VITA

last updated on 31 January 2018

entries for the past year in red, see pages 4, 7, 16, 17

David W. Henderson

Current Position: Professor Emeritus of Mathematics, Cornell University, Ithaca, NY 14853-4201, USA (retired officially on 30 June 2012)

Scholarly Interests: My scholarly interests can be grouped in three overlapping areas.

Educational Mathematics: I would classify my current work as pertaining to aspects of mathematics that impinge on the teaching and learning of mathematics -- the emphasis is on the mathematics not on education. My main thesis is that we should enliven our conception of what "proof" is and that proofs should be a central part of mathematics teaching at all levels, where my definition of "proof" is: *A convincing communication that answers -- Why*. This work includes changing (and developing new) curricula at the university level, including new approaches to teaching and learning of mathematics. I consider this research to be mostly mathematics since it involves the re-thinking and re-conceptualization of mathematics in new ways. My work in this area has resulted in more than 25 articles (or chapters) and 3 editions of *Experiencing Geometry*. The books are now in use around the world and have been translated into Portuguese and Japanese. The latest revised and expanded 3rd edition, *Experiencing Geometry: Euclidean and Non-Euclidean With History* was published in August 2004 with a 2005 copyright.

In 2005, I accepted an invitation to join the core curriculum development team of the Algebra Project, which is led by Robert Moses. I am working with teachers, educators, and other mathematicians to produce materials for a high school geometry curriculum. The goal of the Algebra Project is work with underserved students to "raise the floor" so that all students learn the mathematics they need to enter college and not be required to take remedial courses.

In 2011, I accepted an invitation to join Professor Richard Lehrer, Vanderbilt Peabody College of Education and Human Development, in an ongoing project to develop and research coherent curricula for K-5 mathematics and science. I am currently writing geometry curriculum for this project.

Mathematics Education: Starting in 1970, I became a member of the Graduate Field of Education at Cornell and starting supervising Master's and Doctoral Thesis in Mathematics Education in 1974. Since then, I have had a significant supervisory role in 40 graduate theses in the Field of Education and the chair of 4 Ph.D. theses and 14 M.S. theses in mathematics education, almost all of these theses (as a condition for my supervision) had a strong mathematics component. I had one M.S. student finish in 2011 and two Ph.D. students expecting to finish in 2012.

In the 1970's, I directed the teacher education program for secondary school mathematics teachers. In 1986, I co-founded a new teacher education program (in conjunction with the

Department of Education) for secondary mathematics and science teachers. Also in 1986, I founded and directed a program in the Department of Mathematics for inservice workshops and courses for current mathematics teachers. From 1996 to 2001, I organized and lead week-long *Undergraduate Faculty Enhancement* workshops for college/university faculty teaching geometry to future teachers.

Geometry and Topology: I was, at the beginning of my career, a researcher in geometric aspects of topology, with an international reputation in geometric infinite-dimensional topology and simplicial topology -- I have 37 published research papers in geometric topology from 1963 to 1995 and I have been the chair for 8 Ph.D. theses related to geometric topology from 1970 to 1988. And more recently, I supervised a mathematics PhD thesis on diagrammatic reasoning which was completed in Spring 2001. My work in geometric topology resulted in invitations to work for extended periods at the Institute for Advanced Study in Princeton and the Steklov Institute in Moscow. Since 1995, I have published 6 articles related to geometry and a book on differential geometry *Differential Geometry: A Geometric Introduction* (1998) with a Second Revised Edition in 2005 and a Self Study Edition in 2006, revised 2013, and a Project Euclid e-book.

Birth: February 23, 1939, in Walla Walla, Washington, USA.

Formal Education:

1. Ames Senior High School, Ames, Iowa, 1954-1957.
2. Swarthmore College, 1957-1961; BA (Math, Physics, Philosophy) with High Honors
3. University of Wisconsin, 1961-1964: MS & Ph.D. (Geometric Topology)

Major Mathematical Positions:

1. Mathematician, Sun Shipbuilding and Dry Dock Co., 1961
2. Member, Institute for Advanced Study, Princeton, NJ, 1964-1966
3. (Assistant/Associate/Full) Professor of Mathematics, Cornell University, 1966-2012
4. Exchange Scientist, Steklov Institute, Soviet Academy of Sciences, and Mathematics/Mechanics Faculty, Moscow State University, Moscow, Jan-May, 1970
5. Exchange Scientist, Institute of Mathematics, Polish Academy of Sciences, Warsaw, Poland, June, 1970
6. Member, Graduate Field of Education, Cornell University, 1970-date
7. Visiting Associate Professor, Western Washington State University, Bellingham, Washington, Sept - Dec, 1973
8. Visiting Professor, Birzeit University, West Bank, Palestine, Jan - Aug, 1980.
9. Editorial Board of *General Topology and its Applications*
10. Member, Mathematical Sciences Education Board - *Panel on Equity and Diversity*, 1992-1995.
11. Visiting Professor and Fullbright Scholar, University of Latvia, Riga, Latvia, Aug 2000-Jan 2001.
12. Professor Emeritus of Mathematics, Cornell University, July 2012 - date

Honors and Fellowships:

1. Member, Phi Beta Kappa and Sigma Xi

2. Phi Beta Kappa Fellow, 1961-1962
3. National Science Foundation Graduate Fellow, 1962-1964
4. Alfred P. Sloan Fellow, 1968-1972
5. Fullbright Scholar, 2000-2001

Grants:

1. 1966-1989: National Science Foundation Mathematics Research Grants in Geometric Topology for summer salary, travel, publication support. co-PI.
2. 1968-1972: Sloan Fellowship for research support. PI
3. 1972-1974: Clark Foundation Grant for Teaching Innovation for new exam-tutorial program for teaching calculus. PI
4. 1979-1980: Sloan Foundation for support of the Mathematics Support Center. PI
5. 1980-1981: Exxon Foundation for support of Mathematics Support Center and Graduate Teaching Assistant Training. PI
6. 1986-1999: (with A. Solomon) Title IIA Grants, administered by New York State for the Inservice Program for School Teachers. PI
7. 1992-1995: (with 4 others) National Science Foundation - Course Curriculum Development grant for the Cornell Geometry Project. co-PI/PI
8. 1996-2001: National Science Foundation Undergraduate Faculty Enhancement grants for "Teaching Undergraduate Geometry" workshops for professors. PI
9. 2000-2001: Fulbright Scholar Grant to support visit to University of Latvia. PI
10. 2001: part of National Science Foundation grant to MAA for "Professional Enhancement Programs" to support "Teaching Undergraduate Geometry" workshop, June 2001.
11. 2003: National Science Foundation Proof of Concept Grant for "Good Questions for Calculus". Senior Personnel
12. 2002-2004: National Science Foundation NSDL Grant to support the on-line interactive display of historical kinematic mechanisms and to prepare associated mathematical, historical, and educational materials for use in schools and universities. co-PI
13. 2005-2006: Institute For Figuring - Cookie Jar Fund, grant to support the development of an Algebra Project high school geometry curriculum by providing travel support and stipends for teachers. PI
14. 2006 – 2009. Senior Personnel (and co-writer of the proposal), "Foundation for Mathematical Literacy: High School Materials Based on Mathematically-rich Experiences, Professional Development and Community Involvement for Underserved Populations," NSF Instructional Materials Development.
15. 2006-2008. Senior Personnel (and co-writer of the proposal), “Tracking Katrina: Algebra Project Instructional Materials Development Using Stories by Displaced New Orleans Students.” NSF SEGR.
16. 2008-2013. co-PI, *R&D: The Development of Student Cohorts for the Enhancement of Mathematical Literacy in Under Served Populations*, NSF Discovery Research K-12. co-PI. (Algebra Project, Inc)
17. 2012-2013. co-PI. *Spatial Mathematics, Engineering, and Science: Toward an Integrated STEM Education.* NSF EAGER. (Vanderbilt University)
18. 2013 Podell Emeriti Award for Research and Scholarship
19. 2013-2016. Co-PI. *Understanding Space Through Engineering Design*, NSF DRK. (Vanderbilt University)
20. 2014 Podell Emeriti Award for Research and Scholarship

21. 2015 Podell Emeriti Award for Research and Scholarship
22. 2016 Podell Emeriti Award for Research and Scholarship
23. 2016-2020. Senior Personnel (and co-writer of the proposal), *Function Learning Progressions*. NSF Discovery Research K-12. (ETS and Algebra Project, Inc)
24. 2017 Podell Emeriti Award for Research and Scholarship
25. 2018 Podell Emeriti Award for Research and Scholarship

Professional Memberships:

1. American Mathematical Society
2. Mathematical Association of America
3. National Council of Teachers of Mathematics
4. Canadian Mathematics Education Study Group
5. Mathematicians and Educational Reform
6. MAA Special Interest Group for Research in Undergraduate Mathematics Education
7. MAA Special Interest Group: Philosophy of Mathematics

Publications in Scientific Journals and Books:

1. Venn diagrams for more than four classes, *Amer. Math. Monthly*, **70**, 1963, 425-426.
2. A short proof of Wedderburn's theorem, *Amer. Math. Monthly*, **72**, 1965, 385-386.
3. Extensions of Dehn's Lemma and the loop theorem, *Trans. Amer. Math. Soc*., **120**, 1965, 448-469.
4. Self-unlinked simple closed curves, *Trans. Amer. Math. Soc*., **120**, 1965, 470-480.
5. Relative general position, *Pac. J. Math*., **18**, 1966, 513-523.
6. Finite dimensional subsets of infinite dimensional spaces. *Annals of Mathematical Studies*, Number **60**.
7. An infinite-dimensional compactum with no positive-dimensional compact subsets - A simpler construction, *Amer. J. Math*., **89**, 105-121.
8. Each strongly infinite dimensional compactum contains a hereditarily infinite-dimensional compact subset, *Amer. J. Math*., **89**, 1967, 122-123.
9. (with G. R. Livesay) Another generalization of Brouwer's fixed point theorem, *Proc. Amer. Math. Soc*., **19**, 1968, 176-177.
10. A lower bound for transfinite dimension, *Fundamenta Mathematica*, **63**, 1968, 167-173.
11. Some questions in the dimension theory of infinite-dimensional spaces, *Symposium on infinite dimensional topology*, 1967, Baton Rouge, LA, Annals of Mathematics Studies, **69**, 1972.
12. D-dimension I. A new transfinite dimension, *Pac. J. Math*., **26**, 1968, 91-108.
13. D-dimension II. Separable spaces and compactifications, *Pac. J. Math*., **26**, 1968, 109-114.
14. (with R. D. Anderson and James E. West) Negligible subsets of infinite-dimensional manifolds, *Compositio Math*., **21**, 1969, 143-150.
15. Infinite-dimensional manifolds, *Proceedings of the International Symposium on Topology and its Applications* (1968, Nerceg Novi, Yugoslavia) Beograd, 1969, 183-185.

16. Negligible subsets of infinite dimensional manifolds, *Proceedings of the International Symposium on Topology and its Applications* (1968, Herceg Novi, Yugoslavia) Beograd, 1969, 186.
17. Open subsets of Hilbert space, *Compositio Math*., **21**, 1969, 312-318.
18. Infinite-dimensional manifolds are open subsets of Hilbert space, *Bull. AMS*, **75**, 1969, 759-762.
19. Infinite-dimensional manifolds are open subsets of Hilbert space, *Topology*, **9**, 1970, 25-34.
20. (with R. Schori) Topological classification of infinite-dimensional manifolds by homotopy type, *Bulletin AMS*, **76**, 1970, 121-124.
21. Micro-bundles with infinite-dimensional fibers are trivial, *Inventiones Math*., **11**, 1970, 293-303.
22. (with J. E. West) Triangulated infinite-dimensional manifolds, *Bulletin AMS*, **76**, 1970, 655-660.
23. (with D. Burghelea) Smoothings and homeomorphisms for Hilbert manifolds, *Bulletin AMS*, **76**, 1970, 1261-1265.
24. Infinite-dimensional manifolds, *Summer School on Topology*, Institut za matematiku sveucilista u Zagrebu, Zagreb, 1970.
25. Stable classification of infinite-dimensional manifolds by homotopy type, *Inventiones Math*., **12**, 1971, 48-56.
26. Applications of infinite-dimensional manifolds to quotient spaces of complete ANR's, *Bull. Acad. Polon. Sci., Ser. Sci. Math., Astr. et Phys*., **XIX**, 1971, 747-753.
27. Corrections and extensions of two papers about infinite-dimensional manifolds, *General Topology and its Applications*, **1**, 1971, 321-327.
28. (with R. Geoghegan) Stable function spaces, *Amer. J. Math*., **95** (1973), 461-470.
29. A simplicial complex whose product with any ANR is a simplicial complex, *General Topology and its Applications*, **3**, 1973, 81-83.
30. (with A. Pelczynski) Topological classifications of sigma-compact normed linear spaces, Chapter VIII, Sec. 5, of C. Bessaga and A. Pelczynski, *Selected Topics in Infinite-Dimensional Topology*, PWN, Warszawa, 1975.
31. Z-sets in ANR's, *Trans. AMS*, **213**, 1975, 205-216.
32. (with R. Connelly) A convex 3-complex not simplicially isomorphic to a strictly convex complex, *Math. Proc. of the Camb. Phil. Soc*., **88**, 1980, 299-306.
33. Mathematics as imagination: Implications for teaching, learning and human growth, *International Congress of Mathematics Education*, Berkeley, CA, August 1980.
34. Simplicial complexes homeomorphic to proper self-subsets, *Topology Eighty*, Fall 1981.
35. (with R. Connelly, C. Ho and M. Starbird) On problems related to linear homeomorphisms, embeddings and isotopics, *Topology Eighty*, Fall 1981.
36. Three papers: Mathematics and Liberation, Sue is a mathematician, and Mathematics as imagination, *For the Learning of Mathematics*, vol. **1**, No. 3, 1981.
37. (with E. Bloch and R. Connelly) Contractibility of the space of simplexwise linear homeomorphisms of the 2-disk,
38. Simplexwise Linear Untangling, *Trans. AMS*, **298**, 1986, 215-226.

39. (with M. Awartani) Spaces of geodesic triangulations of the sphere, *Trans. AMS*, **300**, 1988.
40. Proof as a convincing argument that answers - Why?, *Proceedings of the International Congress of Mathematics Education*, Quebec, August 1992.
41. A geometric introduction to differential geometry, *Proceedings of the First Conference of the Palestinian Society of Mathematical Sciences*, June 1993.
42. Geometric Solutions of Cubic and Quadratic Equations, *Pythagoras*, 1994.
43. (with M. Awartani) Compactifications of the ray with the arc as remainder admit no *n*-mean, *Trans. AMS*, **307**, 1995.
44. (with D. Pimm) Geometric Proofs and Knowledge Without Axioms, *Proceedings, 1995 Annual Meeting of the Canadian Mathematics Education Study Group*, Halifax, NS: Mount Saint Vincent University Press, 1995.
45. Geometric Proof and Knowledge Without Axioms At All Levels, *Perspectives on the Teaching of Geometry for the 21st Century*, Catania, Italy: University of Catania, 98-100, 1995.
46. *Experiencing Geometry on Plane and Sphere*, Upper Saddle River, NJ: Prentice-Hall, 1996.
47. (with Jane-Jane Lo and Kelly Gaddis) Building Upon Student Experiences in a College Geometry Course, *For the Learning of Mathematics*, **16**, no. 2, 1996.
48. Alive Mathematical Reasoning, *Proceedings, 1996 Annual Meeting of the Canadian Mathematics Education Study Group*, Halifax, NS: Mount Saint Vincent University Press, 27-33, 1996.
49. I learn mathematics from my students -- multiculturalism in action, *For the Learning of Mathematics*, **16**, 34-40, 1996.
50. *Differential Geometry: A Geometric Introduction*, Upper Saddle River, NJ: Prentice-Hall, 1998.
51. (with D. Taimina) Experiencing Geometry, NORMA-98, *Nordic Mathematics Education Conference Proceedings*, Kristiansand, Norway, 1998.
52. Giving Professors Permission to Change Their Teaching, *Teaching Mathematics on the Undergraduate Level*, International Commission on Mathematics Instruction Study Conference, Singapore, 1998.
53. Square roots in the Sulba Sutra, *Geometry at Work: Papers in Applied Geometry* (editor, C. A. Gorini), MAA Notes Number 53, pp. 39-45, 2000.
54. (with Daina Taimina) *Experiencing Geometry in Euclidean, Spherical, and Hyperbolic Spaces*, Upper Saddle River, NJ: Prentice-Hall, 2001.
55. (with Daina Taimina) Crocheting the Hyperbolic Plane, *Mathematical Intelligencer*, Vol. 23, No. 2, pp. 17-28, Spring 2001.
56. "Review of *Where Does Mathematics Come From?* by Lakoff and Nunez," *Mathematical Intelligencer*, Vol. 24, No. 1, Winter 2002, pp.75-78.
57. "Review of *Geometry: Euclid and Beyond* by Robin Hartshorne," *Bulletin of the A.M.S.*, **39** (October 2002), pg 563-571.
58. (with Daina Taimina) "How to Use History to Clarify Common Confusions in Geometry", Chapter 1 of forthcoming MAA volume *Using Recent History in the Teaching of Mathematics*. Accepted in December 2002, publication expected in 2005.

59. (with Daina Taimina) *Experiencing Geometry: Euclidean and Non-Euclidean With History*, 3rd Edition. Prentice-Hall, Published August 2004, copyright 2005.
60. (partially with Daina Taimina) numerous mathematical descriptions and learning modules for *KMODDL: Kinematic Models for Design Digital Library*. Part of the National Science Digital Library. Permanent archived website: http://kmoddl.library.cornell.edu/resources.php?t=10 which was launched September, 2004.
61. Extended Hyperbolic Surfaces in R^3, Ludmilla Keldysh Memorial Volume, *Proceedings of the Steklov Institute of Mathematics*, Vol. 247, 2004, p.1-13.
62. (with Bing Pan, Geri Gay, and others) Usability, Learning, and Subjective Experience: User Evaluation of K-MODDL in an Undergraduate Class, *Proceedings of the 4th ACM/IEEE-CS Joint Conference on Digital Libraries*, Tuscon, AZ, pp. 188-189, 2004.
63. Crocheting the Hyperbolic Plane: An Interview With David Henderson and Daina Taimina (interviewer: Margaret Wertheim) *Cabinet: A Quarterly of Art and Culture*, Issue 16, Winter 2005, pp. 19-25.
64. (with Daina Taimina) How to Use History to Clarify Common Confusions in Geometry, Chapter 6 in *From Calculus to Computers: Using Recent History in the Teaching of Mathematics*, editors A. Shell and D. Jardine, MAA Notes volume No.68, 2005, p.57-73.
65. Differential Geometry, invited signed article for the 2005 edition of the *Encyclopaedia Britannica*.
66. (with Daina Taimina) Non-Euclidean Geometry, invited signed article for the 2005 *Encyclopaedia Britannica*.
67. *Differential Geometry: A Geometric Introduction*. Revised second edition. Cornell Custom Publishing, 2005.
68. *Differential Geometry: A Geometric Introduction*. Self Study Edition. Cornell Custom Publishing, 2006.
69. (with Daina Taimina) "Experiencing Meanings in Geometry", Chapter 3 in *Aesthetics and Mathematics*, (edited by David Pimm and M. Sinclair), Springer-Verlag. 2006, p.58-83.
70. Alive Mathematical Reasoning, a chapter in *Educational Transformations: Changing our lives through mathematics; A tribute to Stephen Ira Brown*. Editors: Francis A. Rosamond and Larry Copes. Bloomington, Indiana: AuthorHouse, 2006, pages 247-270.
71. Is all course-based mathematics special?, A Response to Ann Watson's "School mathematics as a special kind of mathematics", *For the Learning of Mathematics*, vol. 28, num. 3, 2009, p. 9-10.
72. 11 units for the *Algebra Project Geometry Curriculum*, NSF-supported and published online http://www.algebra.org/curriculum , 2011-2015. Revisions added in 2015.
73. *Differential Geometry: A Geometric Introduction*. Self Study Edition. Project Euclid, 2014. http://projecteuclid.org/euclid.bia/1399917370.
74. Numerous K-5 geometry curricular units, NSF-supported *Disme.org* , 2016.
75. (with Edward Dubinsky and Mona Nosrati), "Equivalence of Symmetries and Permutations in R^n", *Mathematics Intelligencer*, February 2017.

Major invited lectures in USA before 1994

1. Pennsylvania State University
2. Western Washington State University
3. University of Rochester
4. Syracuse University
5. State University of New York, Binghamton
6. City University of New York
7. Louisiana State University
8. University of California at Santa Barbara
9. Swarthmore College, Pennsylvania
10. University of Texas, Austin
11. University of Puerto Rico
12. University of Georgia
13. Michigan State University

Major invited lectures outside USA before 1994

1. Moscow State University, Moscow, USSR
2. Steklov Institute, Moscow, USSR
3. Mathematical Institute, Leningrad, USSR
4. University of Tbilisi, Georgia, USSR
5. Institute of Mathematics of the Polish Academy of Sciences, Warsaw, Poland
6. University of Wroclaw, Poland
7. University of Zagreb, Yugoslavia
8. University of Warwick, United Kingdom
9. Mathematical Institute, Amsterdam, Netherlands
10. University of Ottawa, Canada
11. University of Toronto, Canada
12. Birzeit University, West Bank, Palestine
13. Bethlehem University, West Bank, Palestine
14. Hebrew University, Jerusalem, Israel
15. University of Natal, Durban, South Africa
16. University of the Western Cape, Capetown, South Africa
17. University of Capetown, South Africa
18. Shankara University, Konchi, Tamil-Nadu, India

Invitations since 1995: Largely due to the ideas on mathematics and its teaching and learning that are contained in my four books (which started appearing in photocopy form in 1994/1995) and my work with the Algebra Project since 2004, I have received the following invitations for lectures and workshops:

1. May, 1995. (with David Pimm) Leader of the (9 hours!) working group, *Axioms and proofs in geometry*, at the annual conference of the *Canadian Mathematics Education Study Group*, Waterloo, ON.
2. June, 1995. (with A. Solomon) Organized and taught week-long workshop for teachers.

3. Aug, 1995. Month long visit to South Africa (supported in part by the provost's office) to lead geometry workshops and consult with local mathematicians and educators in Johannesburg, Kwa Kwa, Durban, Capetown.
4. Sept/Oct, 1995. Plenary address, *Alive Geometry*, at the *ICMI Study Conference on the Teaching of Geometry for the 21st Century* -- by-invitation-only worldwide conference for 70 participants, Sicily, Italy.
5. 1995/96 academic year. (with A. Solomon) Four one-day workshops for school teachers, Cornell.
6. May/June, 1996. Plenary address (3 hours!), *Alive Mathematical Reasoning*, at the annual conference of the *Canadian Mathematics Education Study Group*, Halifax, NS.
7. June, 1996. (with K. Gaddis, J.-J. Lo, A. Solomon) Organized and taught in week-long National Science Foundation - Undergraduate Faculty Enhancement workshop, *Teaching Undergraduate Geometry*, Cornell.
8. June, 1996. (with A. Solomon) Week-long workshop on geometry for school teachers, Cornell.
9. July, 1996. Lecture, *Mathematics without Formalism*, at the international conference *Teaching Mathematics in the 21st Century*, Riga, Latvia.
10. Oct, 1996. Invited lectures on formalism and geometry in Montreal, Canada, and Gettysburg, PA.
11. Nov, 1996. Geometry Workshop at the Mathematical Association of America section meeting in Boston.
12. 1996-97 academic year: (with A. Solomon and D. Taimina) Four one-day workshops for school teachers, Cornell.
13. Jan, 1997. Panel on teaching geometry at the Joint Mathematical Meetings in San Diego (could not attend because of a conflict).
14. May, 1997. Geometry workshop at Brock University, St. Catherines, ON, Canada.
15. June, 1997. (with K. Gaddis, J.-J. Lo, A. Solomon, D. Taimina) Organized and taught in week-long National Science Foundation - Undergraduate Faculty Enhancement workshop, *Teaching Undergraduate Geometry*, Cornell.
16. June, 1997. (with A. Solomon and D. Taimina) Week-long workshop for school teachers, Cornell.
17. July, 1997. Geometry workshop at Spellman College Summer Institute, Atlanta.
18. Aug, 1997. 2 geometry workshops for Project NExT Fellows, Atlanta.
19. Aug, 1997. Contributed paper (with C. Mulcahy and D. Taimina), *Living Geometry for Liberal Arts Students*, MathFest 97, Atlanta.
20. 1997-98 academic year: (with A. Solomon and D. Taimina) Four one-day workshops for school teachers, Cornell.
21. Jan, 1998. Seminar, *New Ideas on Teaching Mathematics*, for the Faculty of Physics and Mathematics at the U of Latvia.
22. Feb, 1998. (with C. Mulcahy) organizer of the American Association for the Advancement of Science (AAAS) full-day symposium *Exploring New Frontiers in Geometry: in the World Around Us and in Our Classrooms*, one of only a few full-day symposia accepted by AAAS, Philadelphia.
23. Feb, 1998. Presentation, *Opening Students' Mind: Experiencing Non-axiomatic Geometry in the Classroom*, AAAS Annual Meeting, Philadelphia.

24. June, 1998. (with K. Gaddis, J.-J. Lo, A. Solomon) Organize and teach in week-long National Science Foundation - Undergraduate Faculty Enhancement workshop, *Teaching Undergraduate Geometry*, Cornell.
25. June, 1998. (with D. Taimina) *Experiencing* Geometry, workshop at NORMA-98, Nordic Mathematics Education Conference, Kristiansand, Norway.
26. July, 1998. (with C. Mulcahy) Workshop at MAA MathFest 98 in Toronto. (invited but declined because of conflict in time)
27. Oct, 1998. Plenary address, *A mathematician looks at Research in Undergraduate Education*, Research in Undergraduate Mathematics Education Annual Conference, South Bend, Indiana.
28. Oct, 1998. Member of the National Science Foundation Review Panel for the program *Collaboratives for Excellence in Teacher Preparation.*
29. Dec, 1998. Invited paper: *Giving Professors Permission to Change Their Teaching* at the International Commission on Mathematics Instruction invitation-only study conference on *Teaching Mathematics on the Undergraduate Level*, Singapore.
30. 1998-99 academic year: (with A. Solomon and D. Taimina) Four one-day workshops for school teachers, Cornell.
31. Jan. 14-16, 1999. (with C. Mulcahy and B. Schiller) organizer of a special session, *Geometry in the Classroom in the Next Millennium*, at the Joint Mathematics Meetings in San Antonio.
32. Jan. 13, 1999. Invited paper: *The Eight Undergraduate Geometry Courses at Cornell*, special session on *Mathematics and Educational Reform* at the Joint Mathematics Meetings in San Antonio.
33. Jan. 15, 1999. Invited paper: *Proof as a Convincing Communication that Answers -- Why?*, special session on *Proof in Mathematics Education* at the Joint Mathematics Meetings in San Antonio.
34. Feb. 18, 1999. *Proofs: What are they? Where should they be?*, lecture at University of Northern Colorado.
35. Feb. 20, 1999. Featured speaker: *Can Geometry Make the Theory of Calculus Accessible?*, at the Workshop of the Rocky Mountain Consortium.
36. June, 1999. (with K. Gaddis, J.-J. Lo, A. Solomon, and D. Taimina) Organize and teach in week-long National Science Foundation - Undergraduate Faculty Enhancement workshop, *Teaching Undergraduate Geometry*, Cornell.
37. June, 1999. (with Solomon and D. Taimina) Week-long workshop for teachers, Cornell.
38. 1999-2000 academic year: (with A. Solomon and D. Taimina) Four one-day workshops for school teachers, Cornell.
39. January, 2000. (with D. Taimina) contributed paper *The Role of Physical Models in Teaching Hyperbolic Geometry* at the Joint Mathematical Meetings in Washington, DC.
40. April 5-7, 2000, *Ask "Why?", Insist on Seeing, Experience, Learn from Others*, invited presentation to 3rd Annual Legacy of R.L. Moore Conference, Austin, TX
41. June 2-4, 2000. (with K. Gaddis, J.-J. Lo, and D. Taimina) NSF-sponsored workshops, *Teaching Undergraduate Geometry*, for mathematics professors at colleges and universities.
42. June 10-13, 2000, *Teachers as mathematicians -- mathematicians as teachers*, invited presentation in "Models for the education of future school teachers" in the Education

Program of The Summer 2000 meeting of the Canadian Mathematical Society, Hamilton, ON.

43. October, 2000. Seminar series, *Educational Issues in Undergraduate Mathematics*, Department of Mathematics, University of Latvia, Riga.
44. November 21, 2000. (with Daina Taimina) *"Proof" in Mathematics Education*, Liepaja Pedogogical Institute, Liepaja, Latvia
45. November 22, 2000. Invited lecture: *Possible Geometric Observations of the Shape of Space*, Latvian Physics Society Colloquium, Riga.
46. December 20, 2000. Invited lecture: *Geometric Shape of Space*, Tartu University Mathematics Seminar, Tartu, Estonia.
47. January 3, 2001. Invited lecture: *Constructions of the Hyperbolic Plane*, Latvian Mathematics Society, Riga.
48. February 22, 2001. Invited lecture: *Possible Geometric Observations of the Shape of Space*, Department of Mathematics, University of Rochester.
49. Spring 2001 (with Dave Bock). Saturday workshops for teachers.
50. Spring 2001. *Possible Shapes of the Universe -- How Can We Tell?*, 6-weeks module for the Mathematics Explorers Club for high school students.
51. June 10-15, 2001. (with K. Gaddis, and D. Taimina) NSF-funded, MAA-sponsored workshop, *Teaching Undergraduate Geometry*, for mathematics professors at colleges and universities.
52. November 2, 2001. *Educational Mathematics*, invited talk Theoretical & Applied Mechanics Seminar, Cornell.
53. December 8, 2001. *Shape of Space*, Saturday workshop for teachers, Cornell.
54. February 9, 2002. *Calculus Concepts in Secondary Mathematics*, Saturday workshop for teachers, Cornell.
55. June 15-17, 2002. 1-hour Plenary Address: *How can we encourage students to think like a mathematician?* Canadian Mathematics Society Summer Meeting, Quebec City, Canada.
56. June 15-17, 2002. (with Daina Taimina) *Experiencing Geometry*, 2-hour workshop to start off the *Symposium on the teaching and learning of geometry: why, what, how*. At *Canadian Mathematics Society Summer Meeting*, Quebec City, Canada.
57. July 8-12, 2002. *Misconceptions About Isometrically Embedding The Hyperbolic Plane In Euclidean 3-Space*, Janos Bolyai Conference on Hyperbolic Geometry, Budapest, Hungary.
58. July 15-18, 2002. *Increasing Creativity With Alive Mathematical Reasoning*, International Conference on the Gifted Student and Increasing Creativity in Mathematics Education, Riga, Latvia.
59. November 2, 2002. *Educational Mathematics*. **John Randolph Lecture** (1 hour plenary address). Seaway Section of the MAA, November 2, 2002, Potsdam, NY.
60. January 17, 2003. PREP workshop reunion (invited leader with Daina Taimina). Joint Mathematics Meetings, Baltimore, MD.
61. January 18, 2003, *Extrinsic and Intrinsic Visualization*, Special Session on Creative Visualization, Joint Mathematics Meetings, , Baltimore, MD.
62. March 7-9, 2003. Invited Speaker/Facilitator. *Next Steps in Mathematics Teacher Development, Grades 9-12*. National Research Council and the Mathematical Sciences

Education Board, National Academy of Sciences, , Washington, DC and live Webcast nation-wide.

63. March 15, 2003. Plenary Speaker. *Mode of teaching and learning experiences in mathematics courses for future teachers*. National AMS-MER workshop on Excellence in Undergraduate Mathematics: Mathematics for Teachers and Mathematics for Teaching, Ithaca College, Ithaca, NY.
64. March 15, 2003. Breakout Workshop Leader (1 hour). *Teaching Geometry With Proofs Based on Experiences*. National AMS-MER workshop on Excellence in Undergraduate Mathematics: Mathematics for Teachers and Mathematics for Teaching, Ithaca College, Ithaca, NY.
65. August 16, 2003. Radio show guest speaker (1 hour). *Reflections of an educational mathematician: How do we encourage real experiences with mathematics?* On radio show *Math Medley* hosted by Professor Patricia Kenschaft and broadcast by KFNX in Arizona and on the WWW everywhere at www.1100kfnx.com.
66. October 15-18, 2003. Invited participant and speaker. *Interdisciplinary Seminar on Perception, Body Motion, and Mathematics Learning*. Sturbridge, MA.
67. July 4-10, 2004. Member of the Organizing Team for the Topic Study Group: "Research and development in the teaching and learning of geometry" of the International Congress of Mathematics Education (ICME-10), Copenhagen, Denmark.
68. March 26-27, 2004. *Experiencing Geometry* a two-hour workshop/lecture at the Spring Conference of the 14 universities in the Pennsylvania State System of Higher Education (SSHE-PA). East Stroudsburg, PA.
69. May 27, 2004. *Non-Euclidean Geometries and the Shape of Space* (with Daina Taimina) inaugural lecture for the new *Institute for Figuring*, Los Angeles, CA.
70. July 4-10, 2004. Organizing Team of the 4 hour Topic Study Group: "Research and development in the teaching and learning of geometry", *International Congress of Mathematics Education* (ICME-10), Copenhagen, Denmark.
71. July 2004. "Strands in the History of Geometry and How They Affect Our Teaching", part of the above Topic Study Group.
72. November 5, 2004. "Why History of Mathematics Matters", colloquium talk, University of Maryland, Center for Mathematics Education.
73. November 6-9, 2004. Invited participant in invitation-only conference 'Culturally Responsive Mathematics Curricula', NSF, Arlington, VA.
74. January 7, 2005. "Strands in the history of geometry and how they affect our views as to what geometry is", invited presentation in the MAA Session on Philosophy of Mathematics, Atlanta.
75. January 7 & 8, 2005. Report on my geometry teaching as part of the 4-hour Algebra Project Special Session "Mathematical Rich Experiences", Atlanta.
76. February 5, 2005. "Crocheting the Hyperbolic Plane" (with Daina Taimina), lecture presentation on hyperbolic geometry geared to an audience of architects, and artists. At the Kitchen (theatre) Manhattan.
77. February 26, 2005. "Hyperbolic surfaces", 4-hour lecture/discussion, Department of Architecture, Cornell University.
78. March 24, 2005. "Shape of Space", workshop for teachers at Cornell Outreach Day.
79. April 18-22, 2005. various invited lectures and workshops in Riga, Latvia.

80. June 13-15, 2005. Workshop presentor (with Daina Taimina): MAA's Preparing Mathematicians to Educate Teachers (PMET), Kent State University.
81. June 22-24, 2005. Invited participant: 2005 Consortium for Writing in the Disciplines International Conference, Cornell.
82. August 3-4, 2005. "Geometry with history for teaching teachers" (with Daina Taimina), 2-day minicourse at MathFest 2005. Albuquerque, NM.
83. September 22, 2005. "Crocheting the Hyperbolic Plane" (with Daina Taimina), Science and Arts Series, The Graduate Center of the City University of New York.
84. January 12-14, 2006. Co-leader: "Geometry with history for teaching teachers" (with Daina Taimina), mini-course at Joint Mathematics Meetings, San Antonio, TX.
85. May 18-19, 2006. *Historical Strands in Geometry*, invited lecture, Department of Mathematics,Carleton College
86. June 5-9, *Geometry Curriculum Development*, leader of working group of teachers and educators, Chicago
87. June 14-17, July 30 – August 4, 2006: *Geometry*. Worshop co-leader (with Robert Moses) of Algebra Project program in District 5, Harlem, New York City.
88. June 23-24, 2006. Worshop co-leader (with Robert Moses) of Algebra Project program in District 5, Harlem, New York City.
89. June 27-July 18, 2006. Co-leader (with Daina Taimina), *Geometry with History*, two 3-week workshops/courses as part of the Middle-Grade Mathematics Master's Program funded by the NSF and sponsored by AAAS and The George Washington University, Washington, DC.
90. July 31- August 3, 2006. Worshop co-leader (with Robert Moses) of Algebra Project program in District 5, Harlem, New York City.
91. Jan 7-8, 2007. *Geometry with History for Teaching Teachers*, MAA 2-day mini-course for mathematicians, Joint Mathematics Meetings, New Orleans, LA.
92. March 27-29, 2007. *Coordinate Systems*, *Non-Euclidean Geometries*, various geometry workshops in the public schools, New Orleans.
93. March 30, 2007. *What do we wish from mathematics students when they come to us?*, N. A. Court Lecture, Annual Meeting of the Oklahoma-Arkansas Section of The Mathematical Association of America.
94. June 2007. (with Daina Taimina) *Non-Euclidean geometries, Coordinate Systems* (3 full days with individual workshops), Florida International University, Miami.
95. July 4, 2007. (with Daina Taimina) *Research-like experiences in the geometry classroom*. 3-hour plenary workshop for the "Teaching Day", International Conference "Banach Algebras 2007", Laval, Quebec City, Canada.
96. March 5-8, 2008. *Centennial Symposium of the International Commission on Mathematics Instruction*, Rome. This is an invitation-only small (about 150) conference of mathematicians and educators from around the world. I contributed a paper and was a member of the Working Group: *The Relationships Between School Mathematics and Disciplinary Mathematic*
97. April 10-12, 2008. *Beyond Measure: Geometry Across Science and Art*, attendee, University of Cambridge, UK.
98. April 16, 2008. *How Can a Mathematician Earn a Million Dollars?*: *The Clay Institute Millennium Problems and the Solution of the Poincare Conjecture.* Invited lecture to the Faculty of Physics and Mathematics, University of Latvia, Riga.

99. May 23-27, 2008. Invited leader of a 9-hour working group *Mathematics and Human Alienation* at the annual meeting of the CMESG (Canadian Mathematics Education Study Group), Sherbrouke, Quebec.
100. May 30-31, June 20-21, 2008. Profession Development workshops for teachers, Fanny Lou Hamer Freedom High School (FLHFHS) and Bannana Kelly High School (BK) in South Bronx, NYC.
101. June 30-July 3, July 7-10, 2008. *Geometry*. Workshop for students at Algebra Project Summer Institute, Florida International University, Miami, FL.
102. July 14-18, 2008. *Geometry*. Workshop for students and teachers at Algebra Project Summer Institute, Jackson State University, Jackson, Mississippi.
103. August 7-8, 2008. *Algebra Project Geometry*. Workshop for teacher from BK & FLHFHS (South Bronx), Ithaca, NY.
104. August 30, 2008. *Infinity in Mathamatics*. Lecture to the Summer Studies, Wisdom Goldenrod Center for Philosophical Studies, Hector, NY.
105. September 18-19, October 24, November 21-22, December 11-12, 2008. Classroom visits and profession development workshops for teachers, Fanny Lou Hamer Freedom High School (FLHFHS) and Bannana Kelly High School (BK) in South Bronx, NYC.
106. October 25, 2008. (with Daina Taimina) *Hyperbolic Geometry*. Workshop for teachers sponsored by Math for America, NYC.
107. November 3, 2008. *What are the possible geometric shapes of our physical universe?* Math Club, Cornell University.
108. November 7-8, 2008. *Algebra Project Geometry*, classroom visit and workshop for teachers at Lanier High School, Jackson, Miss.
109. January 7, 2009. *Geometry is Natural*. 30-minute presentation in the AMS-MAA-MER Special Session on Mathematics and Education Reform. Joint Mathematics Meetings, Washington, DC.
110. January 13-14, 2009. *Algebra Project Geometry*, classroom visit and workshop for teachers at Lanier High School, Jackson, Miss.
111. June 19-20, 2009. (with Daina Taimina) *Hyberbolic Geometry*. Workshop of teachers, California State University, Long Beach, CA.
112. April 3, May 1, June 2-3, 2009. Classroom visits and professional development workshops for teachers, Fanny Lou Hamer Freedom High School (FLHFHS) and Banana Kelly High School (BK) in South Bronx, NYC.
113. April 4, May 2, June 4-5, 2009. Professional development workshops for teachers: Boys and Girls High School in Brooklyn, NYC.
114. April 16-19, 2009. Classroom visits and professional development workshops for teachers, Lanier HS, Jackson, MS.
115. May 8-10, 2009. Professional development workshop for teachers from the South Bronx, Ithaca NY.
116. June 19-20, 2009. (with Daina Taimina) *Hyberbolic Geometry*. Workshop of teachers, California State University, Long Beach, CA.
117. June 22-26, 2009. (with others) *Professional Development for Professional Developers*. Algebra Project, Boston.
118. July 13-24, 2009. (with others) *Teachers Institute, Algebra Project*. Chicago.
119. Sept 18, Oct 23, Nov 20, Dec 17-18, 2009: Jan 26-27, Feb 25-26, Apr 8-9, May 20-21, 2010. Classroom visits and professional development workshops for teachers, Fanny

Lou Hamer Freedom High School (FLHFHS) and Banana Kelly High School (BK) in South Bronx, NYC.

120. Dec 3-4, 2009. Classroom visits and professional development workshops for teachers. Scott's Branch HS, Sommerton, SC.
121. Dec 7-8, 2009; April 14-15, 2010. Classroom visits and professional development workshops for teachers. Petersburg HS, VA.
122. January 15, 2010. (with Kelly Gaddis) *Algebra Project Curricula – Mathematics meaning through experience and dialogue.* Mathematics, Equity, Diversity, and Social Justice Session, Joint Mathematics Meetings, San Francisco, CA.
123. April, May, 2010: Professional development workshops for geometry teachers, Boys and Girls High School, Brooklyn, NYC.
124. Sept 2010 – June 2011: monthly classroom visits and professional development workshops for teachers, Fanny Lou Hamer Freedom High School (FLHFHS) and Banana Kelly High School (BK) in South Bronx, NYC.
125. Feb 10, 2011: *Four Strands in the History of Geometry*, Department of Mathematics Colloquium, Vassar College.
126. May 14, 2011: *Look in Your Experiences for the Meanings of Mathematics***,** Keynote address, Math Teacher Transformation Institutes (MTTI) Annual Conference, Lehman College.
127. Sept 2011 – June 2012: monthly classroom visits and professional development workshops for teachers, Fanny Lou Hamer Freedom High School (FLHFHS) in South Bronx, NYC.
128. Aug – Dec 2011: 2 day-long professional development workshops for teachers at Manual Arts High School, Los Angeles.
129. Nov 2011 - May 2012: 3 day-long professional development workshops for K-5 teachers at Monitor Elementary School, Springdale, Arkansas.
130. Nov 30, 2011: *Mathematical Issues of Meaning in School Mathematics*, Mathematics Department Colloquium, Occidental College, Los Angeles.
131. Dec 1, 2011: *Mathematical Issues of Meaning in School Mathematics*, Mathematics Department Colloquium, University of Southern California, Los Angeles.
132. Mar 15, 2012: *Mathematical Issues of Meaning in School Mathematics*, Mathematics Department Colloquium, Cornell.
133. July 30 – Aug 3, 2013: 5-day professional development workshop for K-5 teachers at Monitor Elementary School, Springdale, Arkansas.
134. Sept 2012 – June 2013: monthly classroom visits and professional development workshops for teachers, Fanny Lou Hamer Freedom High School (FLHFHS) in South Bronx, NYC.
135. Sept 2012 - March 2013: 5 day-long professional development workshops for K-5 teachers at Monitor Elementary School, Springdale, Arkansas.
136. Nov 8-10, 2013: 3-day professional development workshop for teachers at Augustus Hawkins High School, Los Angeles.
137. March 21, 2013: *Mathematical Issues of Meaning in School Mathematics*, Math Dept colloquium, Western Illinois University.
138. March 22, 2013: *Translate Your Experiences Into Meanings of Mathematics*, Opening talk for Western Illinois Math Teachers' Conference.

139. June 25-28, 2013: professional development workshop for K-5 teachers at Monitor Elementary School, Springdale, Arkansas.
140. Oct 2013 – June 2014: monthly classroom visits and professional development workshops for teachers, Fanny Lou Hamer Freedom High School (FLHFHS) in South Bronx, NYC.
141. Feb 17 – Mar 5, 2014: several mathematics education workshops in South Africa.
142. Sept 2013 - May 2014: 6 day-long professional development workshops for K-5 teachers at Monitor Elementary School, Springdale, Arkansas.
143. June 9-13, 2014: professional development workshop for K-5 teachers at Monitor Elementary School, Springdale, Arkansas.
144. July 28 – Aug 1, 2014: professional development workshop for high school geometry teachers at Miami Northwestern High School, Miami, FL.
145. Aug 8, 2014: *Experiential Geometry in Elementary and High School*, Making Models: Visual Spatial Reasoning Workshop at Fields Institute for Mathematical Research, University of Toronto, ON, Canada.
146. Sept, Oct 2014: classroom visits and professional development workshops for teachers, Fanny Lou Hamer Freedom High School (FLHFHS) in South Bronx, NYC.
147. Sept 2014: day-long professional development workshops for K-5 teachers at Monitor Elementary School, Springdale, Arkansas.
148. Jan 8-9, 2015: day-long professional development workshops for K-5 teachers at Monitor Elementary School, Springdale, Arkansas.
149. Jan 22 – May 22, 2015: academic visitor, Palestinian Technical University – Kadoorie, West Bank.
150. June 8-12, 2015: professional development workshop for K-5 teachers at Monitor Elementary School, Springdale, Arkansas.
151. June 16, 2015: observed and participated in final student presentation, Fanny Lou Hamer Freedom High School (FLHFHS) in South Bronx, NYC.
152. June 22-27, 2015: co-lead of professional development for teachers in Atlanta Public Schools, Atlanta.
153. August 29, 2015: co-lead of professional development for teachers in Atlanta Public Schools, Atlanta.
154. Dec 4-5, 2015: speaker at conference on Equity in Mathematics, ETS, Princeton, NJ.
155. Jan 25-29, 2016: observations and research visit to Monitor Elementary School, Springdale, AR.
156. Feb 16, 2016: lead professional development for geometry teachers at Northwestern High School, Miami, FL.
157. Apr 11, 2016: Discussant for *Studies of Children's Emerging Sense of Space and Measure*, Research Symposium, NCTM Research Conference, San Francisco
158. May 8-10, 2016: observations and research visit to Monitor Elementary School, Springdale, AR
159. Nov 3-5, 2016: lead professional development for geometry teachers at Northwestern High School, Miami, FL.
160. Feb 16-18 and May 19-21, 2017: invited participant at National Design Meetings on: **MATH LITERACY: PREPARING CLASSROOMS AND COMMUNITIES FOR THE 21st CENTURY ECONOMY.** NSF funded. Saint Louis, MO**.**

161. Oct 31 – Nov 1, 2017: invited participant in *Impact of Visuospatial Skills on Learning*, The 12th International Symposium of Cognition, Logic, and Communication, Riga, Latvia.

Graduate Students Whose Research I Have Supervised: (After each student's name is the title of their thesis, year, and whether I was chairman of their graduate committee. Where I was not chairman, I had a major supervisory role. These students are in mathematics, mathematics education, and other related fields.)

1. Ross Geoghegan, *Topological and Simplicial Properties of Functions Spaces*, Ph.D. (Math), 1970, Chairman.
2. William Cutler, *Deficiency in Frechet Manifolds*, Ph.D. (Math), 1970, Chairman.
3. Rita Cantor, *A Laboratory Approach to College Level Mathematics Instruction*, Ph.D. (Math Ed), 1973.
4. Richard Heisey, *Manifolds Modelled on R^infinity or Bounded Weak-* Topologies*, Ph.D. (Math), 1973, Chairman.
5. Wesley Terry, *On Equivalent Product Structures and Classification of Keller Retracts*, Ph.D. (Math), 1973, Chairman.
6. Jane Holthausen, *Emotional Factors in Teaching for Interpersonal Resonance*, MS (Ed), 1974.
7. Andrea Petitto, *Development of Mathematical Concepts in Ninth Grade Algebra Students*, MS (Math Ed), 1975, Chairman.
8. Nathaniel Silver, *A Unit of Precalculus Curriculum: The Concept of Limit*, MS (Math Ed), 1976, Chairman.
9. Roselyn Teukolsky, *The Novelty Effect Used as a Motivating Factor in the Teaching of High School Mathematics*, MS (Math Ed), 1976.
10. David Pimm, *Language, Symbols and Meaning in Mathematics*, MS (Math Ed), 1978, Chairman.
11. Claude Packer, *The Effects of Hand Calculators on Attitude, Achievement and Retention of Students in College Level Mathematics*, Ph.D. (Math Ed), 1979.
12. Roger Johanson, *Curricular Content in Geometry: Formal and Informal Meanings*, Ph.D. (Math Ed), 1979.
13. Nathaniel Silver, *Elementary Calculus Curriculum: Images and Concepts*, Ph.D. (Math Ed), 1980.
14. Jere Confrey, *Conceptual Shifts in the Introduction of Calculus*, Ph.D. (Math Ed), 1980.
15. Doroth Buerk, *Changing the Conception of Mathematical Knowledge in Intellectually Able, Math Avoidant Women*, Ph.D. (Math Ed) (State University of New York at Buffalo), 1981.
16. Richard Furnas, *A Resource Theory of Self-Thinning in Plant Populations*, Ph.D. (Mathematical Ecology), 1981.
17. Frances Rosamond, *Listening to Students in the Cornell Mathematics Support Center*, Ph.D. (Math Ed), 1981, Chairman.
18. Ethan Bloch, *Pulling Apart Simplexwise Linear Near-Embeddings of a 2-Disk in R^2*, Ph.D. (Math), 1983, Chairman.
19. Leah Minemier, *Concept Mapping, An Educational Tool, and Its Use in a College Level Mathematics Skills Course*, MS (Math Ed), 1983.

20. John Volmink, *Meaning in Mathematics: On Integrating Thinking, Feeling and Acting in a First-Year Calculus* Course, M.S. (Math Ed), 1983, Chairman.
21. Pauline Halpern, *A Comparison of American and Japanese Junior High School Boys and Girls Perceptions of Mathematics Learning and Future Usefulness,* MS (Math Ed), 1984.
22. Avery Solomon, *Aspects of Shared Meaning as Markers of Educational Excellence in Philosophic and Geometric Events,* Ph.D. (Math Ed), 1986.
23. Jacques Rioux, *On the Equivariant Homotopy Type of Compact G-ANR's,* Ph.D. (Math), 1987.
24. Gabriele Meyer, *Attracting and Repelling Point Pairs for Vectorfields on Manifolds,* Ph.D. (Math), 1988. Chairman.
25. John Volmink, *Acquisition of Concepts and Constructions of Meaning in Geometry,* Ph.D. (Math Ed), 1988, Chairman.
26. Wendy Millroy, *An Ethnographic Study of the Mathematical Ideas of a Group of Carpenters,* Ph.D. (Math Ed), 1990.
27. Maria Eduarda Moura, *Students' Alternative Frameworks About the Notion of Limit,* M.S. (Math Ed), 1993. Chairman.
28. Marcello de Borba, *Students' Understanding of Transformations of Functions Using Multi-Representational Software,* Ph.D. (Math Ed), 1993.
29. Fred Reiner, *Mathematics as a Topic of Aesthetic Inquiry: A Comparative Analysis of Concepts in the Philosophies of Art and Mathematics,* M.S. (Math Ed), 1993, Chairman.
30. Daniel Scher, *Rethinking Calculus Reform,* M.S. (Math Ed), 1993.
31. Erick Smith, *Practice in a Radical Constructivist Setting: The Role of Virtues and Activities in Mathematical Knowing,* Ph.D. (Math Ed), 1993.
32. Lucy Dladla, *Students' Difficulties in Solving Contextual Trigonometric Problems Using Functional Transformations,* M.S. (Math Ed), 1994.
33. Susan Piliero, *The Effects of a Problem-Based Curriculum, Multi-Representational Software, and Teacher Development on the Knowledge, Beliefs and Practices of Secondary Mathematics Teacher,* Ph.D. (Math Ed), 1994.
34. Jonathan Swanepoel, *Classroom-Culture-Shift,* Ph.D. (Math Ed), 1994.
35. Helen Doerr, *A Model Building Approach to Constructing Student Understanding of Force, Motion and Vectors,* Ph.D. (Math Ed), 1994.
36. Zimaseka Owusu, *An Autobiographical Account of a Teacher Educator's Experiences on the Learning and Teaching of Geometry,* M.S. (Math Ed), 1994, Chairman.
37. David Dennis, *Historical Perspectives for the Reform of Mathematics Curriculum: Geometric Curve Drawing Devices and Their Role in the Transition to an Algebraic Description of Functions,* Ph.D. (Math Ed), 1995.
38. Gloriana Gonzalez, *Students' Notions of Infinity and Their Remembrances of Mathematics Classes: A Study with Latino Students,* M.S. (Math Ed), 1995, Chairman.
39. Mohamed Toure, *Teachers' Understanding of the Fraction and Ratio Concepts in Additive Situations: A Study with Cornell and Conakry Preservice Teachers,* M.S. (Math Ed), 1997, Chairman.
40. Michele di Guglielmo, *Similarity and Splitting: Exploring Children's Multiplicative Reasoning within a Computer Environment,* M.S. (Math Ed), 1997.
41. Kelly Gaddis, *Participatory Mathematics Curriculum Development: A Case Study from kwaZulu/Natal, South Africa,* Ph.D. (Math Ed), 1997.

42. Andrea Lachance, *Teacher Change is a Technology-Rich Environment*, Ph.D. (Education), 1999.
43. Nat Miller, *Diagrammatic Reasoning*, Ph.D. (Math), 2001, Chairman.
44. Cynthia Bowers Francesco, *Honors Work and a Standards-Based Curriculum in a Heterogeneous Mathematical Classroom*, MS (Education), August 2003, Chairman.
45. Everilis Santana-Vega, *Using Good Questions in a Calculus Course: Impact of a Calculus Reformed Course in Students' Understanding of Calculus' Concepts*, MS (Mathematics), August 2004, Chairman.
46. Kristin Camenga, *A Classification of Secondary Mathematics Writing Tasks*, MS (Education), December 2005, Chairman.
47. Mircea Pitici, *Surveying and Mathematics Education*, MS (Education), December 2008, Chairman
48. Jeffrey King, *HOMEWORK IN AN INTRODUCTORY COLLEGE MATHEMATICS CLASS: ITS PURPOSE, EFFECTS, AND STUDENTS' OPINIONS*. MS (Education). Completed January 2011. Chairman
49. Marita Hyman, *Mathematics in Aboriginal Culture* (tentative title), PhD (Anthropology), work was started and continues under my co-direction, expected unknown.
50. Mircea Pitici, *Interpreting mathematics / some educational considerations*, PhD (Education), August 2015. Chairman

Courses Taught:

Undergraduate courses:

1. Special seminar course for students in the 6-year Ph.D. program.
2. Mathematics Orientation - course for students with weak backgrounds
3. Explorations in Mathematics - course for students not in science or mathematics
4. Calculus, all levels
5. Honors (for best students) Calculus, all levels
6. Linear Algebra
7. Applied Mathematics (partial differential equations)
8. Mathematics for Social Science
9. Mathematical Concepts
10. Algebra (groups and Galois theory)
11. Seminar for Honors (the best) Mathematics Majors
12. History of Mathematics
13. Classical Geometries
14. Geometry on Plane and Sphere
15. Topology
16. Differential Geometry
17. Mathematics in Perspective (capstone course for future mathematics teachers)

Graduate courses:

1. Mathematics for High School Teachers
2. Cultural Aspects of Mathematics - for mathematics and mathematics education graduate students
3. Educational Issues in Undergraduate Mathematics Education -- primarily for mathematics graduate students
4. Foundations of Mathematics (General Topology)

5. Algebraic Topology
6. Differential Manifolds
7. Geometric Topology
8. Infinite-dimensional Topology
9. Dimension Theory
10. Special Topics in Topology
11. Special Topics in Geometry
12. Research Seminar in Educational Mathematics