2002.
  - 72) Invited Presentation. Sam Houston State University, September 27, 2002.
  - 73) Invited Presession. ICTCM, October 30, 2002, Orlando, FL. Using digital imaging technologies to teach mathematics concepts. (3 hours)
  - 74) Invited Presentation. DEC 2003, Building a quality online masters program, January 21, 24, 2003.
  - 75) Invited Presentations. (4 hours) RGVCTM (Rio Grande Valley Council on Teaching Mathematics), Using animations in mathematics instruction, McAllen, TX, November 16, 2002.
  - 76) Invited Presentation. Texas Community College Teachers Association, Using digitization for mathematics understanding. February 21-22, 2003.
  - 77) Invited Presentation. "Math in the Movies", Science Technology and Youth Symposium, March 1, 2003.
  - 78) Panel Discussion, NCTM (National Council of Teachers of Mathematics), Let's Get Together: WWW-based Distance Education for Mathematics Teachers, San Antonio, April 11, 2003.
  - 79) Invited Presentation. CAMT (Conference for the Advancements of Mathematics Teaching), "Math Goes to Hollywood," July 17, 2003.
  - 80) Invited Presentation. TxDLA Regional Groups Meeting, Visual mathematics - an exploration of new visual mathematics in the algebraic sciences, College Station, TX August 18, 2003. (TxDLA - Texas Distance Learning Association) 30 minutes
  - 81) Invited Presentation. Seventh Annual Conference on School-University Partnerships, Sept 28-30, 2003, San Antonio, TX - Educator Perceptions of Math and Science Teacher Preparation Programs, with Dianne Goldsby, Larry Walker, Dawn Parker.
  - 82) ICTCM (International Conference on Technology in Collegiate Mathematics) Annual Conference, What is the status of reform algebra?, Chicago, Illinois, Oct 29, 2003.
  - 83) Invited Presentation. ICTCM (International Conference on Technology in Collegiate Mathematics) Annual Conference, Using Camtasia - a developmental workshop, Chicago, Illinois, Oct 30, 2003.
  - 84) Keynote Address. Multiple Representations - a journey to the future, at the "Aiming for Excellence in Mathematics Teacher Preparation, A Seminar for Teacher Educators," Math TEKS Connections, College Station, TX, May 18-20, 2007.
  - 85) Keynote Address. Technology Usage in the College Algebra Course, The Enhanced WebAssign (EWA) Teaching & Learning Workshop, Thomson Publishing, San Diego, CA, March 17, 2007.

- 86) Presentation. The College Algebra Survey, presented at the TexMATYC (Texas Association of Two Year Colleges, Arboretum Renaissance Hotel, Austin TX, February 24, 2007.
- 87) Invited Presentation, Focus on College Algebra, presented at the TexMATYC Section of the TCCTA Annual Meeting, February 23-24, 2007, Austin, TX.
- 88) Presentation. The Triadic Survey in Building Capacity, with Dianne Goldsby, presented at the 7th Annual Texas A&M University Assessment Conference, February 22-23, 2007, College Station, TX.
- 89) Presentation - Using and Validating a Triadic Instrument to Survey Pre-Service Teacher Preferences, with Dianne Goldsby, 2007 Annual Meeting of the Southwest Educational Research Association (SERA), February 7-10, 2007, San Antonio, TX.
- 90) Keynote Address. What technology for teaching mathematics works and why a perspective, presented at the San Jacinto College Annual Mathematics Meeting, November 18, 2006; Houston, TX.
- 91) Invited Presentation. College Algebra — What Colleges Want, presented at the AMATYC Annual Meeting, November 2-5, 2006; Cincinnati, OH.
- 92) Invited Presentation. College Algebra Across Texas—Survey Results, presented at the Charles A. Dana Center's Annual Mathematics and Science Higher Education Conference and Teacher Quality Higher Education Technical Assistance Meeting " Ensuring College Readiness in Mathematics and Science Higher Education," October 26-28, 2006; Lakeway Inn, Austin, TX.
- 93) Keynote Address . Old Technology, New Technology, Emerging Technology. What works and Why, Keynote address presented to HCC Title V Faculty Leadership Program - Math Workshop, October 20, 2006.
- 94) Invited Presentation. e-Learning in 2016, at the Math Education in 2016 conference, Helsinki, August 8-10, 2006.
- 95) Invited Presentation. Using the Pre-Calculus package, Teacher Quality Grants Conference, Charles A. Dana Center and Texas Higher Education Coordinating Board, Austin, Tx, March 27-28, 2006.
- 96) Panel Presentation. ICTCM, (International Conference on Technology in Collegiate Mathematics) -Should we be teaching undergraduate online courses?, Orlando, FL, March 16-20, 2006. (3/17)
- 97) Invited Presentation. ICTCM, (International Conference on Technology in Collegiate Mathematics) -Teaching higher mathematics courses online, Orlando, FL, March 16-20, 2006. (3/17)
- 98) Panel Presentation. ICTCM, (International Conference on Technology in Collegiate Mathematics) -Techniques for applying for and obtaining grants, at the Pre-Session, Orlando, FL, March 16-20, 2006. (3/16)
- 99) Invited Presentation. Using and Validating a Triadic Instrument to Survey Middle School Children, 2006 Annual Meeting of the Southwest Educational Research Association (SERA), Austin, February 8-10, 2006, with Dianne Goldsby and Larry Kelly.

- 100) Invited Presentation. "Test Item Dependencies", Bowling Green State University, December 2, 2005.
- 101) Invited Presentations. (2 hours) RGVCTM (Rio Grande Valley Council on Teaching Mathematics), MathStar materials and the TQA pre-calculus course-in-a-box , McAllen, TX, November 19, 2005 (with Amanda Ross).
- 102) Invited Presentation. "Using TQA Grants with Community Colleges", Charles A. Dana Center's Annual Mathematics and Science Higher Education Conference, Lakeway Inn and Resort, Austin, TX, November 17-19, 2005.
- 103) Invited Presentation. Coastal Bend Mathematics Collaborative, "Disconnects between High Schools and Colleges within Mathematics Education in Texas", Nov 13-15, 2005.
- 104) Invited Presentation. An In-Depth Study of Educator Perceptions of Mathematics/Science Teacher Preparation by Means of a Triadic Instrument and Interviews, presented at the Association for Teaching and Curriculum (AATC), (with Dianne Goldsby and Larry Kelly), Austin, TX, October 6-8, 2005.
- 105) Invited Presentation. Precalculus Completely TEKS Aligned, CAMT (Conference for the Advancement of Mathematics Teaching), Adams Mark Hotel, July 11-13, 2005. (with P. Poage)
- 106) Invited Presentation. MathStar Project Using Interactive Technologies, CAMT (Conference for the Advancement of Mathematics Teaching), Adams Mark Hotel, July 11-13, 2005. (with D. Jolly and A. Ross)
- 107) Invited Presentation, Teacher Quality Type B Mathematics Awards Workshop for 2004-05 and 2005-06 Awardees, Doubletree Club Hotel, Austin, TX, May 24, 2005.
- 108) Invited Presentation. High school professional development through community colleges and universities: a perspective, Annual meeting Seamless Transitions State Conference, Austin Convention Center, Austin, (presented twice) March 28-30, 2005.
- 109) Invited Presentation. Dynamic models in politics, colloquium at Prairie View A&M, Prairie View, TX, March 15, 2005.
- 110) Invited Presentation. Using and Validating a Triadic Instrument to Survey Pre-Service Teacher Preferences, 2005 Annual Meeting of the Southwest Educational Research Association (SERA), New Orleans, February 9-12, 2005.
- 111) Invited Presentation. The history of early calculating devices, including the slide rule. San Jacinto College North Annual Math Conference, Houston, TX, November 13, 2004.
- 112) Invited Presentation. Math Star: Supporting Middle School Mathematics  
Presentation by Amanda Ross Dr. Don Allen  
Dr. Deborah Jolly  
Texas A&M University. San Jacinto College North Annual Math Conference, Houston, TX, November 13, 2004. (presented by Amanda Ross)
- 113) Panel Discussion, Member of Distance Education Panel for the Texas A&M Distance Education Day, November 3, 2004, Texas A&M University, College Station, TX. (panelist)

- 114) Invited Presentation. Tenth Annual October Pre service Mathematics Conference, Lakeway Inn and Resort, Austin, TX, October 28-30, 2004. Sponsored by the Charles A. Dana Center of The University of Texas, Austin, TX. (Session on October 29)
- 115) Invited presentation and organizer. ICTCM, (International Conference on Technology in Collegiate Mathematics) -All about Assessment Symposium, Chicago. Oct 28, 2004.
- 116) Panel discussion. ICTCM, (International Conference on Technology in Collegiate Mathematics) -All about Assessment Symposium, Chicago. Oct 28, 2004, wrap-up to all day assessment session.
- 117) Invited Presentation. Professional Development in Mathematics at Texas A&M. Math Star Coordinators meeting, Oct 18-19, 2004, Los Angeles, CA.
- 118) Invited Presentation. Regent's Initiative for Excellence in Education, Educator Perceptions of Mathematics/Science Teacher Preparation Programs, with Dianne Goldsby and Larry Kelly, May 26, 2004 Bush School, Texas A&M University.
- 119) Panel Discussion, Where should distance education at Texas A&M be?, sponsored by the Office of Distance Education and the TAMU Libraries, February 26, 2004, Evans Library, Texas A&M University. (panelist)
- 120) Presentation, Southwest Educational Research Association, "Pre-Service Teacher Perceptions of Mathematics and Science," Dallas, TX February 7, 2004, with Dianne Goldsby, Larry Kelly, and Dawn Parker.
- 121) Invited Presentation. ICTCM (International Conference on Technology in Collegiate Mathematics), Using Camtasia, Chicago. Oct 30, 2003.
- 122) Invited presentation. ICTCM, (International Conference on Technology in Collegiate Mathematics) -Panel discussion - What is the status of reform algebra?, Chicago. Oct 29, 2003.
- 123) Panel Discussion, Universal Design Day at Texas A&M University (MSC 206), October 9, 2003, Design of online mathematics materials and application of computer assisted design for students with disabilities. Sponsored by the Department of Student Life. (panelist)
- 124) Invited Presentation. Seventh Annual Conference on School-University Partnerships, Sept 28-30, 2003, San Antonio, TX - Educator Perceptions of Math and Science Teacher Preparation Programs, with Dianne Goldsby, Larry Walker, Dawn Parker.
- 125) Invited Presentation. TxDLA Regional Group Meeting, Visual mathematics - an exploration of new visual mathematics in the algebraic sciences, College Station, TX August 18, 2003. (TxDLA - Texas Distance Learning Association) 30 minutes.
- 126) Invited Presentation. CAMT (Conference for the Advancement of Mathematics Teaching), Math in the Movies, July 17, 2003.
- 127) Invited Presentation. 4th Annual Chancellor's Invitational Conference for The Academy for Educator Development , Using web based assessment and getting teachers involved at a laptop campus, with Lisa Stinson, St Agnes Academy. Houston, TX, June 12-14, 2003.
- 128) High School Presentation, May 12, 2003 College Station ISD, Math in the movies.

- 129) Panel Discussion, Let's Get Together: WWW-based Distance Education for Mathematics Teachers, NCTM, San Antonio, April 11, 2003. (panelist)
- 130) Invited Presentation. Science Technology and Youth Symposium, Math Goes to Hollywood, Texas A&M University, March 1, 2003. Invited Presentation. 4th Annual Chancellor's Invitational Conference for The Academy for Educator Development , Using web based assessment and getting teachers involved at a laptop campus, with Lisa Stinson, St Agnes Academy. Houston, TX, June 12-14, 2003.
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- 143) Invited Presentation. Tenth Annual October Pre service Mathematics Conference, Lakeway Inn and Resort, Austin, TX, October 28-30, 2004. Sponsored by the Charles A. Dana Center of The University of Texas, Austin, TX. (Session on October 29)
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- 145) Texas A&M University. San Jacinto College North Annual Math Conference, Houston, TX, November 13, 2004. (presented by Amanda Ross)
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- 165) Invited Presentation. e-Learning in 2016, at the Math Education in 2016 conference, Helsinki, August 8-10, 2006.
- 166) Keynote Address . Old Technology, New Technology, Emerging Technology. What works and Why, Keynote address presented to HCC Title V Faculty Leadership Program - Math Workshop, October 20, 2006.
- 167) Invited Presentation. College Algebra Across Texas—Survey Results, presented at the Charles A. Dana Center’s Annual Mathematics and Science Higher Education Conference and Teacher Quality Higher Education Technical Assistance Meeting " Ensuring College Readiness in Mathematics and Science Higher Education," October 26-28, 2006; Lakeway Inn, Austin, TX
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- 171) Presentation. The Triadic Survey in Building Capacity, with Dianne Goldsby, presented at the 7th Annual Texas A&M University Assessment Conference, February 22-23, 2007, College Station, TX.

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- 175) Keynote Address. Multiple Representations - a journey to the future, at the "Aiming for Excellence in Mathematics Teacher Preparation, A Seminar for Teacher Educators," Math TEKS Connections, College Station, TX, May 18-20, 2007.
- 176) Presentation, Moving from High School Mathematics to College Mathematics. What's going on?, with Linda Zientek, Mel Griffin, Jim Wohlgehagen, Jacqueline Weilmuenster, CAMT (Conference for the Advancement of Mathematics Teaching), Henry B. Gonzales Convention Center, San Antonio, TX, June 28-30, 2007.
- 177) Presentation, All About Quadratics - for the Teacher, CAMT (Conference for the Advancement of Mathematics Teaching), Henry B. Gonzales Convention Center, San Antonio, TX, June 28-30, 2007.
- 178) Keynote Address. Technology in Math Education at Texas A&M University, JEM - Workshop on New and Emerging Technologies in Math Education, Helsinki, August 17-18, 2007.
- 179) Invited Address. Course redesign at TAMU, presented to the Texas Association of Academic Administrators in Mathematical Sciences (TAAAMS), at Baylor University, Waco, TX, October 13, 2007.
- 180) Panel Presentation, University Interface with Community Colleges to Ensure Success of Transfer Students through the NSF GK-12 Program, at the Southwest Regional NSF GK-12 Conference College Station, Texas with Mel Griffin, Bob Brick, Claudia Davis, Alice Sessions; Representing GK-12 Programs: G. Donald Allen, Jan Snyder, Kate Miller, Nancy Moreno, G. Donald Allen - moderator, November 9-10, 2007
- 181) Invited Presentation, Placement Examinations, presented at the JEM, Joining Educational Mathematics, an EU-funded thematic network for Mathematics Education, January 31 - February 2, 2008.
- 182) Invited Presentation. Triadic measurements of pre-service teachers, presented at the Southwest Educational Research Association annual meeting, February 6-8, 2008.
- 183) Invited Presentation. Placement Examinations at Texas A&M University, presented at the JEM, Joining Educational Mathematics, an EU-funded thematic network for Mathematics Education, Universitat Politècnica de Catalunya Facultat de Matemàtiques i Estadística (FME) Carrer Pau Gargallo, 5, Barcelona, Spain, January 31 - February 2, 2008.
- 184) Keynote Address. e-learning in the 21st Century , presented to the South Texas Mathematics Consortium (STMC), 16th Annual Meeting of Faculty and Students, Texas

A&M Kingsville, February 9, 2008.

- 185) Invited Presentation, Technology in the schools - a survey, ICTCM annual meeting, San Antonio, TX, March 6-8, 2008. Organizer of special session of technology in the schools.
- 186) Keynote Address. What Colleges want and What Colleges Get, presented to the Cengage Assessment Workshop, Microtek Training Facility, Dallas, TX, March 14, 2008.
- 187) Invited presentation (special session), Misconceptions in Mathematics Understanding, AMS Regional Meeting, 2008 Spring Southeastern Meeting Louisiana State University, Baton Rouge, LA, March 28-30, 2008. cancelled due to illness.
- 188) Presentation, Misconceptions in Mathematical Understanding, CAMT (Conference for the Advancement of Mathematics Teaching), San Antonio, TX, July 9-11, 2008, with S. Scarborough.
- 189) Keynote Address. Teaching mathematics: What work, what doesn't work and why. Fall Faculty Forum, TAMU-Galveston, Galveston, TX, August 22, 2008.
- 190) Invited Presentation, Administrative Leadership for TEKS and TAKS Mathematics, presented to Administrators Guide to Increasing Achievement in Math, Education Service Center VI, September 26, 2008.
- 191) Presentation, SERA (Southwest Educational Research Association), Pre-Service Teacher Perceptions of Teaching Fractions through a Survey, Essay, and Mathematical Misconceptions, February 4-7, 2009.
- 192) Invited Presentation, What is the National Math Panel and how does it affect the colleges? TexMATYC, Texas Mathematical Association of Two-Year Colleges), Friday, February 20, 2009
- 193) Presentation, Pre-Service Teacher Perceptions of Teaching Fractions through a Survey, Essay, and Mathematical Misconceptions, ICTCM (International Conference on Technology in Collegiate Mathematics, March 12-15, 2009.
- 194) Presentation, Assessing Perceptions through a Technology-Mediated Triadic Survey Instrument, Association of Teacher Educators, Reno, NV, August 1-5, 2009, with Dianne Goldsby.
- 195) Invited Presentation, Mathematical Power Models, University of Sao Paulo, Sao Paulo, Brazil, February 8, 2010.
- 196) Invited Presentation, Aspects of the TAMU Mathematics Placement Exam, University of Turino, Turino, Italy, March 1, 2010.
- 197) Invited Presentation, Integrating the CCRS into Academic Courses, at the TAMU Collaborative Summer Institute, College Station, TX, June 23, 2010.
- 198) Invited Presentation, TAMU Mathematics Placement Exam, at the NSF TAMU System Engineering Grant Meeting, College Station, TX. March 11, 2010 and April 21, 2010.
- 199) Poster, Retention through Remediation: Enhancing Success in Calculus I, at the NSF meeting, Identifying, Implementing and Integrating Best Practices, Washington, DC, March 3-5, 2010.

- 200) Invited Presentation, Mathematics, Technology, and Mathematics Education, University of Nairobi, Kenya, August 13, 2010.
- 201) Invited Presentation. Huang, R., Li, Y., Kulm, G., & Allen, D. (Accepted). Pre-service mathematics teachers' knowledge for teaching algebra in China and the U.S. American Education Research Association (AERA), April 8-12, 2011, New Orleans, Louisiana.
- 202) Invited Presentation. Mathematics Content, WEPS and STACK Meeting, Exactum Building, University of Helsinki, Helsinki, Finland, August 2-5, 2011.
- 203) Invited Presentation. A Study of Pre-Service Teacher Perceptions of Ability to Use Technology, Dianne Goldsby, Robin Rackley, & G. Donald Allen Texas A&M University, Southwest Educational Research Association, Menger Hotel, San Antonio, Texas February 2-5, 2011.
- 204) Presentations. Visual Algebra, Presented to AP pre-Calculus Institute, College Station, TX, July 8, 2011, Masters program at Texas A&M University, Presented to the AP Calculus Institute, College Station, TX, July 15, 2011.
- 205) Presentation, Personalized Before Calculus Program, ICTCM Annual meeting, March 21-24, 2012, with S. Nite, J. Whitfield, S. Sledge.
- 206) Invited Presentation, "A Fast and Furious Bridge to Calculus II ONLINE!," AMATYC 40th Annual Conference, Gaylord Opryland Resort in Nashville, TN, November 13-16, 2014, with Sharon Sledge .
- 207) Invited Presentation, Impossible Problems and MOOCs, ICTCM (International Conference on Teaching Collegiate Mathematics) 26th annual meeting, March 21-23, 2014.
- 208) Invited Presentation, Student Characteristics That Help Predict Success in Calculus: Results from a Summer Precalculus Program, ICTCM (International Conference on Teaching Collegiate Mathematics) 26th annual meeting, with Sandra Nite, March 21-23, 2014.
- 209) Invited Presentation, "Personalized Precalculus Program A Summer Bridge Program", TCCTA Annual Meeting, San Antonio, TX, February 7, 2014.
- 210) Invited Presentation, Using a bridging program for Calculus Instruction, North Carolina State, January 15, 2014.
- 211) Invited Presentation, Pre-session, presented to the pre-session of the ICTCM (International Conference on Teaching Collegiate Mathematics) in San Antonio, March 7, 2013. All day workshop.
- 212) Invited Presentation, "A Fast and Furious Bridge to Calculus II ONLINE!," AMATYC 40th Annual Conference, Gaylord Opryland Resort in Nashville, TN, November 13-16, 2014, with Sharon Sledge .
- 213) Invited Presentation, Impossible Problems and MOOCs, ICTCM (International Conference on Teaching Collegiate Mathematics) 26th annual meeting, March 21-23, 2014.
- 214) Invited Presentation, Student Characteristics That Help Predict Success in Calculus: Results from a Summer Precalculus Program, ICTCM (International Conference on

- Teaching Collegiate Mathematics) 26th annual meeting, with Sandra Nite, March 21-23, 2014.
- 215) Invited Presentation, "Personalized Precalculus Program – A Summer Bridge Program", TCCTA Annual Meeting, San Antonio, TX, February 7, 2014.
- 216) Invited Presentation, Using a bridging program for Calculus Instruction, North Carolina State, January 15, 2014.
- 217) Invited Presentation, Pre-session, presented to the pre-session of the ICTCM (International Conference on Teaching Collegiate Mathematics) in San Antonio, March 7, 2013. All day workshop.
- 218) Invited Presentation, MOOCs and what they imply, TCCTA annual meeting in San Antonio, TX, February 7, 2014.
- 219) Invited Presentation, The Precalculus Program, North Carolina State University, November 20, 2013.
- 220) Invited Presentation (via Webinar), Advancing an Online Project in the Assessment and Effective Teaching of Calculus, with Mika Seppala and Eamonn Kelly, November 14, 2013. [The meeting is held in Adobe ConnectPro on Thursday 14 November, 18:00 19:00 EEST (Finland)/08:00-09:00 (California, USA)]
- 221) Invited Presentation, Understanding the predictive results of testing, University of Sao Paulo, Brazil, November 12, 2013.
- 222) Invited Presentation. Understanding MOOCs and online delivery, NSF SAVI conference on big data, October 24-27, 2013, Helsinki, Finland.
- 223) Invited Presentation, Misconceptions in Mathematics, Teacher Quality Annual Technical Meeting, Lost Pines, Resort, Bastrop, TX, April 2, 2013,
- 224) Invited Presentation, Triadic Surveys on Teacher Preparation, ICTCM (International Conference on Teaching Collegiate Mathematics) annual meeting, March 23, 2013.
- 225) Invited Presentation, Math Assessment Testing, ICTCM annual meeting, March 22, 2013.
- 226) Invited Presentation. Assessment and Teaching, NSF SAVI meeting, Tallahassee, FL, March 14-15, 2013.
- 227) Invited Presentation. Innovations and Learning in Education, sponsored by the NSF-SAVI USA-Finland program and the Finnish TEKES program, October 11-13, 2012.
- 228) Using a bridging program for Calculus Instruction, North Carolina State, January 15, 2014.
- 229) "Personalized Precalculus Program – A Summer Bridge Program", TCCTA Annual Meeting, San Antonio, TX, February 7, 2014.
- 230) Impossible Problems and MOOCs, ICTCM (International Conference on Teaching Collegiate Mathematics) 26th annual meeting, March 21-23, 2014.
- 231) Student Characteristics That Help Predict Success in Calculus: Results from a Summer

- Precalculus Program, ICTCM (International Conference on Teaching Collegiate Mathematics) 26th annual meeting, with Sandra Nite, March 21-23, 2014.
- 232) Invited Presentation, "A Fast and Furious Bridge to Calculus II – ONLINE!," AMATYC 40th Annual Conference, Gaylord Opryland Resort in Nashville, TN, November 13-16, 2014, with Sharon Sledge .
- 233) Invited Presentation, A Bridge to Engineering: A Personalized Precalculus (Bridge) Program, Frontiers in Education, October 21-24, 2015, El Paso, TX, with Sandra Nite, Jim Morgan, Robert Capraro.
- 234) Contributed Presentation, Confusion Matrices and Preservice Teacher Knowledge, ICTCM (International Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV, with Dianne Goldsby.
- 235) Contributed Presentation, The End of Computing, ICTCM (International Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV.
- 236) Invited Presentation, "A Fast and Furious Bridge to Calculus II – ONLINE!," AMATYC 40th Annual Conference, Gaylord Opryland Resort in Nashville, TN, November 13-16, 2014, with Sharon Sledge. Also presented at ICTCM (International Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV.
- 237) Poster Session, The Impact of Placement Exams on Retention for Engineering Mathematics, ICTCM (International Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV, with Mike Pilant and Jennifer Whitfield.
- 238) Invited Presentation, Online courses in economics, a primer, International Business School of New York, September 24-27, 2014.
- 239) Invited Presentation, "Understanding Distance Education", European School of Economics, August 12-17, 2014
- 240) Invited Presentation, "Increasing Calculus II Success with a Bridging Program," 2014 Hawaii University International Conference, June 10-12 at the Ala Moana Hotel, with Sandra Nite.
- 241) Invited Presentation, Student Characteristics That Help Predict Success in Calculus: Results from a Summer Precalculus Program, ICTCM (International Conference on Teaching Collegiate Mathematics) 26th annual meeting, with Sandra Nite, March 21-23, 2014.
- 242) Invited Presentation, "Personalized Precalculus Program – A Summer Bridge Program", TCCTA Annual Meeting, San Antonio, TX, February 7, 2014.
- 243) Invited Presentation, Using a bridging program for Calculus Instruction, North Carolina State, January 15, 2014.
- 244) Invited Presentation, MOOCs and what they imply, TCCTA annual meeting in San Antonio, TX, February 7, 2014.
- 245) Attended, Teacher Quality Grants annual meeting, The Hyatt Regency Lost Pines Resort and Spa, 575 Hyatt Lost Pines Road, Lost Pines, TX, US, March 27-28, 2014.
- 246) Panel Discussion, III-12 Improving Student Success in Foundational Courses in Math, with Denise Hayman, Northern Illinois University; Ivan Lopez, Northern New Mexico College; NSF STEP 2014 Annual Meeting, Washington DC, March 5-7, 2014,
- 247) Invited Presentation, A Bridge to Engineering: A Personalized Precalculus (Bridge) Program, Frontiers in Education, October 21-24, 2015, El Paso, TX, with Sandra Nite, Jim Morgan, Robert Capraro.
- 248) Contributed Presentation, Confusion Matrices and Preservice Teacher Knowledge, ICTCM (International Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV, with Dianne Goldsby.



- 249) Contributed Presentation, The End of Computing, ICTCM (International Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV.
- 250) Invited Presentation, "A Fast and Furious Bridge to Calculus II – ONLINE!," AMATYC 40th Annual Conference, Gaylord Opryland Resort in Nashville, TN, November 13-16, 2014, with Sharon Sledge. Also presented at ICTCM (International Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV.
- 251) Poster Session, The Impact of Placement Exams on Retention for Engineering Mathematics, ICTCM (International Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV, with Mike Pilant and Jennifer Whitfield.
- 252) Invited Presentation, The Remarkable Number One, 8th Annual International Conference on Mathematics & Statistics: Education & Applications, Athens, Greece, July 1-2, 2014.
- 253) Invited Presentation, Online courses in economics, a primer, International Business School of New York, September 24-27, 2014.
- 254) Invited Presentation, "Understanding Distance Education", European School of Economics, August 12-17, 2014
- 255) Invited Presentation, Impossible Problems and MOOCs, ICTCM (International Conference on Teaching Collegiate Mathematics) 26th annual meeting, March 21-23, 2014.

#### ONLINE BOOKS

- Linear Algebra - [http://www.math.tamu.edu/~dallen/m640\\_03c/readings.htm](http://www.math.tamu.edu/~dallen/m640_03c/readings.htm)
- History of Mathematics - [http://www.math.tamu.edu/~dallen/masters/hist\\_frame.htm](http://www.math.tamu.edu/~dallen/masters/hist_frame.htm)
- WebCalc – an online calculus course - <http://www.math.tamu.edu/~webcalc/webcalc.html>

#### PROFESSIONAL DEVELOPMENT SERIES MATERIALS FOR TEACHERS AND K-12 STUDENTS

- All about fractions - for the teacher, <http://disted6.math.tamu.edu/fractions/index.htm>
- All about quadratics - for the teacher, <http://distance-ed.math.tamu.edu/quadratics/index.htm>
- Visual Algebra - teaching algebra using visual tools, <http://distance-ed.math.tamu.edu/techttools/v algebra/v algebra.htm>
- Fractions, Measurement, and Proportion - for the teacher, <http://disted6.math.tamu.edu/mpf/index.htm>

#### OTHER TALKS

- Poster Session. joint with Lisa Stinson, Female Students' Performance on and Preference for Computer- Delivered vs. Scantron Tests, 2003 Joint Conference Information Technology in Science (ITS) Center for Teaching and Learning Southwest Association for the Education of Teachers in Science, March 1, 2003. (given by Stinson) Ft. Worth, TX.
- Panel Discussion, Universal Design Day at Texas A&M University (MSC 206), October 9, 2003, Design of online mathematics materials and application of computer assisted design for students with disabilities. Sponsored by the Department of Student Life, TAMU.

- College of Science, TAMU - Open House, September 6, 2003, presentation on distance education, online masters of mathematics program.
- Math Camp - presentation to 45 junior high school students on the use of mathematics in Hollywood produced movies, July 11, 2003, College Station, TX.
- Philosophy Group - presentation to a group of philosophers and sociologist on the application of Flash to interactive logic proofs, June 2, 2003, College Station, TX
- ITWG - Information Technology Working Group, Using Flash MX for teaching science - Texas A&M University, October 1, 2002.
- Invited Presentation. Science Technology and Youth Symposium, Math Goes to Hollywood, March 1, 2003.
- Poster Session. joint with Lisa Stinson, Female Students' Performance on and Preference for Computer-Delivered vs. Scantron Tests, 2003 Joint Conference Information Technology in Science (ITS) Center for Teaching and Learning Southwest Association for the Education of Teachers in Science, March 1, 2003. (given by Stinson)

#### OTHER WRITINGS - ADDITIONAL

- The following have appeared in *Focus on Mathematics Pedagogy and Content* - a newsletter for math teachers. See: <http://disted6.math.tamu.edu/newsletter/>
  - The Caesar Cypher, Volume 1, Number 1 January, 2009
  - How big is infinity?, Volume 1, Number 2, February, 2009
  - Problems in Mathematical Recreation Volume 1, Number 4, May 2009
  - The Mystery of the New "Planet" (Or How Regression Saved the Day) Volume 1, Number 5, June 2009
  - Early PI -- Part I, Volume 1, Number 8, September 2009
  - What Technology Works for Teaching Mathematics and Why - A Perspective, Part I, Volume 1, Number 9, October 2009
  - What Technology Works for Teaching Mathematics and Why - A Perspective, Part II, Volume 1, Number 10, December 2009
  - Primes, Perfect Numbers, and Magic Numbers (Just for Fun), Volume 2, Number 8 October 2010
  - Geometry meets Algebra — Super-Conic Constructions, Part I Volume 2, Number 9 November 2010
  - Geometry meets Algebra — Super-Conic Constructions, Part II, Volume 2, Number 10 December 2010
  - Working Together - The Math Part, Volume 3, Number 5 July 2011
  - Principals as Leaders and Decision Makers in Mathematics Instruction, Part I, Volume 3, Number 7 September 2011
  - Why Study Math when I Have Technology? Volume 4, Number 2, April 2012
  - Optimization problems – with and without calculus, to appear.
- Geometry Applets, a collection of Flash interactive applets for high school geometry, May 2007.
- Misconceptions in Algebra, September 2006.
- Problem Solving for Teachers, April, 2007.
- Multiple Representations for Pre-service Teachers, April, 2007.
- Tech Tools, Tools that make teaching mathematics with technology easier, a college of

- numerous math technology tools including Maple, Excel, and Flash. 2005.
- Workshop on Fractions, Proportion, and Measurement, including content, PowerPoint lessons, 5E pedagogy, Lesson plans, etc. for the Pasadena Independent School District , 2005.
  - All about Quadratics - for the Teacher, 2005
  - Collected mathematics essays for teachers, in the MathStar-Texas Newsletter, 2004-2005
  - Pre-calculus - course-in-a-box, for professional development, 2004
  - Flash online workshop, a collection of Flash applications on mathematical topics, 2002-2005.
  - Developed specialty programs for teachers and students including Digitizer. Software:(<http://www.math.tamu.edu/dallen/digitalcam/index.htm>)
  - Math goes to Hollywood (<http://www.math.tamu.edu/dallen/hollywood/mathindex.htm>)
  - Understanding Statistics visually, Software: (<http://www.math.tamu.edu/dallen/flash-demo/index.htm>)
  - Physics animations. Getting the physics right, Software:(<http://www.math.tamu.edu/dallen/physics/index.htm>)
  - Digitizer software and website. Using digitization software to explore mathematics topics. ©2002-03. (<http://www.math.tamu.edu/dallen/digitalcam/index.htm>)
  - MATLAB and Maple models for physics. A part of the Information Technology Center summer institute for education leaders. Online. <http://www.math.tamu.edu/dallen/its>
  - Preparing a Quiz using the Template, JavaScript Quiz Templates - a collection of JavaScript feedback quizzes with directions for creating new quizzes. Fully integrated and self-quiz reproducing. August 2001.(<http://www.math.tamu.edu/dallen/mq14/quizmaker14.htm>)
  - Preparing a Quiz using the Template, JavaScript Quiz Templates - a collection of JavaScript feedback quizzes with directions for creating new quizzes. The user needs only have a text editor to create such quizzes. All the JavaScript has been written, Fall 2000. (<http://www.math.tamu.edu/dallen/mq14/quizmaker14.htm>)
  - Lectures on the History of Mathematics, a continuing web-based project which is updated and used annually. This project has been linked by several online history of mathematics websites, 1996-2001.
  - Online Masters of Mathematics Home page, 1999 URL: [www.disted6.math.tamu.edu](http://www.disted6.math.tamu.edu).
  - WebCalC, an online calculus course, 1998-2000. Home page URL: [www.math.tamu.edu/~webcalc/webcalc.html](http://www.math.tamu.edu/~webcalc/webcalc.html)
  - Java Script-based quizzing, 1999. URL: [www.math.tamu.edu/dallen/cshtemp/cshsframe.htm](http://www.math.tamu.edu/dallen/cshtemp/cshsframe.htm)
  - The History of  $\pi$ , 1998, URL: [www.math.tamu.edu/~dallen/pi/pi.html](http://www.math.tamu.edu/~dallen/pi/pi.html)
  - Math/Science Online Newsletter, Winter 1999/2000.
  - Math/Science Online Newsletter, Summer 1999.
  - Math/Science Online Newsletter, Two Faces of the Internet, December 1999.
  - The History of Infinity, June 1999. (A part of the History of mathematics project. 22 pages).
  - The WebCalC Newsletter, Summer 1998.
  - The WebCalC Newsletter, Winter 1998.
  - Why is Pete Sampras so Good? 1997.
  - A First Encounter with Scientific Notebook, a primer for use in workshops.
  - Would you like to have a war? (An analysis and computer simulation of a card game.)

- The Pythagoreans and the Primes. appeared in the Right Angle, 1997.
- A TAAS like Testing Environment, Exit Level , 1997.
- Computer Codes for General Two Dimensional Transport Problems, 1997.
- Stability of a Class of Self-Organizing Systems, 1991.
- System Impact of Hit Assessment Capability for NPB Discrimination, with Paul Nelson, Robert D. Jarvis, and Walter C. Daugherty, 1990

#### CURRENT AND PROJECTED RESEARCH

I am actively engaged in mathematical research in a several directions. First I am continuing a long time effort in the direction of dynamical systems related to cooperative-competitive systems. This work is centered on stability theory for nonlinear differential systems. In another direction, I am working on numerical methods for the solution of first order hyperbolic partial differential equations that arise in transport theory. We have already discovered an interesting class of methods based on orthogonal projections in distinction to moments-balance equations. Finally, I am continuing my study of diffusion through porous media. In particular, we are studying extreme short term behavior of one and two dimensional diffusion equations where the diffusion coefficient is not differentiable and the boundary condition involve a type of boundary layer.

#### ONLINE COURSES DEVELOPED

- Math 609 - Numerical Analysis - an online course (Fall 2005)
- Math 664 - Theory of Assessment - an online course (Summer 2004)
- Math 689 - Communications and Technology in Mathematics II. Mathematics of assessment. (May 2004)
- Math 646 - Problems in Mathematics II - online version. (Spring, 2004)
- Math 645 - Problems in Mathematics - online version. (Fall, 2003-2004)
- Math 696 Communications and Technology. A course for graduate mathematics students on IT in mathematics. Topics include: Document preparation, computer algebra systems, graphics preparation, HTML, and JavaScript. 2000. (with Michael Pilant)URL: [www.distance-ed.math.tamu.edu](http://www.distance-ed.math.tamu.edu).
- Math WebCalC --- An online Calculus course. Home page URL: [www.math.tamu.edu/~webcalc/webcalc.html](http://www.math.tamu.edu/~webcalc/webcalc.html)
- Math 640 - online Linear Algebra, 2001-2002 Math 645 --- online Problems Survey I, 2002 Math 629 --- online, History of Mathematics, 1996-2003 Math 451 --- online, Differential Equations, 2003
- With a team of 3 other colleagues, I am developing a WEB based Math 151 course, titled WebCalC. WebCalC went online during the Spring 1998 semester. This is a continuing project, designed to ultimately produce a curriculum of online mathematics courses. The WebCalC Project is the development of a on-line calculus course at the beginning college or AP high school level. What does this mean? Nothing less than a fully comprehensive calculus course to be delivered over the Internet. WebMath is a collection of projects dedicated to produce an on-line mathematics curricula from algebra to differential equations. This is what we are about. We have a home page. (See funding.) Below I list some of my WebCalC-related visits and activities during the past calendar year. All visits were one to

three hours in length and were for the purpose of demonstrating and explaining WebCalc.

COMMUNITY COLLEGES VISITATIONS FOR WEBCALC

- McClennan Community College, Waco, Buddy Powell, Randy Schormann, Dr Wayne Matthews
- Temple College, Waco, Cameron Neal, Charles Stout James Van Ness
- Central Texas College, Killeen
- Blinn College, Bryan, Mary Ellen Davenport
  - o HIGH SCHOOLS:
    - ♣ Bryan High, Eleanor Mueller
    - ♣ Consolidated, CS, Mary Selzer
    - ♣ Somerville HS, Ricky Cole
    - ♣ Caldwell HS, Debbie Stefka
  - o FOUR YEAR COLLEGES:
    - ♣ Texas A&M, College of Engineering, July 14, 1997, Karen Watson, Make McDermott, Lee Carlson, Lee Lowry, Larry Piper
  - o CONFERENCES:
    - ♣ Gulf Coast Consortium of Community Colleges, Houston (June 19 20, 1998) Workshop on SNB WebCalc
    - ♣ CAMT (Conference for the Advancement of Mathematics Teaching), San Antonio, TX July 22-24, 1998 WebCalc
    - ♣ ICTCM, 11th Annual International Conference on Technology in Collegiate Mathematics, Nov 19-22, 1998 WebCalc (two talks)
    - ♣ A Faculty Forum: Getting started using technology, Texas A&M University, August 25, 1998
  - o WORKSHOPS:
    - ♣ '98 Maple Workshop, TAMU, June, 26,1998
    - ♣ AP Calculus Workshop, TAMU, July 1, 1998
  - o PUBLISHERS:
    - ♣ Wiley, Vernon Church, Steve Gideon
    - ♣ Brooks/Cole, Bob Evans TCI, Roger Hunter
    - ♣ Prentice-Hall, George Lobell
- Math 308, Differential equations with MAPLE, development of laboratory materials, Spring 1999 (see Web page)
- Math 629, History of Mathematics, development of a distance learning format for delivery in the first summer term, 1996, Spring 1996. (I had 8 students at UTB and 8 students at TAMU. Classes were conducted via the TTVN, Trans-Texas Video Conferencing Network.)

TEACHING

Regularly Scheduled Classes Taught

- Math 646, Spring 2012 Problem Survey II
- Math 645, Fall 2011 Problem Survey I
- Math 646, Spring 2011 - Problems Survey II
- Math 645, Fall 2011, Problems Survey I

Math 629, Fall 2010 - History of Mathematics  
 Math 664, Spring 2010 - Theory of Assessment  
 Math 629, Fall 2009 - History of Mathematics  
 Math 646, Spring 2009 - Problems Survey II  
 Math 645, Fall 2008, Problems Survey I  
 Math 664, Summer 2008 Theory of Assessment  
 Math 646, Spring 2008, T Problems Survey II  
 Math 646, Spring 2007, Problems Survey II  
 Math 696, Summer II, 2006, Mathematical Communications and Technology  
 Math 664, Spring 2006, Mathematical Theory of Assessment  
 Math 609, Fall 2005, Numerical Analysis  
 Math 696, Summer 2005, Seminar in Applied Mathematics  
 Math 664, Spring 2005, Seminar in Applied Mathematics  
 Math 646, Spring 2005, Problems Survey II  
 Math 645, Fall 2004, Problems Survey I  
 Math 689, Summer, 2004, Mathematics of Assessment  
 Math 696, Spring 2004 (an online course) Enrollment: 15  
 Math 629, Spring 2004 (an online course) Enrollment: 15  
 Math 646, Spring 2004, (an online course) Enrollment: 30  
 Math 645, Fall 2003 (an online course) Enrollment: 26  
 Math 640, Fall 2003 (an online course) Enrollment: 28 (two sections)\*  
 Math 451, Summer 2003 (an online course)\* Enrollment: 15 (two sections)  
 Math 629, Spring 2002 (an online course)\* Enrollment: 36 (two sections)  
 Math 640, Fall 2002 (an online course)\* Enrollment: 21 (two sections)  
 Math 645, Fall 2002 (an online course)\* Enrollment: 24 (two sections)  
 Math 629, Spring 2002 (an online course) Enrollment: 19 (two sections)  
 Math 609, Fall 2001  
 Math 640, Fall 2001 (an online course)\*  
 Math 696, Spring 2001 (an online course)\*  
 Math 142, Spring 2001  
 Math 609, Fall 2000  
 Math 151, Fall 2000 (an online course)  
 Math 629, Fall 2000 (an online course)\*  
 Math 151, Summer 2000 (an online course)  
 Math 629, Spring 2000 (an online course)\*  
 \* These courses were taught in dual mode, both in the classroom and online, with separate section numbers.

#### GRADUATE STUDENTS SUPERVISED AND GRAD COMMITTEES (SINCE 2003)

Served on 25 Ph.D. committees for other departments. Served on 130 Masters. Selected list of committees.

Chair of 60 masters committees. Co-chair two Phd committees. Online masters students graduating since 2004: Larry Musolino, Rebecca Moch, Talana Hamilton, Pamela Kimbrough, Aubrey Vasquez, Paula Whitman, Heather Caster Richard Frederick, Susan Vandiver, Richard Enderton, Barbara Nunley, Angela Milano, Heather Bergman, Allyn Leon, Vincent Jones, Julie

Merrill, Cynthia Mixon, Michelle Agriesti, Naomi Driscoll, Ilham El Saleh, Julie Seifert, Cameron Macky Thomas Davis, Ginger Walker, Rebecca Black, Thomas Gree, Jennifer Wellman, Molly Mason, De-Vonna Clark, Crystal Bartels, Cary Crawford, Craig Bridges, Masters: David Ames, Megan Pritchard  
 Phd committees: Meixia Ding, Judy Taylor, Tamera Carter, Pavel Tsvetkov, Cathy Liu (STAT), Adeoti Taiwo Adediran, Lea Ellen Burch, Lea Ellen Burch, Laura Shea Busenlehner, Tamara Anthony Carter, Roger R. Contreras, Peter Verle Cornish, David Paul Craig, Qifeng Ding, Cathy Mariotti Ezrailson, Olivia Rodriguez Garcia, Mousavi Mir Jaafari, Kyoung Jin Lee, Kyoungjin Lee, Yingxue Liu, Guillermo Marquez, Obed Matus, Diem M. Nguyen, Bemini Hennadige Peiris, Bemini Hennadige Peiris, Armando Isaac Perez, Elsa Cantu Ruiz, Hossein Shirvani, Sharon Kaye Sledge, Judy Marie Taylor, Galina Valeryevna Tsvetkova, Pavel Valeryevich Tsvetkov, Yongzhe Xie, Jennifer Rolfes, Rongjin Huang (TLAC), Ling Wang (Stat), Megan Pritchard (NE), David Ames (NE), Kurt Bruggeman (Math), Brent Christianson (STAT), Jessica Wendling (MATH), Emily Housley (STAT), Danny Ralston (MATH), Mark A. Pitts (STAT), Amber Dean (STAT), Mark Barrish (MATH), Lisa Beatty (MATH), Joe Bilyard (MATH), William Bolton (MATH), Mark Butz (MATH), Jeff Cagle (MATH), Thomas Caulton (MATH), Scott Copperman (MATH), Stephen Dauphin (MATH), James Dinh (MATH), Eduardo Drucker (MATH), David Fleeger (MATH), Suzanne Fluke (MATH), Gail (Thorne) Freed (MATH), Kristen Hemmingway (MATH), Ashley Hubble (MATH), Neil Kalinowski (MATH), Marty Kellum (MATH), Jeremy Knight (MATH), Barbara Kunkel (MATH), Elizabeth Lambert (MATH), Kathryn Lemons (MATH), Luther Lessor (MATH), Luis Magallanes (MATH), Don March (MATH), Janell (Martin) Eck (MATH), Chris McDowell (MATH), Mark McKinnon (MATH), Chanin Monestero (MATH), Stephanie Nite (MATH), Adriana Nunez (MATH), Lisa Obrien (MATH), John Osborn (MATH), Stephanie Osinski-Rea (MATH), Sara Patterson (MATH), Erica Pesek (MATH), Susan Powell (MATH), Jason Prince (MATH), Julie Sarzynski (MATH), Anita Schneider (MATH), Matthew Seiders (MATH), Edward Sharkus (MATH), Deborah Shinaberry (MATH), Hyun Ho Song (MATH), Joshua Stevens (MATH), Jason Tepe (MATH), Eric Thompson (MATH), Janessa Tucker (MATH), Meghan Waterbury (MATH), Joshua Wilkerson (MATH), Joe Bilyard (MATH), Luther Lessor (MATH), Jeffrey Fetzer (MATH), Joseph Magagnoli (STAT), Alex Bessinger (STAT), Joel Galang (STAT), Jennifer Morse (STAT), Hung Tran (STAT)



## APPENDIX: MATHEMATICS/EDUCATIONAL/TECHNOLOGY PROJECTS

(All collected through 2008; some overlap with the above is possible)

- Presta Digitization – a website dedicated to connecting digital images to mathematics and what you can do with a digital camera. <http://www.math.tamu.edu/~dallen/digitalcam/index.htm>
- Pre-calculus – course in a box for professional development. ([http://distance-ed.math.tamu.edu/Precalculus\\_home/index.htm](http://distance-ed.math.tamu.edu/Precalculus_home/index.htm)), written with a group of others.
- All About Quadratics - for the Teacher, <http://distance-ed.math.tamu.edu/quadratics/index.htm>
- All About Fractions - for the Teacher, <http://distance-ed.math.tamu.edu/fractions/index.htm>
- Math goes to Hollywood (<http://www.math.tamu.edu/~dallen/hollywood/index.htm>) - a selection of math examples from feature length Hollywood films. From comedy to drama, from K-6 level to 10-12 there are examples of how Hollywood movies occasionally feature some very interesting mathematics.
- WebCalc (<http://www.math.tamu.edu/%7Ewebcalc/webcalc.html>) - a fully online calculus course and related papers.
- JavaScript Geometry (<http://distance-ed.math.tamu.edu/mathtools/javageo/index.htm>) - a basic tutorial of geometry proofs with “unfolding” proof and discussion.
- Online TAAS questions ([http://distance-ed.math.tamu.edu/mathtools/taas\\_quiz/index.htm](http://distance-ed.math.tamu.edu/mathtools/taas_quiz/index.htm)) - covering the 13 objectives of the exit level TAAS (Texas Assessment of Academic Skills) examination with online multiple choice questions.
- Make-a-quiz (<http://www.math.tamu.edu/~dallen/mq14/quizmaker14.htm>) a simple to use generator of self-grading quizzes for teachers of all subjects.
- ICTCM short course on using the Web for mathematics instruction - complete lecture notes and demos <http://distance-ed.math.tamu.edu/techtools/workshop/index.htm>
  - Basic HTML – a tutorial on basic HTML language (<http://distance-ed.math.tamu.edu/techtools/workshop/HTML.html>)
  - Using Dreamweaver- a tutorial on using the HTML editor Dreamweaver 4 (<http://distance-ed.math.tamu.edu/techtools/workshop/htmleditors/dw1.htm>)
  - Using FrontPage - a tutorial on using the HTML editor FrontPage 2000, [http://distance-ed.math.tamu.edu/techtools/workshop/htmleditors/newweb/frontpage\\_basics.htm](http://distance-ed.math.tamu.edu/techtools/workshop/htmleditors/newweb/frontpage_basics.htm)
- Using Excel and Visual Basic in the mathematics classroom - tutorial and examples of VBA code used within Excel, [http://distance-ed.math.tamu.edu/techtools/workshop/excel\\_vba.htm](http://distance-ed.math.tamu.edu/techtools/workshop/excel_vba.htm)
- Excel tutorials - <http://distance-ed.math.tamu.edu/techtools/workshop/excel/tutorials.htm>
- JavaScript (<http://distance-ed.math.tamu.edu/techtools/workshop/JavaScript.html>) - many examples of JavaScript applied to mathematics instructional settings
- Flash - numerous Flash animations with a mathematical theme. <http://distance-ed.math.tamu.edu/techtools/flash/index.htm>
- Math/Science Online Newsletter (<http://www.math.tamu.edu/ms-online/>) – a newsletter pertaining to Mathematics and science online.
- Flash demos on statistical theme. Toward a visual understanding of variance using animations and iconic communication. [http://distance-ed.math.tamu.edu/techtools/flash/flash\\_examples/more\\_still/flash\\_demo/index.htm](http://distance-ed.math.tamu.edu/techtools/flash/flash_examples/more_still/flash_demo/index.htm)
- Talks - assorted talks on technology and e-Learning themes
  - Old Technology, New Technology, Emerging Technology. What works and Why, Keynote address presented to HCC Title V Faculty Leadership Program - Math Workshop, October 20, 2006.

- e-Learning in 2020, presented to the Information Technology Working Group (ITWG) seminar, September 12, 2006.
- e-Learning in 2016, presented at the Math Education in 2016 conference, Helsinki, August 8-10, 2006.
- ICTCM, (International Conference on Technology in Collegiate Mathematics) -Teaching higher mathematics courses online, Orlando, FL, March 16-20, 2006.
- Fractions, TAMU/TEA (Texas Education Agency)/PEIC (P-16 Educational Improvement Consortium), March 4, 2006.
- Pre-conference workshop Visual Algebra and Pre-calculus, (Six hour workshop), TexMATYC/TCCTA Conference. (Invited) Houston, TX February 23-25, 2006.
- Using and Validating a Triadic Instrument to Survey Middle School Children, 2006 Annual Meeting of the Southwest Educational Research Association (SERA), Austin, February 8-10, 2006.
- TAMU/Pasadena ISD, Fractions, Measurement and Proportion for professional development, Pasadena, TX, October 29, 2005.
- Teacher Quality Grants: High Schools, Community Colleges & Universities, a perspective. Seamless Transitions Annual Conference, with Sharon Sledge, March 30, 2005 .
- Twarted Innovations - the problems of distance education, presented to the Information Technology Working Group (ITWG), February 15, 2005
- "Test Item Dependencies", Bowling Green State University, December 2, 2005.
- RGVCTM (Rio Grande Valley Council on Teaching Mathematics), MathStar materials and the TQA pre-calculus course-in-a-box , McAllen, TX, November 19, 2005 (with Amanda Ross).
- "Using TQA Grants with Community Colleges", Charles A. Dana Center's Annual Mathematics and Science Higher Education Conference, Lakeway Inn and Resort, Austin, TX, November 17 19, 2005.
- The High-School - College Disconnect, The Coastal Bend Mathematics Collaborative, Corpus Christi, TX, November 14, 2005.
- TAMU/TEXMatyc (Texas Math Association of Two Year College), Maple for the Classroom, October 28, 2005.
- An In-Depth Study of Educator Perceptions of Mathematics/Science Teacher Preparation by Means of a Triadic Instrument and Interviews, presented at the Association for Teaching and Curriculum (AATC), (with Dianne Goldsby and Larry Kelly), Austin, TX, October 6-8, 2005.
- TAMU/Snook ISD, Using the TI-Navigator equipment, Snook, TX, October 15, 2005.
- TAMU/TEA (Texas Education Agency)/PEIC (P-16 Educational Improvement Consortium), Fractions, Measurement and Scaling for professional development, October 8, 2005.
- University of Idaho, Gateway Mathematics Group, Using Scientific Notebook and Camtasia, Moscow, ID, June 13-17, 2005.
- Maple - in the Classroom, an online workshop given to Texmatyc instructors, April 9, 2004.
- Precalculus Completely TEKS Aligned, CAMT (Conference for the Advancement of Mathematics Teaching), Adams Mark Hotel, July 11-13, 2005. (with P. Poage)
- Twarted Innovations - the problems of distance education, ITWG, February 15, 2005
- A brief outline of early calculating technologies. December 10, 2004
- Teacher Quality Type A - pre-caculus, Dana Center Preservice Conference , Oct 28, 2004.
- Maple - in the Classroom, an online workshop given to Texmatyc instructors, April 9, 2004.

- Precalculus Completely TEKS Aligned, CAMT (Conference for the Advancement of Mathematics Teaching), Adams Mark Hotel, July 11-13, 2005. (with P. Poage)
- Technology Retreat - Department of Mathematics, Texas A&M University, April 22, 2005
- Teacher Quality Grants: High Schools, Community Colleges & Universities, a perspective. Seamless Transitions Annual Conference, March 30, 2005 .
- Twarted Innovations - the problems of distance education, ITWG, February 15, 2005
- A brief outline of early calculating technologies. December 10, 2004
- Teacher Quality Type A - pre-caculus, Dana Center Preservice Conference , Oct 28, 2004.
- A crash course in assessment, ICTCM, Oct 27, 2004
- TxDLA presentation 8/18/03
- Flash Workshop - July 2003
- CAMT-2003 presentation - Math goes to Hollywood
- Visual algebra - toward enhanced visual cognition of algebra concepts
- Resources for Ordinary Differential Equations
- Demos for physics, more demos
- Maple tutorial - a short and basic tutorial on Maple

# EXHIBIT F

# EXHIBIT F

### **DECLARATION OF EXPERT WALTER C. DAUGHERITY**

WALTER C. DAUGHERITY declares, under penalty of perjury, that the following is true and correct.

1. I am a Senior Lecturer Emeritus in the Department of Computer Science and Engineering at Texas A&M University and also a computer consultant to major national and international firms, as well as to government agencies, including classified work.

2. Prior to my retirement in 2019, I taught computer science and engineering at both the undergraduate and graduate levels for 37 years, the last 32 years being at Texas A&M University. Courses I developed and taught include courses in artificial intelligence, expert systems, programming and software design, quantum computing, and cyberethics.

3. I have published 26 research articles related to expert systems, fuzzy logic, noise-based logic, and quantum computing from over \$2.8 million in funded research projects, plus conference papers and other publications.

4. As a computer expert I have consulted for major national and international firms, including IBM Federal Systems Division, *New York Times*, *Washington Post*, *Los Angeles*

*Times*, Southwestern Bell Telephone, Fulbright & Jaworski (Houston), and Phonogram B.V. (Amsterdam), and also for government agencies such as Cheyenne and Arapaho Tribes of Oklahoma, Texas Department of Agriculture, U. S. Customs Service, and classified work.

5. Further details about my qualifications are included in my Curriculum Vitae attached as Exhibit A.

6. I have reviewed the reports by Edward Solomon furnished to me which mathematically analyze the June 14, 2022, Republican gubernatorial primary in Clark County, Nevada, as well as other races. In order to check results in those reports I downloaded the official election data posted by the Clark County Election Department at [https://www.clarkcountynv.gov/government/departments/elections/past\\_elections.php](https://www.clarkcountynv.gov/government/departments/elections/past_elections.php).

7. In my expert opinion these reports overwhelmingly demonstrate clear and convincing evidence that the election results analyzed in these reports were not produced by accurate counting of the votes cast, but were instead artificially contrived according to a predetermined plan or algorithm.

8. The first key finding of the Edward Solomon reports for the June 14, 2022, Republican gubernatorial primary in Clark County, Nevada, is that certain ratios calculated from the mail-in and in-person totals, which should be independent, are in fact dependent. (Independent variables cannot be predicted from one another; for example, knowing that the time the first person in line at precinct 1 voted was at an even number of minutes past the hour, say 7:04 or 7:06 A.M., does not allow us to predict whether the first person in line at precinct 2 voted at an even number of minutes past the hour or an odd number of minutes past the hour.)

9. In this primary race, as in each election, votes for each candidate are reported in three categories: mail-in (absentee), early vote (in-person), and election day (in-person). Since

each voter choosing a particular candidate can vote in any of these three ways, the totals should be independent. For example, knowing how many mail-in and early in-person votes Joey Gilbert received does not provide enough information to know how many election day in-person votes he received. In other words, you could not bet on a particular exact number of election day in-person votes and expect to win the bet, since the exact number is unpredictable.

10. Since there were so many candidates in addition to Joey Gilbert, the following precinct analysis divides all the votes into two categories, “Lombardo” and “Gilbert et al.” Using the same variable names as in the Edward Solomon reports, and considering only votes prior to election day, let

*a* be Lombardo’s mail-in vote total,

*b* be Gilbert et al.’s mail-in vote total,

*c* be Lombardo’s early in-person vote total, and

*d* be Gilbert et al.’s early in-person vote total.

11. Clearly these numbers should be independent, that is, knowing some of the numbers should not allow exactly predicting the other numbers. For example, knowing that in precinct 1000,  $b=13$ ,  $c=21$ , and  $d=32$  should not allow an exact prediction of *a*, Lombardo’s mail-in vote total. In an honest and fair election we could only estimate that since Lombardo received  $c/(c+d)=0.396226$ , that is, 39.6% of the early in-person vote, we would expect that Lombardo would also receive about 39.6% of the mail-in vote, since the way people cast ballots does not influence their choice.

12. Solving  $a/(a+b)=0.396226$  for *a* yields 21.53125, which rounds up to 22 votes. This estimate is only a “best guess,” and the true number of mail-in votes could be anything: 22, or higher, or lower, so a bet on 22 would only win once in a while, not very often.

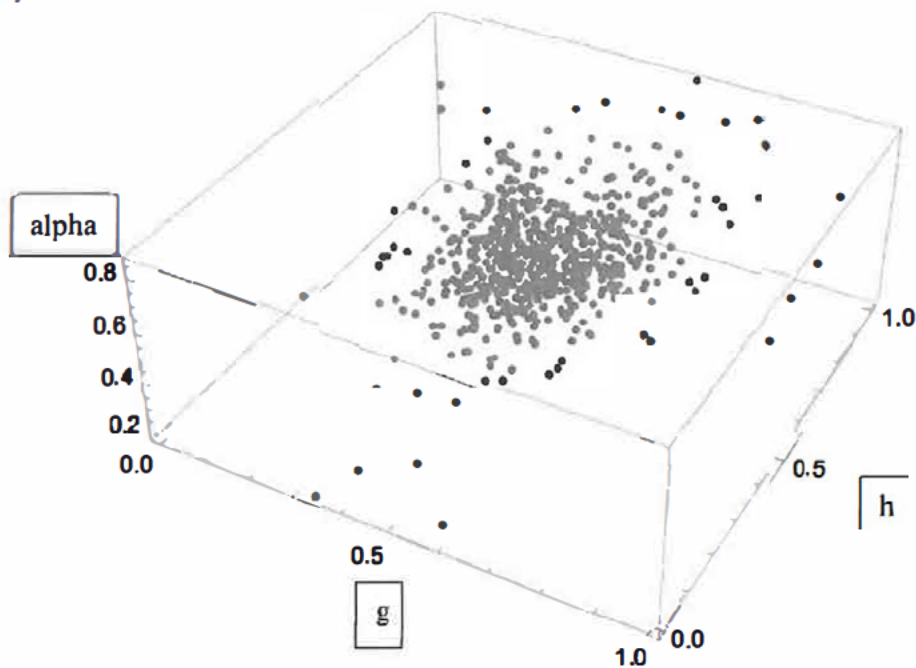


13. However, in the June 14, 2022, Republican gubernatorial primary in Clark County, Nevada, the four numbers  $a$ ,  $b$ ,  $c$ , and  $d$  were not only not independent, as they should be in a fair and honest election, they were so tightly dependent that  $a$  can be exactly predicted from  $b$ ,  $c$ , and  $d$  not only in precinct 1000 (yielding 25, *the exact number of mail-in votes for Lombardo*), but also is *every single precinct in the entire county!*

14. This is a total of 669 precincts with an exact prediction, omitting precincts with zero votes or missing data on the Clark County Elections Department's website. Note that 25, the actual count, is close to the estimate of 22, but not exact, whereas the dependent formula described next gives exactly 25.

15. I calculated the values Edward Solomon names  $g$ ,  $h$ , and  $\alpha$  for each ballot style (*i.e.*, split precinct) for this county, and graphed  $(g, h, \alpha)$  as  $(x, y, z)$ , respectively, which produced the following graph, where each point is one precinct:

Out[ ]=

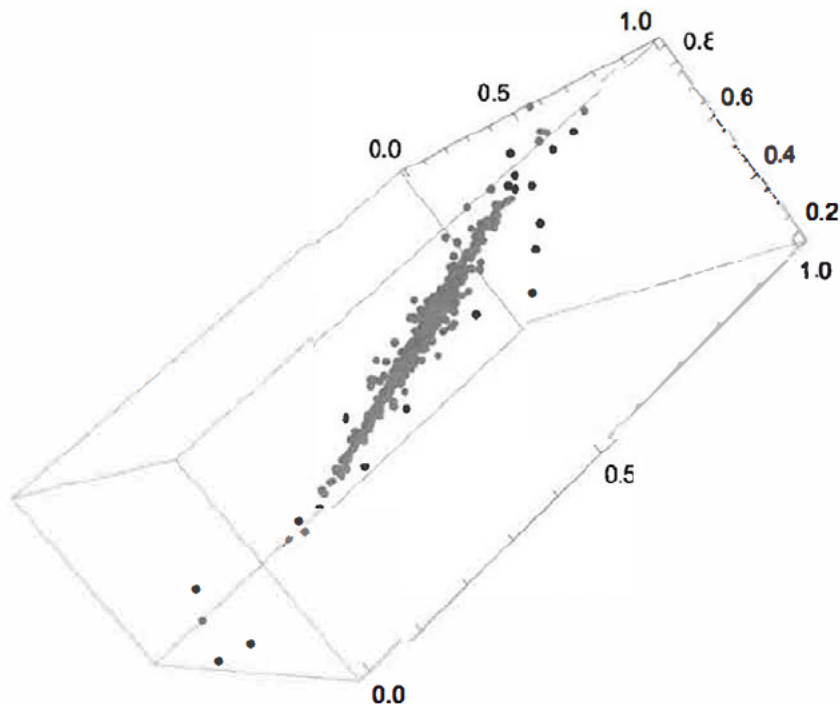


16. From the initial vantage point, the graphed data appears to be uncorrelated

(independent), as it should in a fair election, but by rotating the 3-dimensional graph it becomes clear that the points lie very close to a 2-dimensional plane, indicating strong correlation (dependence) which should not occur in a fair election.

17. Here is the same graph rotated to a different point of view, looking at the plane edge-on:

Out[ ]=



which of course looks like a line. This improper dependence confirms that the election results in the June 14, 2022, Republican gubernatorial primary in Clark County, Nevada, were artificially contrived.

18. Using the standard mathematical method of least-squares linear regression, the equation of the plane is

$$g = 0.01818144438 + 1.758536682 \alpha - 0.8083882873 h,$$

which is used in the following paragraphs.

19. As an example of how this improper dependence could be used to manipulate an

election, consider the following scenario: If ***alpha*** were hypothetically predetermined for each precinct in this 2022 Republican gubernatorial primary from this plane, then after the early in-person votes for candidate Lombardo are counted, and the mail-in and early in-person votes for Gilbert et al. are counted, the exact required mail-in vote for candidate Lombardo can be calculated *without counting*.

20. Specifically, the following procedure would *exactly* predict the required mail-in vote for candidate Lombardo *for nearly every single precinct in the county*:

Let ***alpha*** be the value for the precinct hypothetically predetermined from the plane,  
***b*** be Gilbert et al.'s mail-in vote total,  
***c*** be Lombardo's early in-person vote total, and  
***d*** be Gilbert et al.'s early in-person vote total.

Then Lombardo's mail-in vote count ***a*** is given exactly by the formula

$$\mathbf{a} = \frac{(b+d)(1-\mathbf{alpha})}{\mathbf{alpha}} - \mathbf{c}, \text{ rounded to the nearest integer.}$$

21. For example, in precinct 1012 suppose ***alpha*** were hypothetically set in advance to 0.463855422 from the 2-dimensional plane described in ¶ 19 above. Then counting 95 mail-in votes for Gilbert et al. (***b***), 45 early in-person votes for Lombardo (***c***), and 59 early in-person votes for Gilbert et al. (***d***) and substituting those values into this formula gives ***a*** = 133, the exact required number of mail-in votes for Lombardo, *before those votes have even been counted*. After counting, mail-in ballots can be added or removed to adjust the total to the required 133.

22. In my expert opinion the foregoing calculations overwhelmingly demonstrate

clear and convincing evidence that all of the election results analyzed above were not produced by accurate counting of the votes cast, but were instead artificially contrived according to the same (or a very similar) predetermined plan or algorithm.

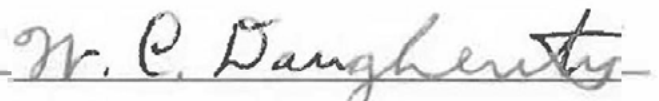
23. Due to the prohibitive amount of calculation to accomplish this by hand, it is clear that computer software must have been used. Such manipulating software could be installed in a variety of ways, including vendor programming, operating system components, open-source or commercial off-the-shelf libraries, remote access, viruses or other malware, etc.

24. Unless and until future proposed electronic voting systems (including hardware, software, source code, firmware, etc.) are made completely open to the public and also subjected to scientific analysis by independent and objective experts to determine that they are secure from manipulation or intrusion, in my professional opinion as a computer expert, electronic voting systems should not even be considered for use in any future elections, as they cannot be relied upon to generate secure and transparent election results free from the very real possibility of unauthorized manipulation. My professional opinion as a computer expert is therefore that hand-marked hand-counted paper ballots should be used instead.

25. I have personal knowledge of the foregoing and am fully competent to testify to it at trial.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 14, 2022.

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Walter C. Daugherty

# EXHIBIT G

# EXHIBIT G

## EXHIBIT A

Curriculum Vitae of Walter C. Daugherty

### Walter C. Daugherty

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

## EDUCATION

Ed.D., Mathematical Education, Harvard University, Cambridge, Massachusetts, 1977.  
Dissertation: "On the Ordering of Topics in the Teaching of Mathematics."  
Advisor: Marc Lieberman.

M.A.T., Mathematics, Harvard University, Cambridge, Massachusetts, 1967 (age 20).

B.S., Mathematics, Oklahoma Christian College, Oklahoma City, Oklahoma, 1966 (3 years). Minors: Physics and chemistry, German.

## EXPERIENCE

- |                 |  |
|-----------------|--|
| 1973 to present | Daugherty Brothers, Inc., (Computer consultants), Bethany, Oklahoma. Co-founder, chairman, and president. Clients include IBM Federal Systems Division, New York Times, Washington Post, Los Angeles Times, Cheyenne and Arapaho Tribes of Oklahoma, Southwestern Bell Telephone, Fulbright & Jaworski (Houston), Texas Department of Agriculture, Phonogram B. V. (Amsterdam), and U. S. Customs Service. |
| 1987 to present | Texas A & M University, College Station, Texas. Visiting Assistant Professor/Senior Lecturer/Senior Lecturer Emeritus, Departments of Computer Science and Engineering and Electrical and Computer Engineering, College of Engineering.  |
| 1989-91         | Texas A & M University System, College Station, Texas. Director, Knowledge Systems Research Center, Computer Science Division of the Texas Engineering Experiment Station.   |

- 1984-87 Blinn College, Brenham, Texas. Computer science instructor. Part-time 1984-86, full-time 1986-87.
- 1978-80 Rose State College, Midwest City, Oklahoma. Data processing instructor (part-time).
- 1971-73 ECRM, Bedford, Massachusetts. Systems programmer.
- 1970-71 Harvard Computing Center, Cambridge, Massachusetts. Telecommunications specialist.
- 1969-70 Computer-Aided Instruction Laboratory, Harvard University, Cambridge, Massachusetts. Systems programmer.
- 1968-70 Harvard University, Division of Engineering and Applied Physics, Cambridge, Massachusetts. Teaching fellow (for George Mealy and Thomas Bartee).
- 1967 Driscoll Junior High School, Brookline, Massachusetts. Mathematics teacher.
- 1967 University of Oklahoma Medical Center Computing Facility, Oklahoma City, Oklahoma. Programmer.
- 1966 University of Central Oklahoma Data Processing Center, Edmond, Oklahoma. Programmer.
- 1965 Oklahoma Christian University of Science and Arts, Oklahoma City, Oklahoma. Statistical programmer.
- 1963 University of Oklahoma Computer Center, Norman, Oklahoma. Lab instructor.

## RESEARCH AND DESIGN

### 1. Refereed Publications

Daughterity, W. C., and Kish, L. B., "More on the Reference-Grounding-Based Search in Noise-Based Logic," *Fluctuation and Noise Letters*, Vol. 21, No. 3, 2250023, 2022.

Kish, L. B., and Daughterity, W. C., "Entanglement, and Unsorted Database Search in Noise-Based Logic," *Applied Sciences*, Vol. 9, No. 15, 3029, 2019.



Kish, L. B., and Daugherty, W. C., "Noise-Based Logic Gates by Operations on the Reference System," *Fluctuation and Noise Letters*, Vol. 17, No. 4, 1850033, 2018.

Daugherty, W. C., and Coulson, R. N., "Knowledge Engineering for Sustainable Agriculture Management," *Proceedings of ICAST 2001 Conference* (Beijing, China, November 2001), 2:266, 2001.

Coulson, R. N., Saarenmaa, H., Daugherty, W. C., Rykiel, E. J., Saunders, M. C., and Fitzgerald, J. W., "A Knowledge System Environment for Ecosystem Management," book chapter in Klopatek, J. and Gardner, R. (eds.), *Landscape Ecological Analysis: Issues and Applications*, Springer-Verlag, 57-79, 1999.

Coulson, R. N., Daugherty, W. C., Rykiel, E. J., Saarenmaa, H., and Saunders, M. C., "The Pragmatism of Ecosystem Management: Planning, Problem Solving and Decision Making with Knowledge-Based Systems," *Proceedings of Eco-Inforna '96 Global Networks for Environmental Information Conference* (Lake Buena Vista, Florida, November 1996), 10:342-50, 1996.

Coulson, R. N., Fitzgerald, J. W. \*, Daugherty, W. C., Oliveria, F. L., and Wunneburger, D. F., "Using Spatial Data for Integrated Pest Management in Forest Landscapes," *Proceedings of the 11<sup>th</sup> Conference on Geographic Information Systems: Integrating Spatial Information Technologies for Tomorrow* (Vancouver, British Columbia, Canada, 1997).

Daugherty, W. C.; Harris, C. E., Jr.; and Rabins, M. J., "Introducing Ethics and Professionalism in REU Programs," *Proceedings of the 1995 World Conference on Engineering Education* (Minneapolis, Minnesota, October 1995).

Coulson, R. N., Daugherty, W. C., Vidlak, M. D. \*, Fitzgerald, J. W. \*, Teh, S. H. \*, Oliveria, F. L., Drummond, D. B., and Nettleton, W. A., "Computer-based Planning, Problem Solving, and Decision Making in Forest Health Management: An Implementation of the Knowledge System Environment for the Southern Pine Beetle, ISPBEX-II," *Proceedings of the IUFRO Symposium on Current Topics in Forest Entomology* (Maui, Hawaii), 1995.

Yen, J., Daugherty, W. C., Wang, H. \*, and Rathakrishnan, B. \*, "Self-Tuning and Self-Learning Fuzzy Systems," book chapter in Yen, J., Langari, R., and Zadeh, L. (eds.), *Industrial Applications of Fuzzy Logic and Intelligent Systems*, IEEE Press, 1995.

\* Graduate Research Assistant I funded

Daugherty, W. C., Video review of *Introduction to Biological and Artificial Neural Networks for Pattern Recognition*, by Steven K. Rogers, in *IEEE Transactions on Neural Networks*, Vol. 5, No. 5, 1994.

Teh, S. H.\* , Daugherty, W. C., and Coulson, R. N., "A User-Centric Methodology for Building Usable Expert Systems," *Proceedings of the 7th International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems* (Austin, Texas, May-June 1994), 45-48, 1994.

Daugherty, W. C., "A Neural-Fuzzy System for the Protein Folding Problem," *Proceedings of the Third International Workshop on Industrial Fuzzy Control & Intelligent Systems (IFIS '93)* (Houston, Texas, December 1993), 47-49, 1993.

Daugherty, W. C., "A Partially Self-Training System for the Protein Folding Problem," *Proceedings of the World Congress on Neural Networks (WCNN '93)*, (Portland, Oregon, July 1993). Invited paper.

Yen, J., Wang, H.\* , and Daugherty, W. C., "Design Issues of Reinforcement-Based Self-Learning Fuzzy Control," *Proceedings of the World Congress on Neural Networks (WCNN '93)*, (Portland, Oregon, July 1993).

Daugherty, W. C., "Characterizations of Fuzzy Operations," *Proceedings of the Second International Workshop on Industrial Fuzzy Control & Intelligent Systems* (College Station, Texas, December 1992), 234, 1992.

Yen, J., Wang, H.\* , and Daugherty, W. C., "Design Issues of a Reinforcement-Based Self-Learning Fuzzy Controller for Petrochemical Process Control," *Proceedings of North American Fuzzy Information Processing Society* (Puerto Vallarta, December 1992), 1992.

Yen, J., Wang, H.\* , and Daugherty, W. C., "An Adaptive Fuzzy Controller with Application to Petroleum Processing," *Proceedings of IFAC Workshop on Intelligent Manufacturing Systems* (Dearborn, October 1992), 1992.

Yen, J., Daugherty, W. C., and Rathakrishnan, B.\* , "Fuzzy Logic and Its Application to Process Control," *Proceedings of CAPA Technology Conference* (Houston, May 1992), 78-86, 1992.

\* Graduate Research Assistant I funded

Daughterity, W. C., Rathakrishnan, B. \*, and Yen, J., "Performance Evaluation of a Self-Tuning Fuzzy Controller," *Proceedings of the IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)* (San Diego, March 1992), 1992.

Daughterity, W. C., "An Application of Geometrical Reasoning to a Combinatorial Problem," *Proceedings of the Seventh Annual Conference on Applied Mathematics* (Edmond, Oklahoma, April 1991), pp. 226-232, 1991.

Daughterity, W. C., Review of *Data Communications Dictionary*, by Charles J. Sippl, in *Computing Reviews*, Vol. 17, No. 9, pp. 335-336, 1976.

Daughterity, W. C., "Circuits for Dial-up and Local Use of a Stand-alone PDP-8," *Proceedings of the Digital Equipment Computer Users Society*, Vol. 2, No. 2 (Los Angeles, December 1975), pp. 413-414, 1976.

Daughterity, W. C., Review of *Effective Use of ANS COBOL Computer Programming Language*, by Laurence S. Cohn, in *Computing Reviews*, Vol. 16, No. 10, p. 441, 1975.

Manwell, T., Daughterity, W., Desch, S., and Stolurow, L., "Tom Swift and His Electric Bilingual Grandmother," *ACM SIGCUE Bulletin*, Vol. 7, No. 1, pp. 5-17, 1973.

Daughterity, W. C., "A Telephone Amplifier," *Transactions of the Oklahoma Junior Academy of Science*, Vol. IV, pp. 130-132, 1961.

\* Graduate Research Assistant I funded

## 2. Other Publications

Daughterity, W. C., "Honors Section," in Rabins, M. J., and Harris, C. E. Jr. (eds.), *Engineering Ethics Teaching Manual*, 1997.

Daughterity, W. C., "Honors Section," in Rabins, M. J., and Harris, C. E. Jr. (eds.), *Engineering Ethics Teaching Manual*, 1996.

Allen, G. D., Nelson, P., Jarvis, R. D., and Daughterity, W. C., "System Impact of Hit Assessment Capability for NPB Discrimination: Analysis of the Case of No-Hit Assessment," *Weapons Lab/TALN Technical Report*, Kirtland Air Force Base, May, 1990.

### 3. Other Conference Papers and Presentations

Coulson, R. N., and Daugherty, W. C., "A Knowledge Engineering Approach for Ecosystem Management," 11th Annual Landscape Ecology Symposium, International Association for Landscape Ecology - Integration of Cultural and Natural Ecosystems Across Landscapes: Applications of the Science, Galveston, Texas, 1996.

Coulson, R. N., and Daugherty, W. C., "Decision Support Systems for Forest Pests: Where Do All the Knowledge-Based Systems Go?," North American Forest Insect Work Conference, San Antonio, Texas, 1996.

Daugherty, W. C. and Coulson, R. N., SPBEBE (Economic and Environmental Impact Assessment for Southern Pine Beetle Suppression Projects), computer code, developed for the USDA Forest Service, Forest Health Protection, 1996-1997.

Coulson, R. N., and Daugherty, W. C., "Knowledge System Environment for Ecosystem Management," Global Studies Seminar, Battelle Pacific Northwest Laboratories, Richland, Washington, 1995.

Daugherty, W. C. and Coulson, R. N., ISPBEX-II (Integrated Southern Pine Beetle Expert System), computer code, developed for the USDA Forest Service, Forest Health Protection, 1994.

Daugherty, W. C., and Yen, J., "Tutorial on Neuro-Fuzzy Systems," Third International Workshop on Industrial Fuzzy Control & Intelligent Systems Houston, Texas, December 1993.

Daugherty, W. C., "Introduction to LISP with an On-line Demonstration," Houston Geotech '91, Houston, Texas, 1991.

Daugherty, W. C., "The Universal Classification Problem," South Central Regional Conference of the Association for Computing Machinery, Austin, Texas, 1984.

### 4. Research Projects

"Remote Laboratory Data Entry and Retrieval System," Texas Department of Agriculture, Walter C. Daugherty, 1986, \$3,000 (Daugherty 100%).

"Electrochemical Modeling of a Sinter Plate, Sealed Design Nickel-Cadmium (Ni-Cd) Battery Cell," National Aeronautics and Space Administration, Ralph E. White, Walter C. Daugherty, 1 graduate student, 1989, 25% of my salary 1989-90 (Daugherty 100%).

“Application of Reasoning under Uncertainty to Process Control,” Texaco, Walter C. Daugherty and John Yen, 1 graduate student; competitive and peer-reviewed, September 1990, \$18,000.

“Design of a Computational Classroom,” Texas A & M University, Walter C. Daugherty, September 1990-May 1991, \$60,000 (Daugherty 100%).

“Design of a Second Computational Classroom,” Texas A & M University, Walter C. Daugherty, January 1991-December 1992, \$153,000 (Daugherty 100%).

“Development of Honors Courses in Artificial Intelligence and Analysis of Algorithms,” Texas A & M University, Walter C. Daugherty, James Abello and Arkady Kanevsky, 2 graduate students, competitive, September 1991-May 1991, \$11,000 (Daugherty 50%).

“Integrated Southern Pine Beetle Expert System”; USDA Forest Service; Robert N. Coulson, Walter C. Daugherty, and Jeffrey W. Fitzgerald; 5 graduate students; competitive and peer-reviewed; 1985-1992, \$974,120.

“Distributed Data-Base Support for the ISPBEX Expert System”; USDA Forest Service; Robert N. Coulson, Walter C. Daugherty, and Jeffrey W. Fitzgerald; 1 graduate student; competitive and peer-reviewed; 1992-93; \$35,000.

“Integrated Southern Pine Beetle Expert System II”; USDA Forest Service; Robert N. Coulson, Walter C. Daugherty, and Jeffrey W. Fitzgerald; competitive and peer-reviewed; March 1993-February 1994; competitive and peer-reviewed; \$170,000.

“Ecological Modelling of Regional Responses to Global Changes: A Knowledge System Environment for Planning, Problem-Solving and Decision Making”; Battelle Pacific Northwest Laboratory; Robert N. Coulson and Walter C. Daugherty; competitive and peer-reviewed; June-December 1995; \$39,996.

“Fitness of a Genetically Modified *Gliocladium virens* in Soil and Rhizosphere”; USDA Cooperative State Research Service; Charles M. Kenerley and Walter C. Daugherty; 1 senior associate, 2 graduate students, and 1 undergraduate student; competitive and peer-reviewed; September 1996-August 2001; \$254,450 (Daugherty 50%).

“Southern Pine Beetle Biological Evaluation and Economic Evaluation Program Conversion”; USDA Forest Service, Forest Health Protection; Robert N. Coulson (PI) and Walter C. Daugherty (Co-PI); competitive and peer-reviewed; 1996-1997; \$16,421.

“The Texas Imported Fire Ant Survey: The Fire Ant Spatial Information Management System (FASIMS)”; Texas Agricultural Experiment Station; Robert N. Coulson (PI) and S. Bradleigh Vinson, Maria D. Guzman, Douglas F. Wunneburger, and Walter C. Daugherty (Co-PI’s); competitive and peer-reviewed; January 1998-December 1998; \$50,000.

“Special Topics in Computer Science Concepts and Programming”; Academy for Advanced Telecommunications and Learning Technologies; Walter C. Daugherty; competitive and peer-reviewed; June 1998-May 1999; \$5,000 (Daugherty 100%).

“Object Modeling Techniques Support for National Simulation Center Tactical Directorate”; U. S. Army through prime contractor Cubic Applications, Inc.; Walter C. Daugherty, James A. Wall, and José Salinas; competitive; September 1998-April 1999; \$74,498 (Daugherty 20%).

“The Fire Ant Spatial Information Management System (FASIMS)”; Texas Department of Agriculture, Texas Imported Fire Ant Research and Management Plan; Robert N. Coulson (PI) and Douglas F. Wunneburger, S. Bradleigh Vinson, and Walter C. Daugherty (Co-PI’s); competitive and peer-reviewed; 1999-2001; \$220,000.

“Evaluating the Impact of Southern Pine Beetle on Ecologically Sustainable Forest Management”; USDA Forest Service; Robert N. Coulson and Walter C. Daugherty; 1 graduate student and 1 undergraduate student; competitive and peer-reviewed; 2000-2003, \$90,000.

“Honey Bee Initiative”; State of Texas; Robert N. Coulson (PI), Walter C. Daugherty (Consultant); 2 graduate students; competitive; September 2001-August 2002; \$40,000.

“Increasing Computer Science Retention by Developing and Deploying Self-Paced Learning Modules”; State of Texas; Jennifer Welch and Frank Shipman (Co-PI’s), Lawrence Petersen, Walter C. Daugherty, and Lauren Cifuentes (Key Personnel); 10 undergraduate students; competitive; June 2002-August 2004; \$422,692.

“Facilitating the Transition to Java in High School Computer Programming Classes”; Texas A&M University System Academy for Educator Development; Walter C. Daugherty; 1 graduate student; competitive and peer-reviewed; December 2003-September 2004; \$2,966 (Daugherty 100%).

“Instructional Technology Enhancements for Computer Teaching Labs,” Texas A&M University, Walter C. Daugherty, competitive, January 2004-August 2004, \$20,000 (Daugherty 100%).

“Increasing Computer Science Retention with Peer Teachers and Learning Modules”; State of Texas; Valerie Taylor and Jennifer Welch (Co-PI’s), Lawrence Petersen, Walter C. Daugherty, and Joseph Hurley (Key Personnel); undergraduate students; competitive; September 2004-August 2005; \$173,158.

***Cumulative total: \$2,845,801***

## 5. Research Proposals

*Note:* Funded proposals are listed in section 4 above.

“Automated Support for VLSI Standard Cell Optimization,” Texas Advanced Technology Program, Walter C. Daugherty, competitive and peer-reviewed, July 1989, not funded, \$233,887.

“Integration of Computer Software Models for NiCd Battery Design,” National Aeronautics and Space Administration, Ralph E. White and Walter C. Daugherty, competitive and peer-reviewed, 1990, not funded, \$125,000.

“Innovative Use of Supercomputers and Parallel Computers in Grades K-8,” Department of Energy, Paul Nelson, Walter C. Daugherty and Bahram Nassersharif, competitive and peer-reviewed, December 1990, preproposal submitted, \$885,000.

“Integration of Texas Junior Colleges into State and National Computer Networks,” Texas Advanced Technology Program, Walter C. Daugherty and Charles H. Beard, competitive and peer-reviewed, July 1991, not funded, \$174,219.

“Adaptive Fuzzy Control for Industrial Processes,” Texas Advanced Research Program, John Yen and Walter C. Daugherty, competitive and peer-reviewed, July 1991, not funded, \$177,064.

“Development of a Fuzzy Logic Tuner for a PID Controller,” Texaco, John Yen and Walter C. Daugherty, 1992-93, not funded, \$200,000.



“National Center For Ecological Analysis and Synthesis,” National Science Foundation; Robert N. Coulson, Walter C. Daugherty *et al.*, competitive and peer-reviewed, July 1994, not funded, \$10,000,000.

“Development of a Fungal Growth Model for Risk Assessment,” Texas Advanced Research Program, Charles M. Kenerley and Walter C. Daugherty, competitive and peer-reviewed, July 1995, not funded, \$203,792.

“Intelligent Vehicle Navigation System,” Texas Advanced Technology Program, Walter C. Daugherty and Jeffrey W. Fitzgerald, competitive and peer-reviewed, July 1995, not funded, \$195,058.

“Innovative Programs to Increase the Enrollment in Computer Science,” Texas Technology Workforce Development Grant Program, Valerie Taylor and Frank Shipman (co-PI’s), Lawrence Petersen, Walter C. Daugherty, and Joseph Hurley (Key Personnel), competitive and peer-reviewed, March 2005, pending, \$69,760.

## 6. New Design Methods, Techniques, or Concepts Developed

### Null Modem

I independently invented the null modem in 1969 and constructed one for Harvard University (which is still operational!).

### Computer Keyboard National Standard

As a member of the Harvard-MIT Terminal Committee, I participated in the development of the national standard for computer keyboards (*e.g.*, putting braces above brackets for the benefit of programming languages). Nearly every computer terminal and keyboard since then (*e.g.*, VT100, PC) uses this layout.

### Integrated User Training

I invented the method of training users about additional features of an application program by integrating the information with the operation of the program (see Manwell, Daugherty, *et al.* under Publications, above). This is now widely adopted, *e.g.*, by Microsoft for its Windows operating systems in the “Getting Started” panel.

### Object-Oriented Database

I independently invented and implemented an object-oriented database to support arbitrary combinations of data types.

### Self-Organizing Fuzzy Controller

In collaboration with Balaji Rathakrishnan (a Graduate Research Assistant I funded) and John Yen, I developed a new systematic methodology for constructing and tuning fuzzy logic controllers. The research project was funded by Texaco (see the preceding section for details) for use in its refineries.

# TEACHING

## 1. New Courses Developed

CPSC 111/211/311 Java and C-based sequence - Member of curriculum subcommittee, taught 111 and 211

CPSC 210 (Honors) - Data Structures

CPSC 320 (Honors) - Artificial Intelligence

CPSC 489 - Object-Oriented Programming, Systems, and Languages

CPSC 635 - Natural Language Processing (taught by Dr. P. Mayer)

CPSC 689 - Symbolic and Algebraic Computation (not taught)

CSCE 489/PHIL 382 (with Glen Miller [PHIL]) - Ethics and Cybertechnology

ENGR/PHIL 482 (Honors) - Ethics and Engineering

PHIL 282 (with Glen Miller [PHIL]) – Ethics in a Digital Age

PHYS/ELEN 674 (with David Church [PHYS]) - Special Topics in

Quantum Computing (the first course at Texas A&M in quantum computing, and, to the best of my knowledge, the first course in quantum computing anywhere in Texas), taught Spring, 2005, for the fifth time.

A Distance Learning section of CPSC 601 - Programming in C and Java, taught Spring, 2003.

Two sections of CPSC 111 - Computer Science Concepts and Programming taught with student peer teachers as assistants, Fall, 2002.

Honors section of CPSC 111 - Computer Science Concepts and Programming taught with student peer teachers as assistants, Fall, 2004.

Developed (with Lawrence Petersen) an intensive summer training program in Java and Software Engineering for high-school computer science teachers, taught Summer, 2003.

Developing an intensive summer training program in Data Structures for high-school computer science teachers, taught Summer, 2004; I was also completely responsible for recruiting teachers, getting them admitted, arranging for housing, and so on.

## 2. Courses Taught

### A. Graduate

CPSC 601 Programming in C and Java

CPSC 602 Object-Oriented Programming, Development, and Software Engineering

CPSC 614 Computer

Architecture CPSC 625 Artificial

Intelligence CPSC 632 Expert  
Systems

CPSC 681 Graduate Seminar

CPSC 685 Problems

CPSC 691 Research

PHYS/ELEN 674 Quantum Computing (co-teacher)

#### B. Undergraduate

CPSC 111 Computer Science Concepts and Programming

CPSC 111H Computer Science Concepts and Programming (Honors)

CPSC 120 Programming II

CPSC 120H Programming II (Honors)

CPSC 203 Introduction to Computing

CPSC 206 Structured Programming in C

CPSC 210 Data Structures

CPSC 210H Data Structures (Honors)

CPSC 211 Data Structures and Implementations

CPSC 211H Data Structures and Implementations (Honors)

CPSC 285 Special Topics - Data Structures for Teachers

CPSC 289 Special Topics - Java and Software Engineering for Teachers

CPSC 311 Analysis of Algorithms

CPSC 320/420 Artificial Intelligence

CPSC 320H/420H Artificial Intelligence (Honors)

CPSC 321 Computer Architecture

CPSC 464 Integrated Systems Design Automation

CPSC 485 Problems

CPSC/ELEN 485H Problems (Honors theses)

CPSC 489 Object-Oriented Programming, Systems, and Languages

CSCE 113 Intermediate Programming and Design

CSCE 121 Introduction to Program Design and Concepts

CSCE 121H Introduction to Program Design and Concepts (Honors)

CSCE 315 Programming Studio

CSCE 410 Operating Systems

CSCE 489 Cyberethics (co-teacher)

ENGR 112 Foundations of Engineering II

ENGR 112H Foundations of Engineering II (Honors)

ENGR/PHIL 482H Ethics and Engineering (Honors)

## PROFESSIONAL OUTREACH

1. Director, Knowledge Systems Research Center
2. Invited Significant Seminars or Lectures

Daughterity, W. C., "Computers and Privacy," Phi Theta Kappa Honor Society State Convention, Blinn College, Brenham, Texas, 1985.

Daughterity, W. C., and DeSoi, J. F., "Objected-Oriented Programming," Second Annual Texaco Artificial Intelligence Symposium, Houston, Texas, 1989.

Daughterity, W. C., "A Self-Tuning Fuzzy Controller," ARRI Conference on Fuzzy Logic, Arlington, Texas, March 1992.

Daughterity, W. C., Yen, J., and Langari, R., "Tutorial on Fuzzy Logic," Second International Workshop on Industrial Fuzzy Control & Intelligent Systems, College Station, Texas, December 1992.

Daughterity, W.C., "A Partially Self-Training System for the Protein Folding Problem," World Congress on Neural Networks, Portland, Oregon, July 1993.

Daughterity, W.C., "Neuro-fuzzy Systems," Third International Workshop on Industrial Fuzzy Control & Intelligent Systems, Houston, Texas, December 1993.

Daughterity, W.C. and Harris, C.E., "Ethics and Engineering," NSF Research Experience for Undergraduates, College Station, Texas, Summer 1994.

Daughterity, W.C. and Harris, C.E., "Ethics and Engineering," NSF Research Experience for Undergraduates, Austin, Texas, Summer 1994.

Daughterity, W.C. and Harris, C.E., "Ethics and Engineering," NSF Research Experience for Undergraduates, College Station, Texas, Summer 1995.

Daughterity, W.C. and Harris, C.E., "Ethics and Engineering," NSF Research Experience for Undergraduates, Austin, Texas, Summer 1995.

Daughterity, W.C., "Public-Key Cryptography Meets Quantum Computing: Why Secret Agencies are Quaking in their Boots." Quantum Computing Seminar, Texas A&M University, April 9, 2001.

Daughterity, W.C., "Quantum Computing 101: How to Crack RSA." DefCon X, Las Vegas, NV, August 4, 2002.

Daugherty, W.C., "Computer Ethics." ENGR 482 Ethics and Engineering, Texas A&M University, April 14-16, 2003.

Daugherty, W.C., "Incorporating Computer Ethics into an Engineering Ethics Course." University of Texas Ethics Conference, Austin, Texas, April 16, 2004.

Daugherty, W.C., "Computer Ethics." ENGR 482 Ethics and Engineering, Texas A&M University, November 8-10, 2004.

Daugherty, W.C., "[My] 53 Years of Computing History," CSCE 681 Open Graduate Seminar, Texas A&M University, November 18, 2015.

### 3. Consulting

St. Joseph's Hospital, Bryan, Fall 1990, at no charge.

Other clients include IBM Federal Systems Division, *New York Times*, *Washington Post*, *Los Angeles Times*, Cheyenne and Arapaho Tribes of Oklahoma, Southwestern Bell Telephone, Fulbright & Jaworski (Houston), Texas Department of Agriculture, Phonogram B.V. (Amsterdam), and U. S. Department of the Treasury.

## HONORS AND AWARDS

Oklahoma Junior Academy of Science, elected to membership, 1961,  
Oklahoma State University  
National Science Foundation, Institute for High Ability Secondary  
School Students, 1962, University of Oklahoma  
Westinghouse, Science Talent Search national finalist,  
1963 National Merit Scholarship test, highest score in  
Oklahoma, 1963  
Frontiers of Science, scholarship, 1963, Oklahoma City,  
Oklahoma  
Engineering Club of Oklahoma City, award, 1963, Oklahoma  
City, Oklahoma  
Oklahoma Christian College, full scholarship (top entering  
freshman), 1963, Oklahoma City, Oklahoma  
National Science Foundation, Undergraduate Research Participation  
Program, 1965, University of Oklahoma, Norman, Oklahoma  
Alpha Delta Tau, National Honor Society, 1966

Who's Who in American Colleges and Universities, 1966  
 Graduate Record Exam in Mathematics, scored 800, 1966  
 Harvard University, Prize Fellowship, 1966  
 National Science Foundation, Academic Year Institute, 1967  
 Phi Delta Kappa, National Honor Society, 1967  
 Harvard University, Class Marshal for the Graduate School of Education, 1967  
 Harvard University, Bowdoin Prize, bronze medal and cash award for outstanding writing, 1973  
 Association for Computing Machinery, selected as a reviewer for *Computing Reviews*, 1975  
 Association for Computing Machinery, Outstanding Regional Intercollegiate Programming Contest Director Award, 1993, Indianapolis, Indiana  
 World Congress on Neural Networks, Neural Systems Session Co-chair, 1993, Portland, Oregon  
 Graduate Student Council, 1997 Outstanding Graduate Faculty Award citation: "For your time and dedication to graduate students at Texas A&M."  
 Named by the TAMU System to The Academy for Educator Development, a major component of The Texas A&M University System's Regents' Initiative for Excellence in Education, 2003 (one of only two faculty members selected from the entire College of Engineering).  
 Winner, \$500 cash prize, Texas A&M University Academic Integrity Week Essay Competition (Faculty Category), 2004.  
 Texas A&M University, Department of Computer Science & Engineering, 2009 Undergraduate Faculty Award citation: "In grateful appreciation of dedicated service, exemplary attitude, and significant contribution."  
 Qualified for American MENSA, 2015.  
 Oklahoma Christian University, Department of Mathematics and Computer Science, 2015  
 Distinguished Alumnus Award citation: "For outstanding vision, dedication, and commitment to excellence."