MUELLER & ASSOCIATES, INC.
CRAIG A. MUELLER, ESQ.
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Attorney for *Contestant Joey Gilbert*

FIRST JUDICIAL DISTRICT COURT

CARSON CITY, NEVADA

JOEY GILBERT, an individual,

Plaintiff,

vs.

JOSEPH LOMBARDO, putative Republican candidate for Governor of Nevada.

Defendant.

CASE NO. 22 OC 000851B

DEPARTMENT 2

APPENDIX TWO TO CONTESTANT'S OPPOSITION TO DEFENDANT'S MOTION FOR SANCTIONS

COMES NOW, Contestant, Joey Gilbert, by and through his attorney CRAIG MUELLER, ESQ. of MUELLER & ASSOCIATES, INC., and hereby submits his APPENDIX TO CONTESTANT'S OPPOSITION TO DEFENDANT'S MOTION FOR SANCTIONS, as follows:

EX.	APPX.	DESCRIPTION	PAGES
1.	I.	Statement of Contest filed July 15, 2022	On File
2.	I.	Deposition Transcript of Mark Wlaschin (Excerpts)	001-007
3.	I.	Deposition Transcript of Joe Gloria (Excerpts)	008-011
4.	I.	(Initial) Expert Report of Oliver A. Hemmers, Ph.D. dated July. 2, 2022	012-016
5.	I.	Deposition Transcript of Oliver A. Hemmers (Excerpts)	017-032
6.	I.	(Initial) Expert Declaration of Walter C. Daugherity, Ph.D. dated July 14, 2022, and C.V. of Walter C. Daugherity, Ph.D.	033-054
7.	I.	Deposition Transcript of Walter C. Daugherity (Excerpts)	055-066
8.	I.	(Initial) Expert Declaration of G. Donald Allen, Ph.D. (undated)	067-071

9.	II.	C.V. of G. Donald Allen, Ph.D.	072-121
10.	II.	Clark County, 2022, Primary Precinct Analysis, by Edward Solomon	122-162
11.	II.	(Revised) Expert Declaration of G. Donald Allen (undated)	163-169
12.	II.	Deposition Transcripts of G. Donald Allen (Excerpts)	170-185
13.	III.	(Revised) Expert Declaration of Walter C. Daugherity, dated July 25, 2022	186-193
14.	III.	Deposition Transcript of Walter C. Daugherity (Excerpts)	194-210
15.	III.	Deposition Transcript of Michael C. Herron (Excerpts)	211-221
16.	III.	Expert Report of Michael C. Herron, dated August 1, 2022 (without Appendices)	222-273
17.	III.	Amended Expert Report of Oliver C. Hemmers, dated August 9, 2022	274-278
18.	IV.	Expert Report of Justin R. Grimmer, dated August 1, 2022	279-283
19.	IV.	Transcript of Aug. 10, 2022 Hearing on Motion for Summary Judgment	284-334
20.	IV.	Demand Letter to Contestant's Counsel, dated July 27, 2022	335-336

DATED this 2nd day of September 2022.

MUELLER & ASSOCIATES, INC.

CRAIG A. MUELLER, ESQ.
Nevada Bar No. 4703
808 S. 7th Street
Las Vegas, Nevada 89101
Counsel for Contestant, Joey Gilbert

DECLARATION OF CRAIG A. MUELLER, ESQ.

I, CRAIG A. MUELLER, ESQ., declare under penalty of perjury as follows:

1. I am an attorney licensed to practice law in the State of Nevada, the owner of the law firm of MUELLER & ASSOCIATES, INC., and I represent the Contestant in this matter. I make this declaration in support of Contestant's Opposition to Defendant's Motion for Sanctions. I am over eighteen years of age, have personal knowledge of the facts set forth herein, and am competent to testify to the facts stated herein.

MUELLER & ASSOCIATES, INC.

2. Attached hereto as Exhibit 1 is a true and correct copy of the Statement of Contest, filed with the Court on July 15, 2022 (the Statement of Contest is on file with the Court and therefore is not reproduced with these exhibits).

3. Attached hereto as Exhibit 2 is a true and correct copy of excerpts from the deposition transcript of Mark Wlaschin.

4. Attached hereto as Exhibit 3 is a true and correct copy of excerpts from the deposition transcript of Joe Gloria.

5. Attached hereto as Exhibit 4 is a true and correct copy of the (Initial) Expert Report of Oliver A. Hemmers, Ph.D. dated July 2, 2022.

6. Attached hereto as Exhibit 5 is a true and correct copy of excerpts from the deposition transcript of Oliver A. Hemmers.

7. Attached hereto as Exhibit 6 are true and correct copies of the (Initial) Expert Declaration of Walter C. Daugherity, Ph.D. dated July 14, 2022, and the C.V. of Walter C. Daugherity, Ph.D.

8. Attached hereto as Exhibit 7 is a true and correct copy of excerpts from the deposition transcript of Walter C. Daugherity.

9. Attached hereto as Exhibit 8 is a true and correct copy of the (Initial) Expert Declaration of G. Donald Allen, Ph.D.

10. Attached hereto as Exhibit 9 is a true and correct copy of the C.V. of G. Donald Allen, Ph.D.

11. Attached hereto as Exhibit 10 is a true and correct copy of the Clark County, 2022, Primary Precinct Analysis, prepared by Edward Solomon.

12. Attached hereto as Exhibit 11 is a true and correct copy of the (Revised) Expert Declaration of G. Donald Allen.

13. Attached hereto as Exhibit 12 is a true and correct copy of excerpts from the deposition transcripts of G. Donald Allen.

14. Attached hereto as Exhibit 13 is a true and correct copy of the (Revised) Expert Declaration of Walter C. Daugherity, dated July 25, 2022.

15. Attached hereto as Exhibit 14 is a true and correct copy of excerpts from the deposition transcript of Walter C. Daugherity.

16. Attached hereto as Exhibit 15 is a true and correct copy of excerpts from the deposition transcript of Michael C. Herron.

17. Attached hereto as Exhibit 16 is a true and correct copy of the Expert Report of Michael C. Herron, dated August 1, 2022, without appendices.

18. Attached hereto as Exhibit 17 is a true and correct copy of the Amended Expert Report of Oliver C. Hemmers, dated August 9, 2022.

19. Attached hereto as Exhibit 18 is a true and correct copy of the Report of Justin R. Grimmer, dated August 1, 2022.

20. Attached hereto as Exhibit 19 is a true and correct copy of the Transcript of August 10, 2022 Hearing on Motion for Summary Judgment.

21. Attached hereto as Exhibit 20 is a true and correct copy of a letter sent by J. Colby Williams, Esq. to Craig Mueller, Esq. on July 27, 2022.

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

DATED this 2nd day of September 2022.

CRAIG A. MUELLER, ESQ.

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the service of the foregoing **APPENDIX TO CONTESTANT'S OPPOSITION TO DEFENDANT'S MOTION FOR SANCTIONS** was served on the 2nd day of August 2022 via email to all parties on the e-service list as follows:

CAMPBELL & WILLIAMS
DONALD J. CAMPBELL, ESQ. (1216)
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J. COLBY WILLIAMS, ESQ. (5549)
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Attorneys for Defendant Joseph Lombardo

An Employee of Mueller & Associates, Inc.

EXHIBIT 9

EXHIBIT 9

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 979/845-7950 (Office) 979/845-6028 (Fax)
Email: dallen@math.tamu.edu
Homepage: http://www.math.tamu.edu/~dallen

Current Home Address
9215 Brookwater Circle
College Station, Texas 77845

Citizenship: U.S.A.

Degree	**Major**	**University**	**Year**
	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), 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

076

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 Coachers 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.
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15) G.D. Allen and J.D. Ward, ``Hermitian liftings of $B(\ell_p)$ " 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 $B(\ell_p)$, Proc. AMS 80 (1980) 71-77.
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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.
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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 Optimation***, Proceedings of the Sixth Mexico-United States Workshop on Numerical Analysis, Kluwer Academic Publishers, 1993 pp. 1-14.
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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.
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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.

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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.
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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, IJISET - 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 p rogram 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

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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. Westminister, 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, 2000http://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 onadvanced 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 , Febriuary 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 (Iinternational Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV, with Dianne Goldsby.
5. Contributed Presentation, The End of Computing, ICTCM (Iinternational 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 (Iinternational 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 (Iinternational 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, Febrary 7, 2014.

15. Invited Presentation, Using a bridging program for Calculus Instruction, North Carolina State, January 15, 2014.

16. Invited Presentation, Presession, presented to the presession 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 Presenation (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, Octeber 28-December 1, 2006, See: http://www.online-educa.com/ and 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
- 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 RFegents' 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. Cetificate.
- 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 Mathematicas Aplicades y en Systemas, 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 Presession. 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 Presession, 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-Lousiana 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, Arboretun 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; Cincinnatti, 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 andScience 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, colloquiuum 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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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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170) 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.

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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174) Keynote Address. Technology Usage in the College Algebra Course, The Enhanced WebAssign (EWA) Teaching & Learning Workshop, Thomson Publishing, San Diego, CA, March 17, 2007.

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 Educations, 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, Febrary 7, 2014.

210) Invited Presentation, Using a bridging program for Calculus Instruction, North Carolina State, January 15, 2014.

211) Invited Presentation, Presession, presented to the presession 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.

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216) Invited Presentation, Using a bridging program for Calculus Instruction, North Carolina State, January 15, 2014.

217) Invited Presentation, Presession, presented to the presession 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 Presenation (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, Febrrary 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 (Iinternational Conference on Teaching Collegiate Mathematics, March 13-15, 2015, Las Vegas, NV, with Dianne Goldsby.

235) Contributed Presentation, The End of Computing, ICTCM (Iinternational 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 (Iinternational 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 (Iinternational 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, Febrary 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
- History of Mathematics - 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/techtools/valgebra/valgebra.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 - ADDTIONAL

- 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. (://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.
- WebCalC, an online calculus course, 1998-2000. Home page URL: www.math.tamu.edu/ ~webcalc/webcalc.html
- Java Script-based quizzing, 1999. URL: www.math.tamu.edu/ dallen/cshtemp/cshsframe.htm
- The History of [illegible], 1998, URL: 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. Daugherity, 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.
- Math WebCalC --- An online Calculus course. Home page URL: www.math.tamu.edu/~webcalc/webcalc.html
- Math 640 - online Linear Algebra, 2001-2002Math 645 --- online Problems Survey I, 2002Math 629 --- online, History of Mathematics, 1996-2003Math 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
  - HIGH SCHOOLS:
    - Bryan High, Eleanor Mueller
    - Consolidated, CS, Mary Selzer
    - Somerville HS, Ricky Cole
    - Caldwell HS, Debbie Stefka
  - FOUR YEAR COLLEGES:
    - Texas A&M, College of Engineering, July 14, 1997, Karen Watson, Make McDermott, Lee Carlson, Lee Lowry, Larry Piper
  - 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
  - WORKSHOPS:
    - '98 Maple Workshop, TAMU, June, 26,1998
    - AP Calculus Workshop, TAMU, July 1, 1998
  - 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 2008Theory 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 PritchardPhd 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), 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) - 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
- 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
- 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
- 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 andScience 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 10

EXHIBIT 10

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.

Table of Contents

Preface

Suppose at Lorraine High School, a precinct among many in a particular election, there were two candidates and two 41 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 $\zeta = \frac{Total\ number\ of\ Mail\ in\ Votes}{Total\ Number\ of\ Election\ Day\ Votes}$, 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*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/1Rk0QNzNuboit7pyY1UbGlIQyl5JtLxqcnoMmQpK3Xkw/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.

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

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

In a fair election:

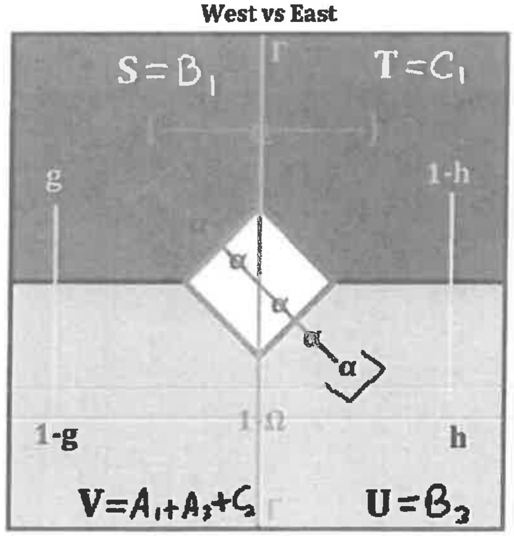
$$g = \alpha + \Gamma(\alpha - h) = \frac{\alpha-(1-\lambda)h}{\lambda} = \Omega + \Gamma(\Omega - w) = \frac{\Omega-(1-\lambda)w}{\lambda} = \frac{(\Gamma+1)(\Omega+\alpha)-\Gamma}{2}$$

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 α_1 and Ω_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, $g = \frac{s}{s+v}$, 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 α, Ω, both h and λ are compelled into existence, since in any election, fair or unfair:

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

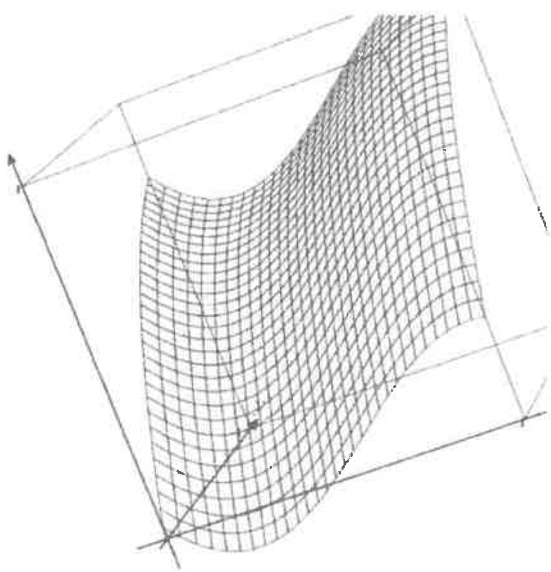
Since the proportions, g_1, α_1, Ω_1 are known, it forces the value of Γ_1, which is proportion of East Side Ballots to West Side Ballots, that is $\Gamma_1 = \frac{u_1+t_1}{s_1+v_1}$, is now forced. Since s_1 and v_1 are both known at this stage, then so the sum of u_1 and v_1.

Since Γ_1, α_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: $\frac{t_1}{u_1} = \frac{1-h_1}{h}$, 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 α, Ω, 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 $v_2 = (A_1 + A_3) + (C_1 + C_3)$.

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

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

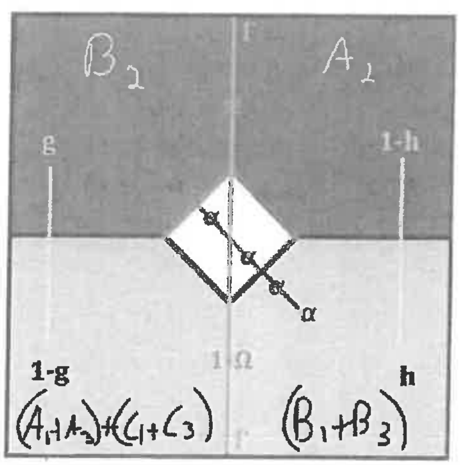
In a fair election:

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

In the above sequence of equalities, three of the five proportions must always be known to resolveg_2, however, in Clark County we obtain the illegal cubic manifold equations that yields g_2 with only α_2 and Ω_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 α_2 *and* Ω_2, both h_2 and λ_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, α_1, Ω_1 are known, it forces the value of Γ_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 Γ_2, α_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 $\left(\Gamma_2\right)^{-1} = \frac{s_2+v_2}{u_2+t_2}$, 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.

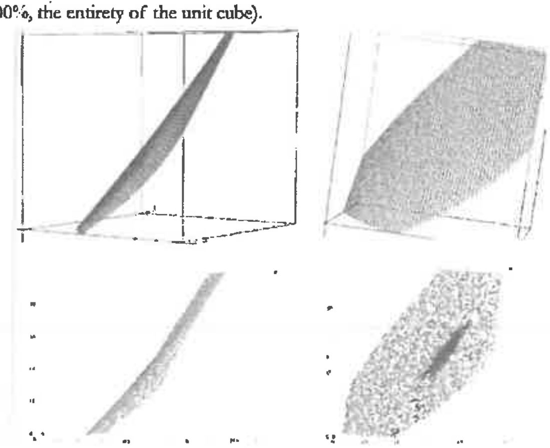
Since v_2 is known, and $v_2 = \left(A_1 + A_3\right) + \left(C_1 + C_3\right)$, and A_1, A_3 are natural and C_1 was illegally calculated in the previous equation, we finally resolve $C_3 = v_2 - \left(A_1 + A_3\right) - C_1$, which is Robert's Election Day Vote, and now all of the precinct totals, 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 α, Ω, 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	+3.545617525	- 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 α, Ω coordinates, and the actual Clark County precincts in blue. They do not deviate from the red. The α, Ω, g bounds are all from 0 to 1 (that is from 0% to 100%, 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.

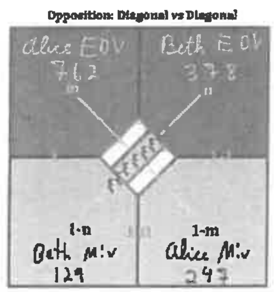
Thus if Alice receives 1000 votes, 750 on Election Day and 250 in the Mail, which is a 3:1 proportion of Election Day to Mail-in Votes, then Beth, regardless of how many votes she receives overall, should have roughly 3 election day votes for each mail-in vote, in that same precinct, and so should all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



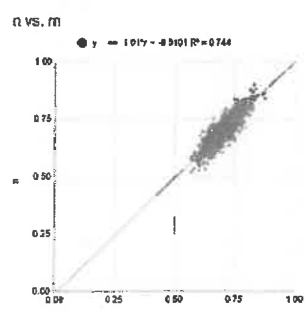
$$m = \frac{762}{762+247} = 75.52\%$$

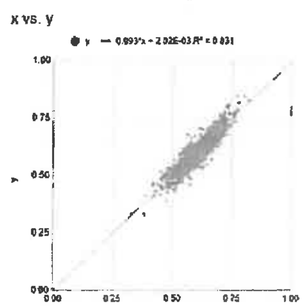
$$n = \frac{378}{378+129} = 74.55\%$$

$$x = \frac{762}{762+378} = 66.84\%$$

$$y = \frac{247}{247+129} = 65.69\%$$

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: Ali Ghodsi, Lec 1: Principal Component Analysis

https://www.youtube.com/watch?v=g-Hb26agBFg

https://www.youtube.com/watch?v=L-pQtGm3VS8

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, Ψ_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 α_1, Ω_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, α_2, Ω_2, which it can alter, in any precinct, at any time.

The total sum of the new ballots $\Psi_1 = A_{1,0}, A_{3,0}, C_{2,0} + \left(B_{1,1}, B_{3,1}, C_{1,1}\right) + \left(B_{2,1}, A_{2,1}, C_{3,1}\right)$ is then determined, from which the scale $z = \frac{\Psi_0}{\Psi_1}$, is now applied across $\left(A_{1,0}, A_{3,0}, C_{2,0}\right), \left(B_{1,1}, B_{3,1}, C_{1,1}\right), \left(B_{2,1}, A_{2,1}, C_{3,1}\right)$, 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 $\left(A_{1,0}, A_{3,0}, C_{2,0}\right)$ 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* Ω_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, McMahill, 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=IHZwWFHWa-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 Stavors 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 Washoe Counties 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.

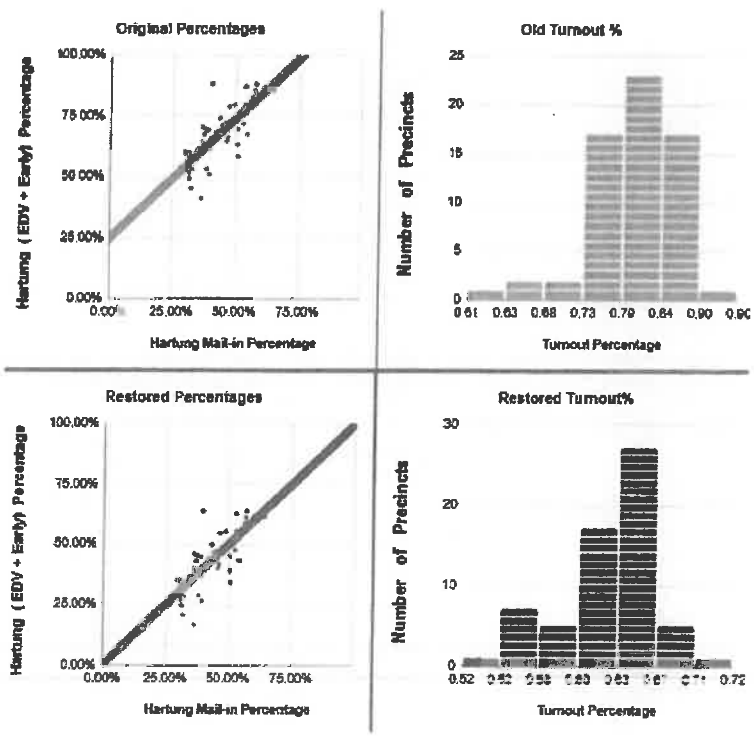
At the same time, in order to keep Ms. Baker ahead of Hartung in the Mail (the maintain the facade that Democrats overperformed in the Mail), they made it that if M.r Hartung got 100% of the Early (+EDV) vote, Ms. Baker would magically receive 25% of the Mail-in Vote (since he gets 75% in the Mail, which 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 CountyCom4; Baker)*** *page in the spreadsheet link on the following page) we first remove the positive intercept from the* ***Winner*** *of the election, plotting the dominantmethod 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/1yezGhTkMg1GkIbNiu-lmK|FFTON-0569ec6LwZVaRc/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 e 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 Hartungs'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, $a_{i,1} = ROUND[(x_{i,1})(a_{i,0} + b_{i,0})]$

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, $c_{i,1} = ROUND[(y_{i,1})(c_{i,0} + d_{i,0})]$

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 $a_{i,2}$, $b_{i,0}$, $c_{i,0}$, $d_{i,2}$.

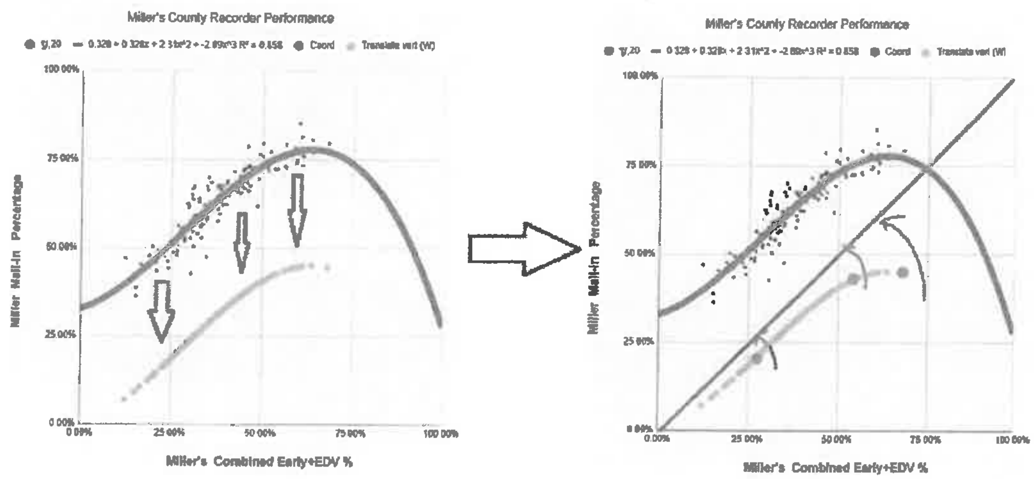
2020 Election Restoration Algorithm , Miller vs Stavros

As for Miller vs Stavros, restoring Nevada's Election is not a simple procedure of translation and rotation, this is because the z complex formula introduced an intense quartic curative 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).

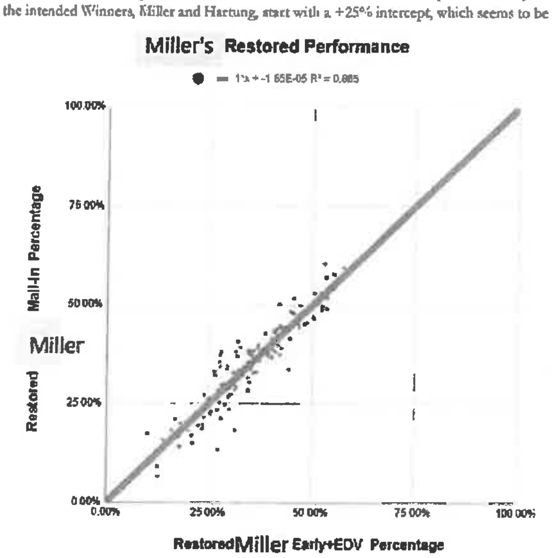
The reason quartic curvature is transferred into the North vs South Arrangement is because quartic curvature naturally occurs in the East vs West Arrangement in a fair election. In a fair election, the North and South percentages form a cloud that can be well approximated by a plane and the East and 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.

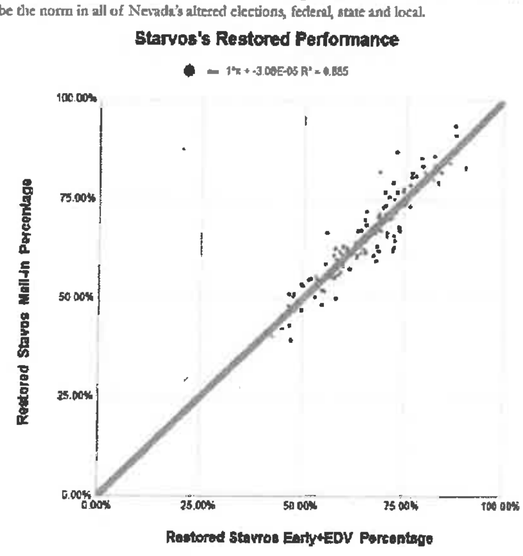
Because of this, we first subtract the y-intercept of the winner (as we did previously), and then record the difference of the Mail-in Percentage from the quartic polynomial spine.

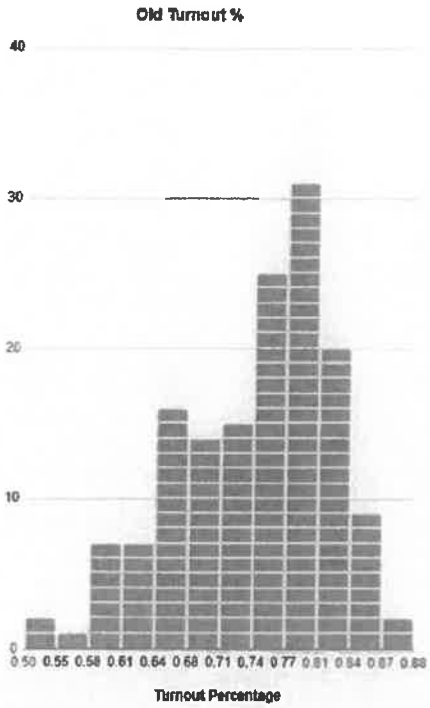
We then do a dynamic rotation of each coordinate along the precinct interpolation of the quartic spine to bring it back to the line $y = x$ and then add back the original residual distances. We then subtract the new values from 100% to see it from Stavros's Perspective.

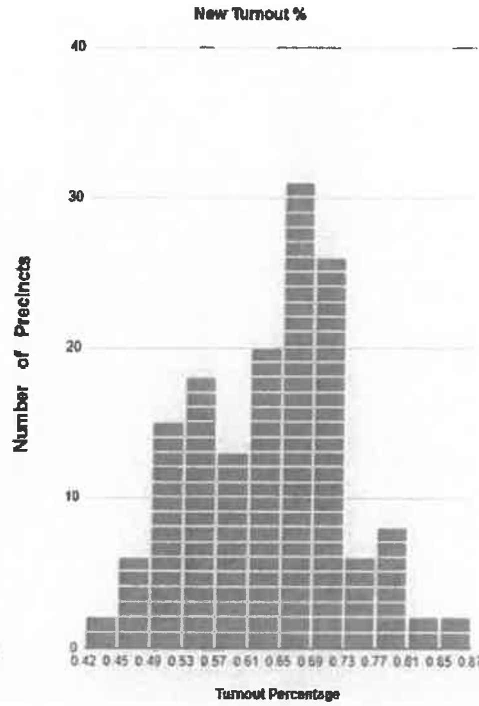


We then apply the algorithm on the above page to restore and rescale the integers, knowing that Stavros's Mail-in Vote and Miller's Early Vote+EDV vote are authentic. Miller replaces Hartung as the Intended Winner and the Mail-in Vote is placed on the y-axis instead, as it was the dominant form of voting 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.









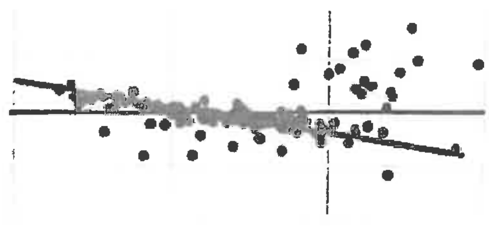
The results show that although Stavros's totals remained close to 75,000 before and after the restoration, Miller's ballot count was inflated from 44715 to 75446.

Original	County Recorder	Restored	Restored	Stavros	Vs	Margin
Total EDV+Early	82086	Total EDV+Early	91152	Original	75313	-133
Total MiV	68673	Total MiV	37942	Restored	84379	39664
Stavros EDV+Early	50290	Stavros EDV+Early	59356			
Miller EDV+Early	31796	Miller EDV+Early	31796	Miller	Vs	Margin
Stavros MiV	25023	Stavros MiV	25023	Original	75446	133
Miller MiV	43650	Miller MiV	12919	Restored	44715	-39664
		Cubic Restore	Miller View			
County Agg. 150 Precincts	Vs	b0	0.32758872	County Omega	Vs	Phantom
Original	49.95%	b1	0.328462	Original	54.44%	30731
Restored	65.36%	b2	2.31106857	Restored	70.60%	0
		b3	-2.69332122	Phantom %	20.38%	30731
County Lambda	Vs	No b4	null	Stavros to Miller via	Adjudication	-9066
Original	62.31%	Phi Range	+5.50	Miller MiV Phantom %	70.40%	Miller Phantom Share
Restored	55.98%	In Degrees	+15.28	Stav EDV Phantom %	00.00%	100.00%
Original Turnout	74.08%			Restored Stav Early	Div by Adj	15.57%
Restored Turnout	63.43%			Restored Miler MIV	Div by Adj	70.17%

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^2 value of all election when the regression of $\alpha = k_1 g + k_2 h + k_3$ *was run.*

Without removing a single outlying precinct the R^2 of the above plane regression was 0.998, and even stranger, it the residuals of the expected value of α *and the actual value of* α *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-anthony/



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 Starvors's Early Vote at a particular precinct.
Let b be Miller's Early Vote at a particular precinct.
Let c be Starvor's Mail-in Vote at a particular precinct.
Let d be Miller's Mail-in Vote at a particular precinct.

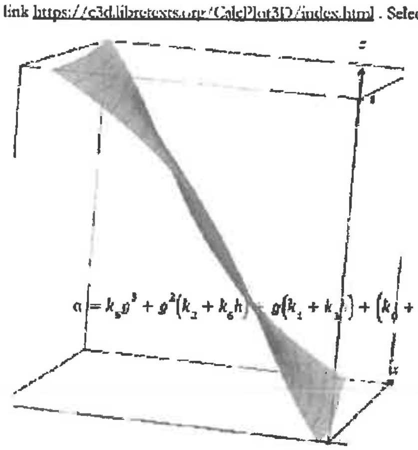
Let $h = \frac{c}{c+b}$; let $\alpha = \frac{a+c}{(a+c)+(b+d)}$; let $g = \frac{a}{a+d}$,

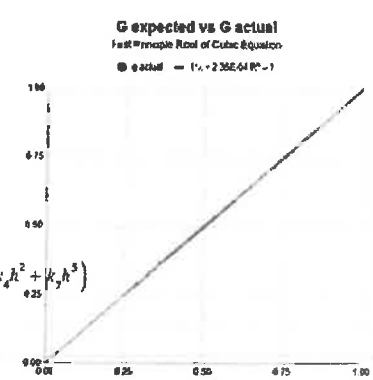
$0 = k_5 g^3 + g^2(k_2 + k_6 h) + g(k_1 + k_3 h) + (k_0 + k_4 h^2 + k_7 h^3 - \alpha)$, which is a general cubic in the form:

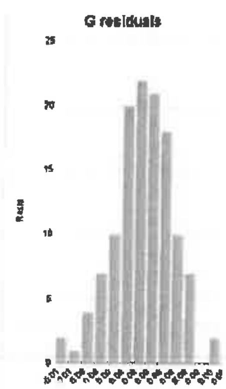
$0 = Ag^3 + Bg^2 + Cg + D$, for this race we take the first principle root of the Cubic Equation.

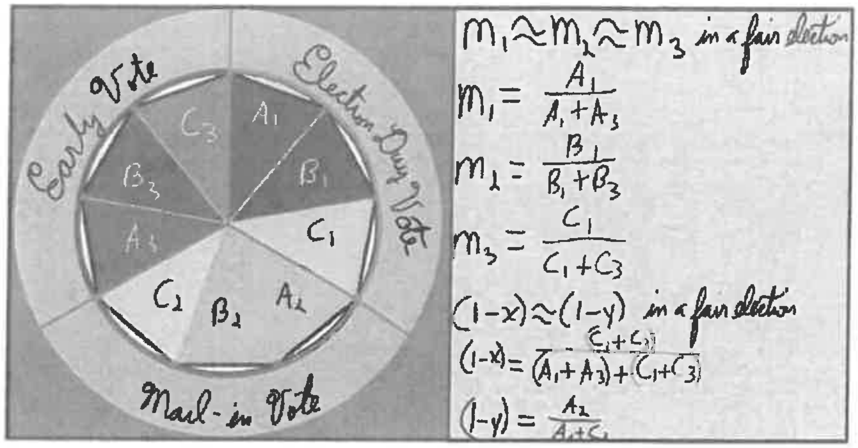
k0	0.03011967441	k4	0.2314017714
k1	0.8193824172	k5	1.006207413
k2	-0.9499398397	k6	-1.094817236
k3	1.064030566	k7	-0.1217901096

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/1uMvelENAnT4eyBUu4cyBPo7lcifwzO6M5Uopgh2uPdo/edit?usp=sharing
https://docs.google.com/spreadsheets/d/1GvLhOzaOUcmrq7NTB0IDoLsLiNr3vNAw-79_PBCOsw/edit?usp=sharin
Type y=0.03011967441 + 0.8193824172z - 0.9499398397z^2+ 1.064030566zx+ 0.2314017714x^2+ 1.006207413z^3- 1.094817236xz^2- 0.1217901096x^3 into this link https://c3d.libretexts.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/1GEUp7LY7zp22Ir4v19xEpn3lukG2ZEYIUm28-5gHBB8/edit?usp=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 McMahill'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 $\frac{A_{1,i}}{A_{1,i}+A_{3,i}} = m_{1,1,i}$ where i is the precinct number index.

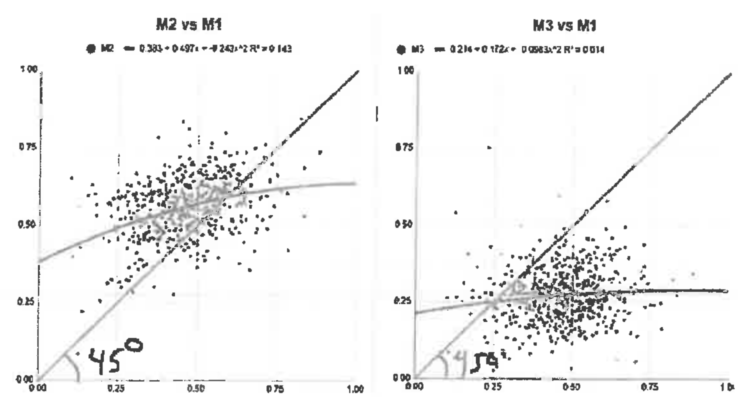
We shall call $\frac{B_{1,i}}{B_{1,i}+B_{3,i}} = m_{2,1,i}$ where i is the precinct number index.

We shall call $\frac{C_{1,i}}{C_{1,i}+C_{3,i}} = m_{3,1,i}$ 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 $\overline{m_{2,1,i}} = 0.383 + 0.497 m_{1,1,i} - 0.243(m_{1,1,i})^2$; $\overline{m_{3,1,i}} = 0.214 + 0.172 m_{1,1,i} - 0.0983(m_{1,1,i})^2$



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:

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

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 $\theta_{1,i} = Arctan\frac{v_{1,i}}{u_{0,i}}$ 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 $u = v$.

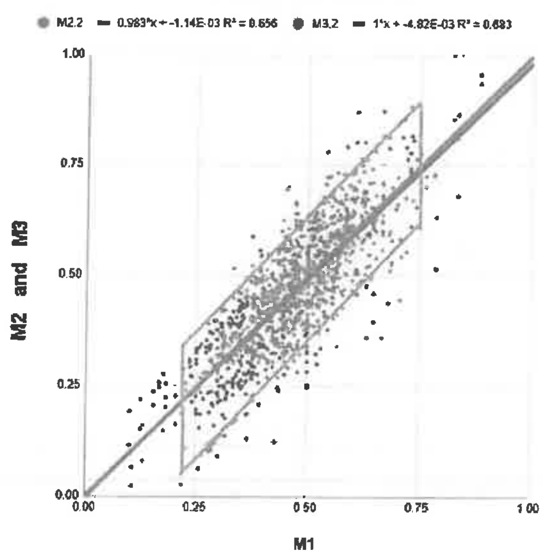
Now set $\phi_{1,i} = Arctan\frac{w_{1,i}}{u_{1,i}}$ and $\phi_{2,i} = \frac{\pi}{4} - \phi_{1,i}$ and then rotate $u_{1,i}, w_{1,i}$ by $\phi_{2,i}$ to yield $u_{2,i}, w_{2,i}$, and then set $v_{2,i} = u_{2,i}$, such that $u = v = w$; producing the coordinate $u_{2,i}, v_{2,i}, w_{2,i}$.

We now find the residual values of $m_{2,1,i}$ and $m_{3,1,i}$ from their expected values in the earlier quadratic regressions. Let these be $r_{2,1,i}$ and $r_{3,1,i}$ respectively. We now find the standard deviation of these residuals, let this be σ_2 and σ_3.

We now multiply all $r_{2,1,i}$ by $\frac{5\%}{\sigma_2}$, and all $r_{3,1,i}$ by $\frac{5\%}{\sigma_3}$ if either σ_2 and/or σ_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 $r_{2,2,i}$ and $r_{3,2,i}$ respectively.

We now add the vectors $u_{2,i}, v_{2,i}, w_{2,i}$ and $0, r_{2,2,i}, r_{3,2,i}$ to produce the Intercessor 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 $\frac{m_{1,1,i}}{u_{3,i}}$, 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

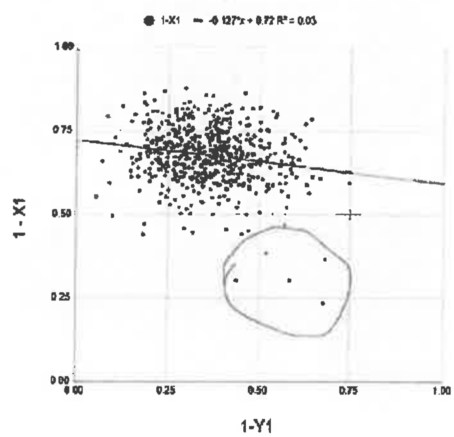


Thankfully, the next two steps are both done in two dimensions.

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

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

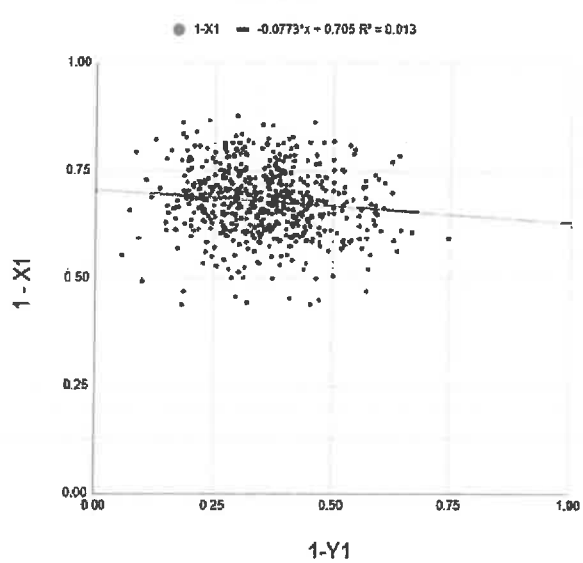
We now plot $\left(1 - y_{1,i}\right)$ horizontally and $\left(1 - x_{1,i}\right)$ vertically. Using our own eyeballs, we can tell that the five precincts in the maroon circled region, having the property $\left(1 - x_{1,i}\right) < 40\%$ are severe outliers and shall be excluded from the linear regression (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 $\overline{m_{2,1,i}} = 0.442 + 0.264m_{1,1,i} - 0.0229\left(m_{1,1,i}\right)^2$; $\overline{m_{3,1,i}} = 0.219 + 0.143m_{1,1,i} - 0.0646\left(m_{1,1,i}\right)^2$.

With these precincts removed, we obtain the linear regression $\overline{1 - x_{1,i}} = 0.705 - 0.0773\left(1 - y_{1,i}\right)$. We now subtract 0.701 from all $(1 - x)$ values, and define $\varpi = ARCTAN(-0.07737) = -3.017 degrees = -0.077146 radians$



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: $\Psi_k = 0.4\Psi_t$, where $\Psi_k = \frac{Kathy's\ Vote}{Registered}$, $\Psi_T = \frac{Total\ Ballots\ Cast}{Registered}$.

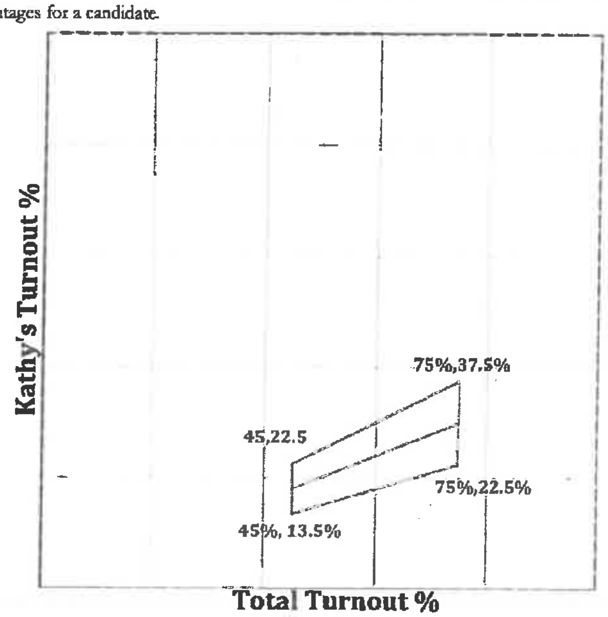
In the below diagram, Kathy receives 40% of all ballots cast, with a standard deviation of 5%, and the overall turnout across the precincts has a mean of 60%, with a standard deviation of 7.5%.

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.



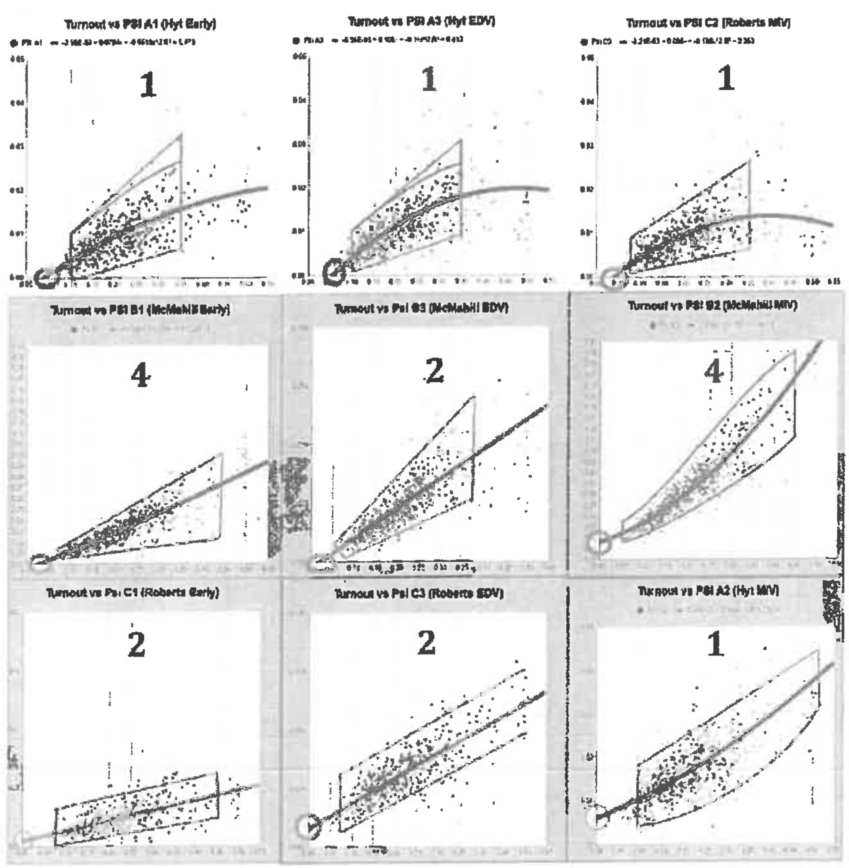
In the graphs below you can see the relationship between total precinct turnout (from 0% to 55% of registered voters) on the horizontal axis against the percentage of registered voters that turned out to vote for each candidate in each mode. The large green numbers, 1,2 and 4, tell you the relative scale 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_3, C_2, that is, Hyt's Early Vote, Hyt's Election Day Vote and Robert's Mail-in 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_3, C_1, which are the illegal outputs of the first cubi manifold. Notice that the quadratic regressions of B_1 and B_3 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 Ω_1 operators across the precincts, which increases C_1 with intensity, drawing from B_3 and the combined sum of A_1, A_3, C_2, while raising the α_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 Ω_2 operators across the precincts, since both A_2 and B_2 are on the North Side and Ω 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 α_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 Ω_2 operators must have been substantially greater than the decrease in the α_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, McMahill 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 α_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.

$$w_3 = \overline{\Psi[C_1]} = c_0 + z_1\Psi[T] + c_2(\Psi[T])^2.$$

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_3 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:

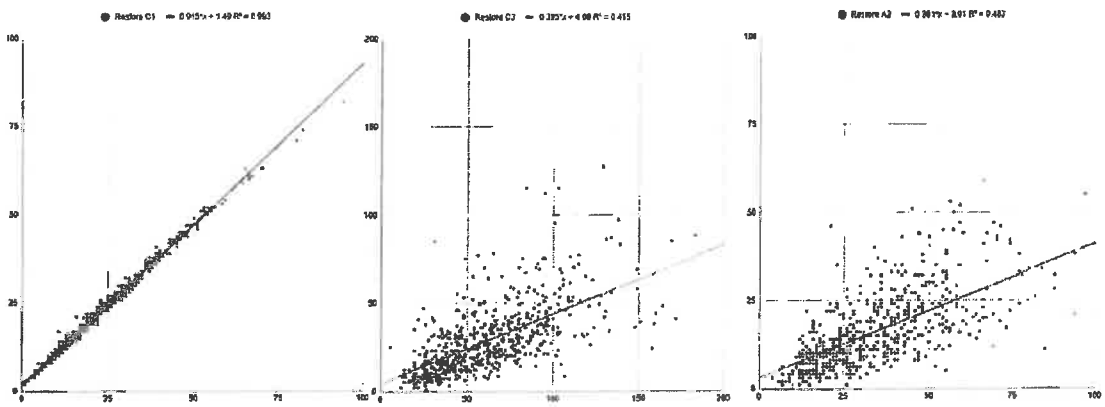
$$\left[\frac{C_3}{C_1} = \frac{1-m_{3,2,i}}{m_{3,2,i}}\right] \Rightarrow \left[m_{3,2,i}C_3 = C_1(1 - m_{3,2,i})\right] \Rightarrow \left[C_3 = \frac{C_1(1-m_{3,2,i})}{m_{3,2,i}}\right]$$

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.

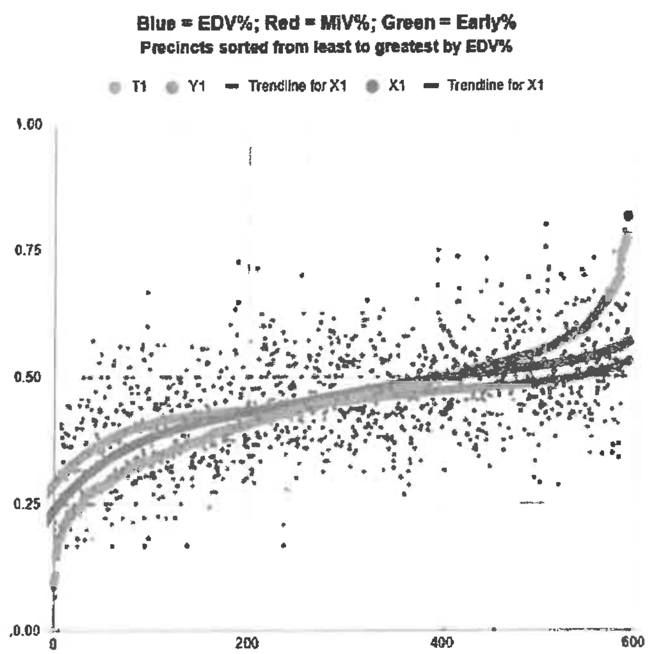
It shows that Robert's Election Day Votes and Hyt's Mail-in Votes were more than doubled from what they should have been. This is not surprising since both C_3 and A_2 are the outputs of second cubic manifold, which were leveraged against the the first cubic manifold, whose natural inputs were $v_1 = C_2, A_1, A_3$. The county-wide increasing both Ω_1 and Ω_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!

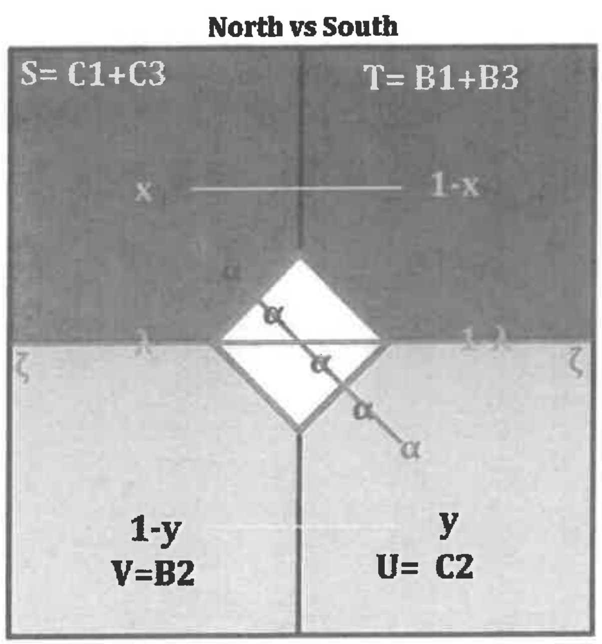


Of course, we still have the problem of restoringB_1, B_2, B_3. We must first recognize that all of McMahill's vote totals were outputs in both of the manifolds.

Thus, it is possible that McMahill 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 McMahill 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 McMahill 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 McMahill's true performance. We shall examine the relationship between McMahill and Roberts.

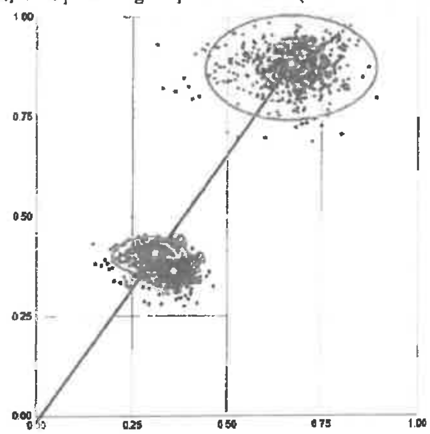
Let $s_{1,i} = C_{1,i} + C_{3,i}$, where $C_{1,i}$ and $C_{3,i}$ are the restored values.
Let $t_{1,i} = B_{1,i} + B_{3,i}$.
Let $u_{1,i} = C_{2,i}$
Let $v_{1,i} = B_{2,i}$
Let $w_{1,i} = (1 - x_{1,i}) = \frac{t}{s+t}$, be McMahill's intercessory combined Early and Election Day percentage.
Let $z_{1,i} = (1 - y_{1,i}) = \frac{v}{u+v}$, be McMahill's intercessory combined Mail-in percentage.



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 McMahill'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 $\bar{z}_i$ 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 $\theta = ARCTAN\frac{\bar{z}}{\bar{w}}$, 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 McMahill'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 !!!)

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

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 $\alpha_1, \Omega_1, \alpha_2, or\ \Omega_2$ 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 $\Upsilon_{1,i}$ 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 $\Upsilon_{2,i}$ 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.

Let $\Lambda_i = \frac{\Upsilon_{1,i}}{\Upsilon_{2,i}}$.

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 Λ_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.

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

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

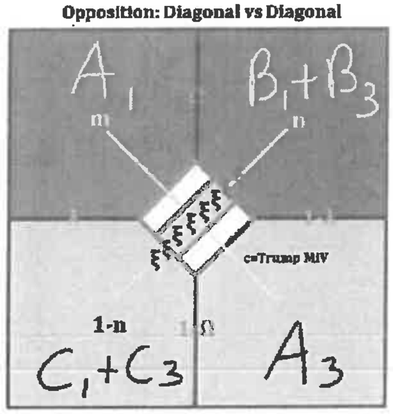
In a fair election:

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

In the above sequence of equalities, three of the five proportions must always be known to resolven_1, however, in Clark County we obtain the illegal cubic manifold equations that yields n_1 with Ω_1 and λ_1 without either α_1 nor m_1.

Even more outrageous is that the R^2 of this function is rather low, until a third parameter, Ψ, is added. Taking an R^2 of bivariate plane and quadratic ofΩ_1 and λ_1 unto n_1 from below 0.99, all the way to 0.998. To ensure there wasn't a trivial correlation with Ψ, 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 trivarite 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 Laxalts 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 Ψ 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 Ω_1, λ_1 *and* Ψ, both m_1 and α_1 are compelled into existence, since in any election, fair or unfair:

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

Since the proportions, w_1, Ω_1, λ_1 are known, it compels the value of ξ_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 ξ_1, w_1, λ_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 Ω, λ, w values are plotted in x, y, z space respectively, with Ψ 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.

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

$z_{0,0,0}$	$z_{1,0,0}$	$z_{1,0,1}$	$z_{1,1,0}$
-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

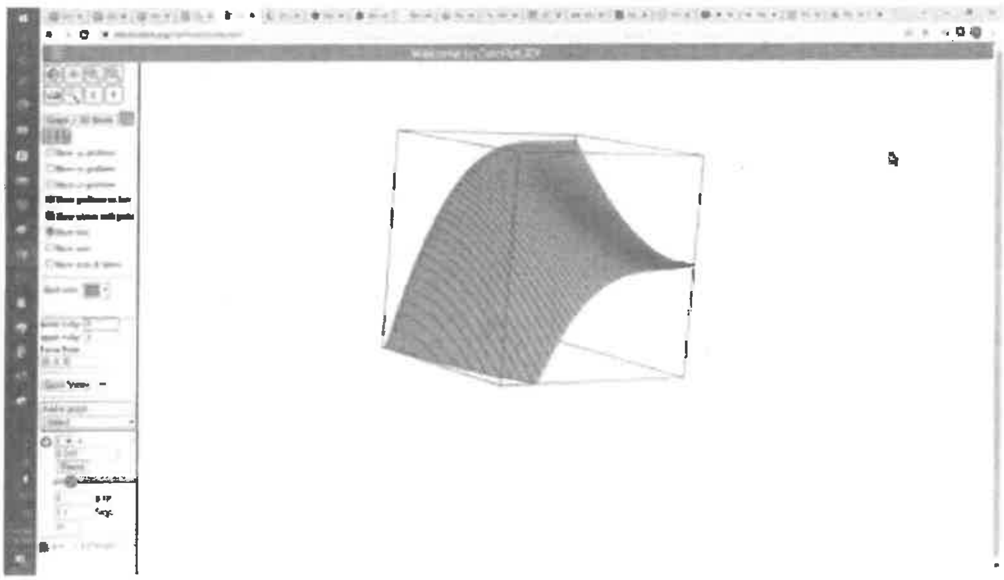
$z_{3,0,0}$	$z_{3,0,1}$	$z_{3,0,2}$	$z_{3,0,3}$
288.161113813985	-24.8740476649254	6.07211023080162	-0.269537406940344

$z_{3,1,0}$	$z_{3,1,1}$	$z_{3,1,2}$	$z_{3,2,0}$	$z_{3,2,1}$	$z_{3,3,0}$
-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 Ω, λ, 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.

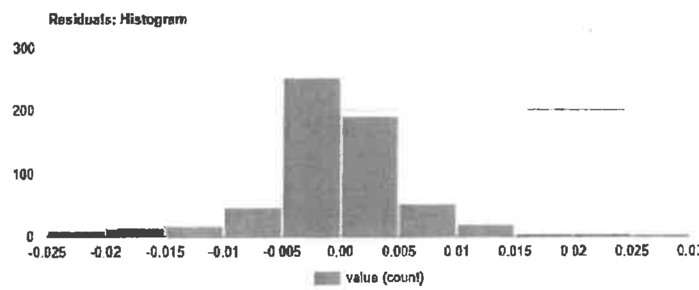


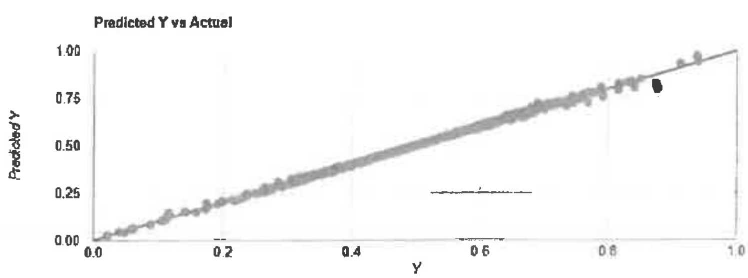
1. Y and X relationship

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 (ŷ) 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.

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

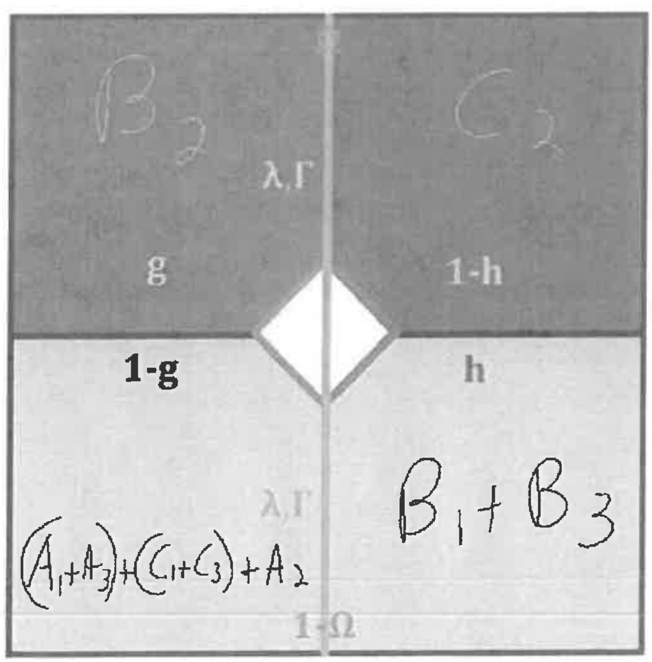
$$\Gamma_1 = \frac{u_1+t_1}{s_1+v_1} = \frac{1-\lambda_1}{\lambda_1}, \quad w_1 = (1 - h_1) = \frac{t_1}{u_1+t_1}$$

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 α_1 and Ω_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 α, Ω, both h and λ are compelled into existence, since in any election, fair or unfair:

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

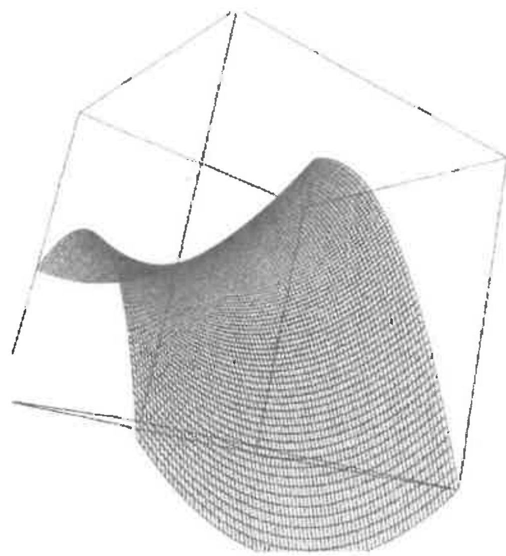
Since the proportions, g_1, α_1, Ω_1 are known, it forces the value of Γ_1, which is proportion of East Side Ballots to West Side Ballots, that is $\Gamma_1 = \frac{u_1+t_1}{s_1+v_1}$, is now forced. Since s_1 and v_1 are both known at this stage, then so the sum of u_1 and v_1.

Since Γ_1, α_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: $\frac{t_1}{u_1} = \frac{1-h_1}{h}$, 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 α, Ω, 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

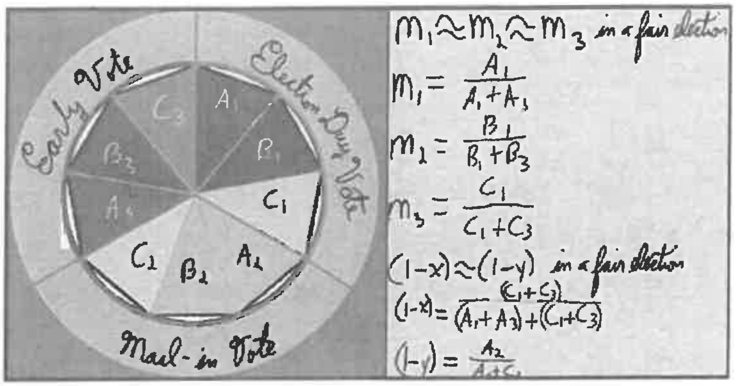


After the execution of this formula, the following values are known:

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/1cXM7j9T-Pp_6pEWBCABC1fR5EEn8dt92RcqipHofJs0/edit?usp=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 $r_{0,i} = y_{1,i} - y_{1,i}$, this restores the residual value.

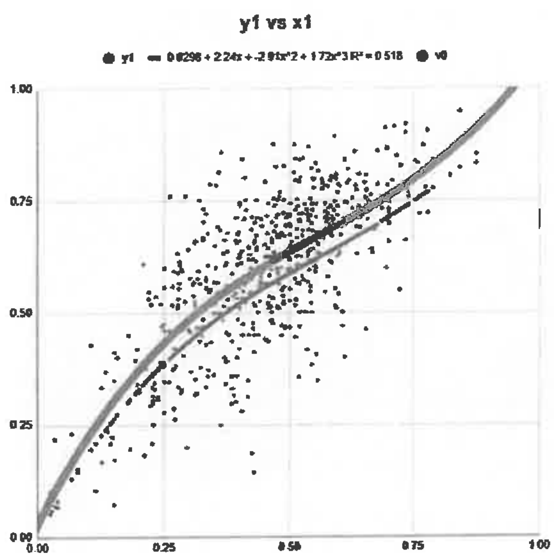
Let σ be the standard deviation of all $r_{0,i}$. If $\theta > 5\%$, then scale all residuals uniformly by $\frac{5\%}{\sigma}$.

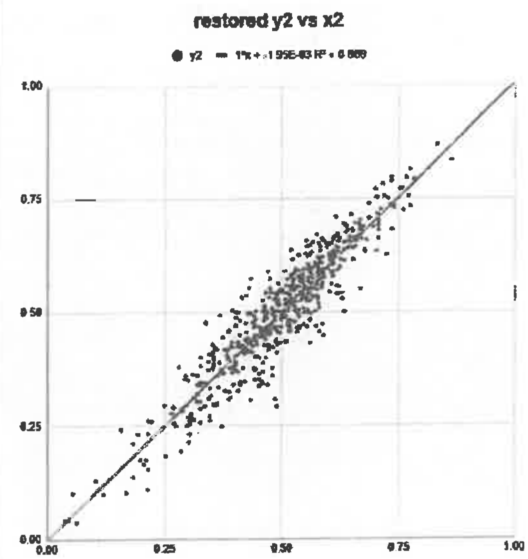
Set $\theta_i = \frac{\pi}{4} - ARCTAN\left(\frac{v_{0,i}}{u_{0,i}}\right)$ for all precincts.

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.

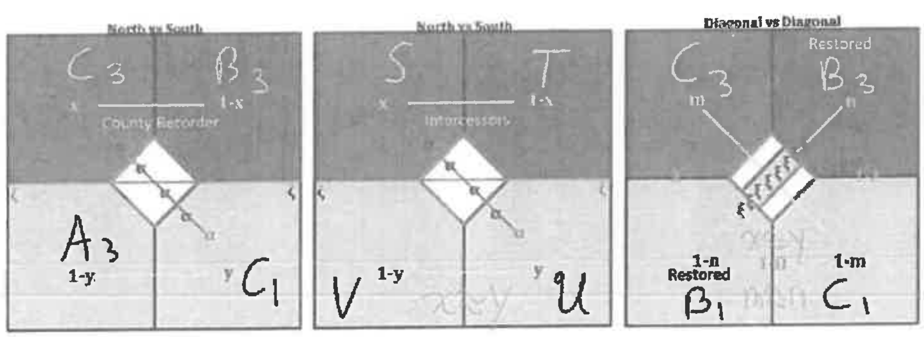
Let $u_i = (y_{2,i})(f_i)$ be Laxalt's Intercessory Election Day Vote in each precinct

Let $t_i = f_i - u_i$ be Cortez's IntercessoryElection 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 $C_{2,2,i} = \left(\frac{n_{3,2,i}}{1 - n_{3,2,i}}\right)\left(C_{1,2,i} + C_{3,2,i}\right)$, 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 $B_{2,2,i} = \left(\frac{n_{3,2,i}}{1 - n_{3,2,i}}\right)\left(B_{1,2,i} + B_{3,2,i}\right)$, 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 $q_{3,i} = \frac{1}{2}\left(q_{1,i} + q_{2,i}\right)$ 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 $A_{1,1,i} = \left(q_{3,i}\right)\left(w_i\right)$ 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 $A_{2,1,i} = \left(\frac{n_{3,2,i}}{1 - n_{3,2,i}}\right)\left(w_i\right)$, 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 Λ_i be the total sum of ballots cast in each precinct in the county recorder data for Laxalt, Cortez and Brown.

Let ρ_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 ω_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 $A_{1,2,i} = z_{3,i}\left(A_{1,1,i}\right)$; $A_{2,2,i} = z_{3,i}\left(A_{2,1,i}\right)$; $A_{3,2,i} = z_{3,i}\left(A_{3,1,i}\right)$ 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_6pEWBCABC1fR5EEn8dt92RcqipHofJs0/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	27653	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	+39613

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	~~112,504~~	55.7%	43.37%
Sam Brown	132,256	~~69,519~~	34.4	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.

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

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

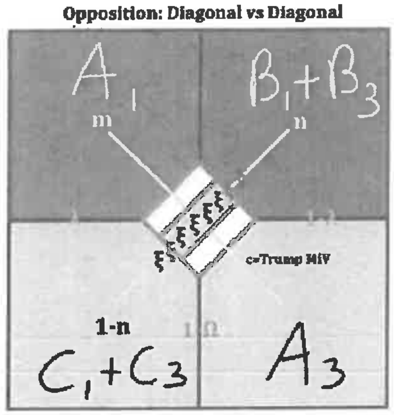
In a fair election:

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

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 Ω_1 and λ_1 without either α_1 nor m_1.

Even more outrageous is that the R^2 of this function is rather low, until a third parameter, Ψ, is added. Taking an R^2 of bivariate plane and quadratic of Ω_1 and λ_1 unto n_1 from below 0.99, all the way to 0.998. To ensure there wasn't a trivial correlation with Ψ, 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 trivarite 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 Sisolaks'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 Ψ 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 Ψ parameter, part of the Neural Network'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 Ω_1, λ_1 and Ψ, both m_1 and α_1 are compelled into existence, since in any election, fair or unfair:

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

Since the proportions, w_1, Ω_1, λ_1 are known, it compels the value of ξ_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 ξ_1, w_1, λ_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 Ω, λ, w values are plotted in x, y, z space respectively, with Ψ 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.

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

$z_{0,0,0}$	$z_{1,0,0}$	$z_{1,0,1}$	$z_{1,1,0}$
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 $t_2 = \left(A_1 + C_3\right) + A_2$; A_2 is the output; A_1, C_3 were already illegally calculated.
Let $u_2 = \left(B_1 + B_3\right)$, this is the input square, B_1, B_3 were already illegally calculated.
Let $v_2 = \left(C_1 + A_3\right) + C_2$; C_2 is the output; C_1, A_3 were already illegally calculated.
Let R be the number of registered voters at the precinct.

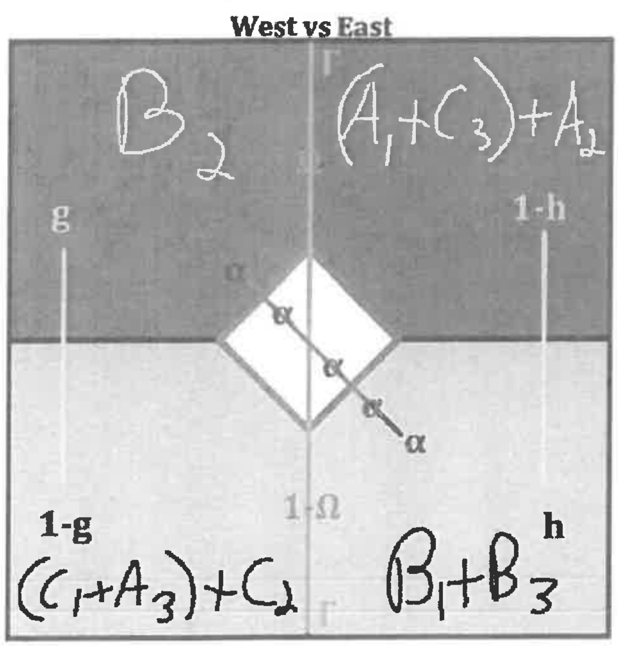
$$g_2 = \frac{s_2}{s_2+v_2}, h_2 = \frac{u_2}{u_2+t_2}, \alpha_2 = \frac{s_2+u_2}{\left(s_2+u_2\right)+\left(t_2+v_2\right)}, \Omega_2 = \frac{s_2+t_2}{\left(s_2+t_2\right)+\left(u_2+v_2\right)}, \lambda_2 = \frac{s_2+v_2}{\left(s_2+v_2\right)+\left(u_2+v_2\right)}$$

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

In a fair election:

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

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 α_1 without either Γ_1 nor Ω_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, α, both Γ and Ω 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: $A_2 = v_2 - (A_1 + C_3)$.

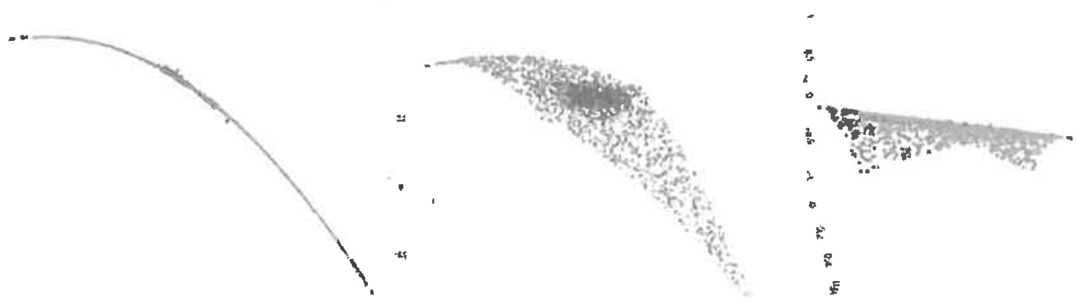
Since the proportions, g_2, h_2, α_2 are known, it forces the value of Γ_2, which is proportion of East Side Ballots to West Side Ballots, that is $\Gamma_2 = \frac{u_2+t_2}{s_2+v_2}$, which means we also know $\Gamma_2^{-1} = \frac{s_2+v_2}{u_2+t_2}$, which is the proportion of West Side to East Side 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 $R^2 = 0.9988816647$

$$g_2 = k_0 + k_1\alpha_2 + k_2h_2 + k_3\alpha_2^2 + k_4h_2\alpha_2 + k_5h_2^2$$

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.



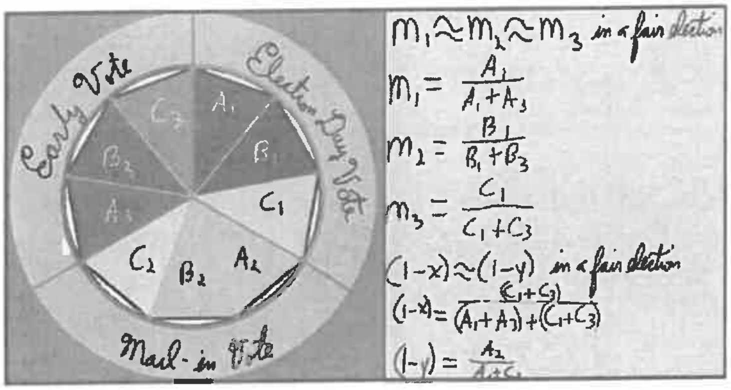
As to why the Neural Network chose to invoke the same Trivariate Turnout Manifold as the Senate race in the first of the equations, yet opted to follow up with quadratic of $g = f(h, \alpha)$ instead of $g = f(\alpha, \Omega)$ shall most likely remain as mysterious as the thought processes which incited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

https://youtu.be/AXhToUcQPE8

Leela Chess Zero's Immortal Queen Sacrifice

https://tcec-chess.com/articles/Sufi_18_-_Sadler.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/1INL0yJh-Cr9FxQj4d_RYCuBiIJM0h7Ov4F5YGrVBbM4/edit?usp=sharing

Since we have the advantage of the restored Sheriff's Race, the restoration of the Governer'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 betweenLombardo'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 $r_{0,i} = y_{1,i} - y_{1,i}$, this restores the residual value.

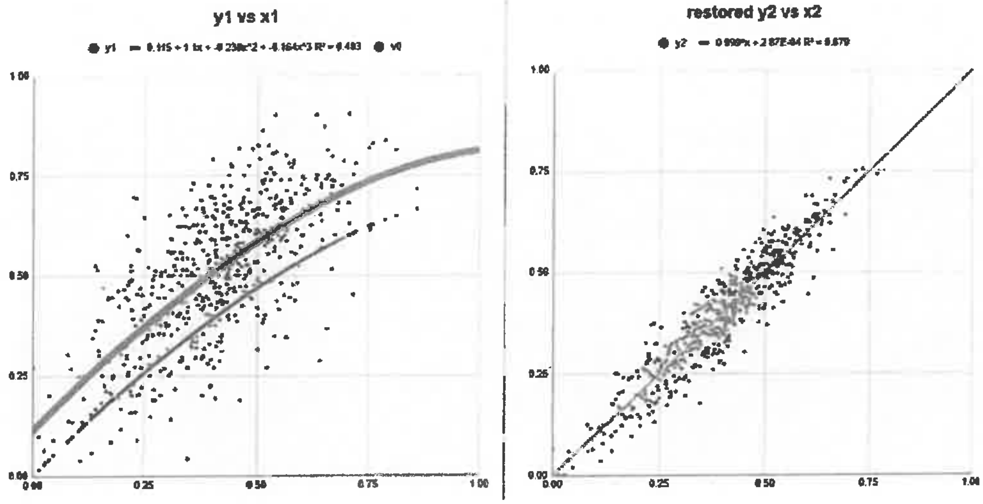
Let σ be the standard deviation of all $r_{0,i}$. If $\theta > 5\%$, then scale all residuals uniformly by $\frac{5\%}{\sigma}$.

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

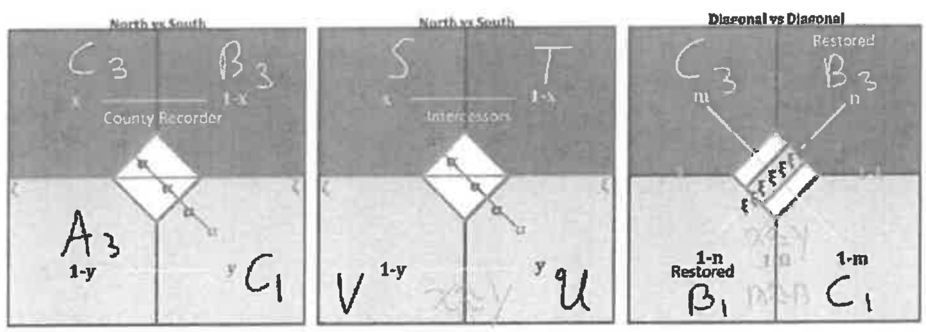
Let $u_i = (y_{2,i})(f_i)$ be Lombardo's Intercessory Election Day Vote in each precinct

Let $t_i = f_i - u_i$ 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 $n_{3,2,i} = \frac{C_2}{C_2 + (C_1 + C_3)}$ is Robert's Mail-in to combined Early+EDV total in the Sheriff's race.

Let $C_{2,2,i} = \left(\frac{n_{3,2,i}}{1 - n_{3,2,i}}\right)\left(C_{1,2,i} + C_{3,2,i}\right)$, 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 $B_{2,2,i} = \left(\frac{n_{3,2,i}}{1 - n_{3,2,i}}\right)\left(B_{1,2,i} + B_{3,2,i}\right)$, 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 $q_{3,i} = \frac{1}{2}\left(q_{1,i} + q_{2,i}\right)$ 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 $A_{1,1,i} = \left(q_{3,i}\right)\left(w_i\right)$ 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 $A_{2,1,i} = \left(\frac{n_{3,2,i}}{1 - n_{3,2,i}}\right)\left(w_i\right)$, which is the product of Robert's n percentage with the sum of Gilberts's Early and Election 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 Λ_i be the total sum of ballots cast in each precinct in the county recorder data for Lombardo, Sisolak and Gilbert.

Let ρ_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 ω_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 $A_{1,2,i} = z_{3,i}\left(A_{1,1,i}\right)$; $A_{2,2,i} = z_{3,i}\left(A_{2,1,i}\right)$; $A_{3,2,i} = z_{3,i}\left(A_{3,1,i}\right)$ 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_6pEWBCABC1fR5EEn8dt92RcqipHofJs0/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	105816	55861	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	105816	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.

55,206 — JOE LOMBARDO ✓ GOP 38.4% ~~66,984~~

103,664 — JOEY GILBERT GOP 27.6% ~~46,156~~

DEAN HELLER GOP 13.5% 23,556

79% EXPECTED VOTE IN

County	Lombardo Percent	Lombardo Votes	Gilbert Percent	Gilbert Votes	Heller Percent	Heller Votes	% in
Carson City	24.8%	1,456	30.4%	1,789	25.4%	1,494	77.7% in
Churchill	18.4%	692	35.5%	1,333	29.9%	1,122	77.1% in
Clark	45.4%	46,708	23.9%	24,583	8.6%	8,825	91.4% in
Douglas	29.1%	1,878	29.3%	1,889	17.5%	1,131	48.2% in
Elko	22.4%	1,068	42.8%	2,040	20.7%	988	89.4% in

EXHIBIT 11

EXHIBIT 11

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 algoithmized 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.

13. Substantially, this approach failed to determine any anomalies in the voting records. Therefore we turned to Solomon's theory, which is to apply nonlinear transformations to the voting records and then perform a standard regression type analysis. The details are in the next paragraphs.

14. we begin with a, b, c, and d, which are the early and mail-in voting records. These are vectors - by precinct, and are contained in the master spreadsheet, already provided.

15. Colombo makes these nonlinear transformations to g,h, and alpha. These new vectors are an essential compression of the data from four dimensions to three.

(*) g=d/(a+d) h=b/(b+c) alpha=(b+d)/(a+b+c+d)

16. What is remarkable is they are observed to lie close to a plane in (g,h,alpha) space. This apparent dependence is a **strong part** of the case. Walter has previously reported these graphs, and are present in his declaration.

17. Let me note my simulations show that using random vote counts this planar form is not achieved. They also do seem to be also randomly distributed.

18. Given g, h, and alpha, and from any of the given votes a,b,c, or d, we can reconstruct all votes. This is important because it is critical not to introduce singularities into the model.

19. At this point a linear regression is applied to these values of g against h and alpha. Thus we obtain an equation of the form g = r +s*h+t*alpha, where r, s, and t are the regression coefficients.

20. This is the bilinear relation of the regressed values of g to h and alpha. Note, I get only R^2 = 0.96, which is extraordinarily high.

21. From the regressed values of g, and the reported values (i.e. votes) of d, we can reconstruct a, the **predicted values by solving the first of the equations in (*) for a.**

22. These new values of "a" compare very well with the original values of a. This is the other **strong part** of the case.

23. All of this seems to prove a **strong possibility** of vote tampering.

G. Donald Allen

EXHIBIT 12

EXHIBIT 12

FIRST JUDICIAL DISTRICT COURT
CARSON CITY, NEVADA

JOEY GILBERT, an individual,

Plaintiff,

vs.

STEVE SISOLAK, in his official capacity as Governor of Nevada; BARBARA CEGAVSKE, in her official capacity as Secretary of State; and JOSEPH GLORIA, in his official capacity as Clark County Registrar of Voters; JAMES B. GIBSON in his official capacity as Chairman of the CLARK COUNTY BOARD OF COMMISSIONERS, and DEANNA SPIKULA, in her official capacity as Washoe County Registrar of Voters; and VAUGHN HARTUNG, in his official capacity as Chair of the WASHOE BOARD OF COUNTY COMMISSIONERS; and JOSEPH LOMBARDO, putative Republican candidate for Governor of Nevada; and DOES 1-10; and ROES 1-10,

Defendants.

Case No. 22 OC 000851B
Dept No. I

VIDEOTAPED REMOTE VIDEOCONFERENCE DEPOSITION OF
G. DONALD ALLEN, Ph.D.
Taken on Wednesday, July 27, 2022
At 9:09 a.m. PT
WITNESS APPEARING REMOTELY FROM
College Station, Texas

REPORTED REMOTELY BY: JO A. SCOTT, RPR, CCR NO. 669

I don't think I ever said anything that I did do. 09:54:27 09:54:29

MR. MIRKOVICH: Okay. We'll talk about the substance of it in a moment. 09:54:31 09:54:32

But eventually you prepared a second declaration. This is Tab 4 of the documents we circulated this morning. 09:54:35 09:54:38 09:54:44

I would like to have that marked as Exhibit 3, and ask everyone to bring it up, please. 09:54:45 09:54:47 09:54:49

(Whereupon, Defendant's Exhibit 3
was marked for identification.)

BY MR. MIRKOVICH:

Q. Now, Dr. Allen, this revised declaration that's been marked as Exhibit 3, when is it you drafted this declaration? 09:54:56 09:54:59 09:55:01

A. A few days ago, I would say. Certainly less than a week ago. 09:55:06 09:55:13

Q. It's also drafted under penalty of perjury, right? 09:55:14 09:55:25

A. Yes, it is. 09:55:27

Q. You, again, made every effort to be honest, accurate, and complete, correct? 09:55:28 09:55:31

A. I did. 09:55:33

Q. Did somebody ask you to prepare this 09:55:34

exactly. But it was not a confirmation of what Solomon did. It was to use a standard analysis on the voting records. 10:11:02 10:11:05 10:11:11

Q. Okay. And that's the analysis that failed, right? 10:11:12 10:11:15

A. That did not work. 10:11:16

Q. You didn't review any data from any county other than Clark County, Nevada, correct? 10:11:18 10:11:30

A. The data I looked at in that spreadsheet, which you have, was Clark County data. 10:11:34 10:11:38

Q. And my question is, that's the only county data that you looked at, correct? 10:11:41 10:11:43

A. Oh, well, it was the only county data broken that way. I have seen the Nevada voting results done by county, not by precinct, but I have not analyzed that. 10:11:45 10:11:50 10:11:53 10:11:59

Q. Now, if we go forward to Page 2 of your initial declaration at Paragraph 5, this is in reference to your mathematical review of the Solomon reports that you mentioned in the preceding paragraph, correct? 10:12:06 10:12:11 10:12:19 10:12:22 10:12:24

A. Yes. 10:12:26

Q. And you write, quote, These reports demonstrate clear and convincing evidence that the election results analyzed in these reports were 10:12:30 10:12:32 10:12:35

not produced by accurate counting of the votes cast, but were instead artificially contrived according to a predetermined plan or algorithm. 10:12:37 10:12:40 10:12:45

Did I read that correctly? 10:12:48

A. Yes, you did. 10:12:49

Q. How is it that you found that Mr. Solomon's reports were clear and convincing evidence, given that the analysis you performed on his work was unsuccessful and failed? 10:12:50 10:12:52 10:12:55 10:12:58

MR. MUELLER: Objection. Form of the question, and it ignores facts in evidence. 10:13:02 10:13:03

Mr. Allen, you have to go ahead and answer. Go ahead and answer that, and we'll sort it out later with the judge, okay? 10:13:24 10:13:27 10:13:29

THE WITNESS: All right. To answer your question as I understand it, you want to know how I found clear and convincing evidence that the election analyzed in the reports are not produced by accurate counting of votes? 10:13:31 10:13:33 10:13:37 10:13:42 10:13:45

Well, I did that on the basis of reading the Solomon paper and the spreadsheet of Walter. It seemed clear, but I had not proved anything. In fact, there are no mathematical proofs in this entire event. 10:13:47 10:13:49 10:13:58 10:14:02 10:14:05

There are formulas suggested, and more or 10:14:12

less formulas confirmed, but there is no theorem basis to rely on. 10:14:17 10:14:22

BY MR. MIRKOVICH:

Q. So despite the fact that your statistical analysis of Mr. Solomon's methodology failed, is it your contention that this is an honest statement to the court that Mr. Solomon's reports are still clear and convincing evidence? 10:14:24 10:14:28 10:14:33 10:14:36 10:14:38

A. No, I didn't say that. What I said is I tried a standard linear analysis irrespective of Solomon's report, which looked only at the data. 10:14:41 10:14:46 10:14:50

It was only later that having not worked, that I then used, again, looking at and trying to understand what Solomon had did, and then was able to -- let's say, able to confirm what he did, but it's not a mathematical confirmation. It's more or less an observational confirmation. 10:14:55 10:14:59 10:15:04 10:15:10 10:15:14 10:15:17

Q. So you are not aware of any mathematical study that you've done or anyone else has done to confirm the opinions and -- the opinions set forth by and methodology used by Mr. Solomon; is that right? 10:15:20 10:15:23 10:15:25 10:15:32 10:15:35

A. Yes. I believe I answered that already. 10:15:36

Q. Okay. Now, when you say that after your linear statistical analysis was done and didn't 10:15:37 10:15:41

A. No, not at all. 12:05:48
Q. Solomon notes that there's a correlation between Lombardo results and Sisolak results. 12:05:50 12:05:57
Did you investigate that at all? 12:05:59
A. No. 12:06:01
MR. MIRKOVICH: I'll pass the witness. 12:06:02
MR. MUELLER: Thank you. 12:06:04

EXAMINATION

BY MR. MUELLER:
Q. Doctor, I would like to go ahead and cover a few basic points, and hopefully I'll be a little briefer. 12:06:07 12:06:09 12:06:13
You are a doctor of mathematics, correct? 12:06:14
A. Correct. 12:06:16
Q. And you've been working as a doctor of mathematics for going on 35 or 40 years? 12:06:16 12:06:21
A. Yes. 12:06:22
Q. And you taught mathematics both at the undergraduate and the graduate level, correct? 12:06:22 12:06:25
A. Oh, yes. 12:06:28
Q. All right. Now, you published peer-reviewed work on mathematics, correct? 12:06:28 12:06:32
A. Yes. 12:06:37
Q. All right. Now I want to go through, in each field of endeavor has a few terms of art, and 12:06:37 12:06:41

I want to make sure I understand your fields of endeavor. 12:06:46 12:06:47

You use mathematics as a different field of study as statistics, correct? 12:06:48 12:06:52

A. Well, you can use statistics as a branch of probability, and probability is a branch of mathematics, but statistics lives in its own world. 12:06:54 12:07:01 12:07:03 12:07:06

Q. Okay. We here in Las Vegas understand statistics, Doctor. 12:07:06 12:07:08

A. I imagine. 12:07:10

Q. Okay. I just want to get a few points out here. 12:07:11 12:07:14

You're a theoretician, correct? 12:07:15

A. Most of my career, I did pure mathematics. 12:07:18 12:07:21

Q. Thank you. Now, frequently you are presented with or asked to assist in developing a mathematical approach to solving problems, correct? 12:07:22 12:07:24 12:07:27 12:07:30

A. Yes. 12:07:32

Q. And in higher level mathematics, I'm not talking about grocery store shopping or the bank account, but I mean in higher level mathematics, frequently there are two or three different 12:07:32 12:07:35 12:07:38 12:07:40

branches of mathematics that can be used to solve a problem, different -- 12:07:42 12:07:44

A. Yes. 12:07:46

Q. Correct? 12:07:46

A. Yes, depending on how you approach a problem. 12:07:51 12:07:53

Q. Yes, sir. And you have been, on occasion, in fact, part of what you do is to try to figure out how to use mathematics to solve real world engineering and technical problems, correct? 12:07:53 12:07:55 12:07:57 12:08:01

A. I have. 12:08:03

Q. All right. Now I want to go through and I want to understand a few things, because you used the word "predicting." Predicting is very important here; is it not? 12:08:03 12:08:08 12:08:10 12:08:13

A. It seems to be the crux of the matter. 12:08:14

MR. MIRKOVICH: Objection to the form of the question. Leading. 12:08:18 12:08:19

MR. MUELLER: All right. And my colleague is right. I'm going to slow down here. But I want to get us through a couple key points so we can conclude the deposition, Doctor. 12:08:20 12:08:22 12:08:24 12:08:27

BY MR. MUELLER:

Q. The predicted value of the vote tally, if I tell you what the mail-in and walk-in ballot for 12:08:30 12:08:36

a Clark County precinct is, you can use this formula to tell me what the mail-in tallies will be without looking, correct? 12:08:40 12:08:43 12:08:47

MR. MIRKOVICH: Objection. Form. Vague. 12:08:50

THE WITNESS: Well, to do it, I'll need the regression having been achieved, yes. 12:08:51 12:08:53

BY MR. MUELLER:

Q. Okay. Regression has, in fact, been achieved; you've completed that, correct? 12:08:57 12:08:59

A. Yes. 12:09:01

Q. All right. So there was how many precincts in Clark County; do you recall? 12:09:02 12:09:08

A. There was at least 600. 12:09:10

Q. And in every -- or almost every one of those precincts, if you were to be told that mail-in and early voting tallies, you could predict with a very high degree of certainty what the reported mail-in tallies would be without even looking, correct? 12:09:11 12:09:13 12:09:18 12:09:22 12:09:23 12:09:27

MR. MIRKOVICH: Objection. Form of the question. Leading. Incomplete and improper hypothetical. 12:09:28 12:09:29 12:09:32

BY MR. MUELLER:

Q. Correct, Doctor? 12:09:34

A. Seems to be correct. 12:09:35

Q. And that is seems to be, or that's actually is, in fact, the state of the affair right now? 12:09:37 12:09:40 12:09:41
MR. MIRKOVICH: Objection. 12:09:42
THE WITNESS: Seems to be what's happened. There's errors, of course. I mean, they are not exact. They're not exactly reconstructed, but they seem to be direct votes overall. 12:09:43 12:09:44 12:09:46 12:09:51 12:09:56
BY MR. MUELLER:
Q. Right. Let me go through some basic concepts here, Doctor. 12:09:56 12:09:58
You were asked to do an independent work here, correct? 12:09:59 12:10:01
A. I was asked to look at the problem. 12:10:02
Q. Independently, correct? 12:10:05
A. Yes. 12:10:08
Q. All right. 12:10:08
A. I did. 12:10:09
Q. And you started with looking at Solomon's work, but then independently did your own linear regression, correct? 12:10:10 12:10:12 12:10:18
A. Correct. 12:10:19
Q. All right. Now, I want to talk a little bit about linear regression. It's been a few 12:10:19 12:10:21

years since my college days. I want to make sure I understand a few things. 12:10:24 12:10:27
Linear regression is when you take data and we try to make patterns out of it, correct? 12:10:28 12:10:31
MR. MIRKOVICH: Objection to form. Leading. 12:10:33 12:10:34
BY MR. MUELLER:
Q. Correct, Doctor? 12:10:37
A. Correct. 12:10:38
Q. And by using -- or regression, patterns that didn't normally appear can appear, and an underlying principle can be discovered, correct? 12:10:38 12:10:44 12:10:48
MR. MIRKOVICH: Objection to form. Leading. 12:10:51 12:10:51
THE WITNESS: What is correct is that you make a model of the data, and you apply methods to it, and then to check to see how well the methods can approximate or predict something else. 12:10:52 12:10:55 12:11:00 12:11:06
BY MR. MUELLER:
Q. All right. Now, you did that here as requested, and independently you reviewed the data, correct? 12:11:11 12:11:13 12:11:16
A. I have. 12:11:17
Q. And without referencing anybody else or any other input, you reached several conclusions 12:11:19 12:11:22

after looking at this data, correct? 12:11:25
MR. MIRKOVICH: Object to form. Leading. 12:11:27
THE WITNESS: I have looked at the data, and I noticed all of the matters that I've discussed here today. 12:11:32 12:11:33 12:11:40
BY MR. MUELLER:
Q. Okay. And just to -- to clear this up very succinctly, what did you notice specifically? 12:11:40 12:11:43
A. I noticed that given -- let's see -- the data in Column D, and I'm not -- I'm not even saying what it represents. I think it represents early voting, or mail-in voting, or something. I can estimate what should be in column A. 12:11:45 12:11:55 12:11:59 12:12:03 12:12:07
Q. Okay. 12:12:11
A. May have been mail-in voting. I don't know. 12:12:11
I get them all confused. To me, I'm just looking at numbers. I'm not trying to make any speculation on what the numbers represent or what the numbers mean. I'm just doing a pure analysis on four columns of numbers. 12:12:14 12:12:15 12:12:19 12:12:23 12:12:28
Q. All right. And you found a correlation between the known variables and the unknown variables that was accurate and predicted? 12:12:31 12:12:34 12:12:37
MR. MIRKOVICH: Objection to the form of 12:12:40

the question. Leading. Lack foundation. 12:12:41
BY MR. MUELLER:
Q. Correct, sir? 12:12:42
A. That's correct. 12:12:44
Q. And that should not be there in a normal vote? 12:12:45 12:12:48
MR. MIRKOVICH: Objection. Form. Leading. 12:12:49 12:12:49
THE WITNESS: It -- it is not there. I can't say it should not be there. It just is there. 12:12:53 12:12:55 12:12:58
BY MR. MUELLER:
Q. All right. Now, you also used a term linear -- I guess in Page -- Paragraph 20 of your report, and I'll read this to you, This is the bilinear relation of the regressed values of G to H and alpha. I note I get only R squared, which equals .96, which is extraordinarily high. 12:12:58 12:13:04 12:13:08 12:13:11 12:13:14 12:13:19
Now, for the nontechnically trained, what does that mean, sir? 12:13:23 12:13:25
A. Well, the method of approximation is that you take this multi-variant linear equation, that means it's a function of two variables, and then you say, I'm going to approximate a single function of two variables to each row of all this 12:13:26 12:13:31 12:13:36 12:13:40 12:13:45

data, and then you go through what's called the process of least squares.

And what it estimates at the end of the day is this so-called correlation coefficient, which is a measure of how close the -- how close the input data matches the output data.

In this case, it was how close the input data, which was G and alpha, match the output data, which was F.

Q. Right.

A. And R squared can range from 0 to 1. It's all designed so what the maximum can be. And to obtain an R squared of even .8 is considered very low. But this was .96.

Q. Which is --

A. I thought it was unbelievable, but that's -- that's what I came out.

I mean, I think Mr. Solomon got a higher number, but --

Q. But your independent work was that you got almost a .96, nearly a one-to-one correlation for the predicting what the value is going to be?

A. Very close.

Q. Very close.

A. Very close.

Q. And that leads you to the conclusion that -- 23, that this seems to prove a strong possibility of vote tampering. 12:14:59 12:15:01 12:15:04

Do you see that, sir? 12:15:06

MR. MIRKOVICH: Objection. Objection. Form. 12:15:07 12:15:08

THE WITNESS: Well, I don't -- I don't know how you measure vote tampering. I don't -- I don't want to call it vote tampering. I'll just call it an anomaly. 12:15:09 12:15:10 12:15:13 12:15:16

BY MR. MUELLER:

Q. All right. Something is not right here, correct? 12:15:18 12:15:19

MR. MIRKOVICH: Objection to form. Leading. 12:15:19 12:15:20

THE WITNESS: Well, it -- it seems different than purely random data produces. 12:15:21 12:15:25

Purely random data does not give R values that high. 12:15:30 12:15:33

BY MR. MUELLER:

Q. Correct. Now, my colleague just spent quite a bit of time questioning you about Mr. Solomon's work, correct? 12:15:34 12:15:35 12:15:38

A. Oh, yeah. 12:15:40

Q. All right. The answer is, is you looked 12:15:40

at it, you considered it, but everything you did here and testified to here is your independent work, correct? 12:15:43 12:15:45 12:15:48

MR. MIRKOVICH: Objection to form. Leading. 12:15:49 12:15:50

THE WITNESS: What I did was use three of Solomon's formulas and nothing else from Solomon. 12:15:51 12:15:54

BY MR. MUELLER:

Q. Right. And you found those to be mathematically sound? 12:16:00 12:16:01

MR. MIRKOVICH: Objection. Form. 12:16:04

THE WITNESS: Well, it seems to work. All I can say is to my great surprise, it proves very nice results, or at least confirming results. 12:16:06 12:16:07 12:16:12

MR. MUELLER: Maybe just a moment to consider for a minute, and I think I'm just about a moment. But give me a moment to consider it. I'll take about a ten-second recess here. 12:16:44 12:16:45 12:16:47 12:16:50

MR. MIRKOVICH: Okay. 12:16:53

THE VIDEOGRAPHER: The time is approximately 12:16 p.m., and we are going off the record. 12:16:53 12:16:54 12:16:57

(Whereupon, a recess was taken from 12:16 p.m. to 12:17 p.m.) 12:17:42

THE VIDEOGRAPHER: The time is 12:17:42