

Curriculum Vitae
Walter Iaan Seaman

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EDUCATIONAL AND PROFESSIONAL HISTORY (*most to least recent*)

Higher Education

- University of Massachusetts at Amherst, 1976-1982. Ph.D. in Mathematics, 1982.
- Beloit College, Beloit, Wisconsin, 1972-1976. B.A in Mathematics, 1976.

Professional and Academic Positions

- Associate Professor, Department of Teaching and Learning and Department of Mathematics (joint), University of Iowa, January, 1, 2008-Present
- Visiting Associate Professor of Education, Department of Curriculum and Instruction, The Pennsylvania State University, Fall 2000 - Spring 2002
- Associate Professor, Department of Mathematics, University of Iowa, 1991 - Present
- Assistant Professor, Department of Mathematics, University of Iowa, 1985-1991
- Visiting Assistant Professor, Department of Mathematics, University of Iowa, 1983-1985
- Acting Assistant Professor, Department of Mathematics, Stanford University, 1982-1983

Memberships

- American Mathematical Society
- The National Council of Teachers of Mathematics
- Iowa Council of Teachers of Mathematics
- Iowa Mathematics and Science Education Partnership, Executive Board
- Association of Mathematics Teacher Educators, University of Iowa representative

SCHOLARSHIP (most to least recent)

Publications (Refereed)

1. ***¹Matthews, Michael E.; Seaman, Walter I. The Effects of Different Undergraduate Mathematics Courses on the Content Knowledge and Attitude towards Mathematics of Preservice Elementary Teachers (July 2007) IUMPST: The Journal, (Issues in the Undergraduate Mathematics Preparation of School Teachers: The Journal) Vol 1 (Content Knowledge), July 2007. [www.k-12prep.math.ttu.edu]
2. *"When is a rotation a translation?" by Walter Seaman and Kenneth Labuskes, Iowa Council of Teachers of Mathematics Journal, Volume 32, Winter 2005, pages 44 - 58.
3. **Heid, M. K., Blume, G. W., Zembat, Z., MacCullough, D., MacDonald, D., Seaman, W. Understanding Of Function As Seen In Understanding Of Multivariate Function: The Case Of Prospective Secondary Mathematics Teachers, paper presented at the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA) meeting XXIV, October, 2002 in Athens, Georgia. This paper appears on pages 283-293 of the Proceedings of the Twenty-Fourth Annual Meeting of the PME-NA, Volume I.
4. **MAPPAEMUNDI, a ten minute DVD digital animation with electronic music combining elements of Digital Art, Electronic Music and Mathematics. I worked with Professor Sue Hettmansperger (Art and Art History, University of Iowa) and Professor Lawrence Fritts (Music, University of Iowa) in the production of this work. Completed in Summer 2001, this project was funded through the 2000-2001 Arts and Humanities Initiative Interdisciplinary Grant at the University of Iowa (the amount of the grant was \$20,000).
5. *Representations of Discrete Dynamical Systems with Mathematica Animations, Pennsylvania Council of Teachers of Mathematics 2002 Yearbook, The Role of Representation in Teaching and Learning of Mathematics Part II, 55-70.
6. *Higgs Bundles and Holomorphic Forms, Differential Geometry and Its Applications, 12 (2000) 291-311. This paper is posted in the electronic archive at the URL <http://xxx.lanl.gov/abs/math.DG/9811097>.
7. *The Differential Geometry Images Page This web page illustrates the use of Mathematica graphics and animations in representing some of the concepts central to beginning Differential Geometry.
8. **K. Abdel-Malek, W. Seaman, and H.J. Yeh, "NC Verification of up to 5 Axis Machining Processes Using Manifold Stratification" Journal of Manufacturing Science and Engineering, American Society for Mechanical Engineers, J MANUF SCI E-T ASME 123 (1): 99-109 FEB 2001.
9. •On manifolds with nonnegative curvature on totally isotropic two-planes, Trans. Amer. Math. Soc., 338 (1993), no. 2, 843-855.
10. *Harmonic two-forms in four dimensions, Proc. Amer. Math. Soc., 112 (1991), no. 2, 545-548.
11. *Orthogonally pinched curvature tensors and applications, Math. Scand., 69 (1991), no. 1, 5-14.
12. *Existence and uniqueness of algebraic curvature tensors with prescribed properties and an application to the sphere theorem, Trans. Amer. Math. Soc., 321 (1990), no. 2, 811-823.
13. *A pinching theorem for four manifolds, Geom. Dedicata, 31 (1989), no. 1, 37-40.
14. *Some remarks on positively curved 4 manifolds, Michigan Math. J., 35 (1988), no. 2, 179-183.
15. *On four-manifolds which are positively pinched, Ann. Global Anal. Geom. 5 (1987), no. 3, 193-198.
16. *Two-forms on four-manifolds, Proc. Amer. Math. Soc., 101 (1987), no. 2, 353-357.
17. *The third Betti number of a positively pinched Riemannian six manifold, Ann. Inst. Fourier (Grenoble) 36 (1986), no. 2, 83-92.
18. *On surfaces in R^4 , Proc. Amer. Math. Soc., 94 (1985), no. 3, 467-470.
19. *Helicoids of constant mean curvature and their Gauss maps, Pacific Journal of Mathematics, 110 (1984), no. 2, 387-396.

¹ *=senior author, major contribution; **=secondary contribution; ***=equal contribution; ****=minor contribution

Publications or Creative Work (non-refereed)

Would generally be technical reports or abstracts

Published Reviews of Scholarship

1. Book review of "Modern Differential Geometry of Curves and Surfaces with Mathematica, 2nd Edition" by Alfred Gray for the SIAM Review, Volume 41(1999), No. 1 see pages 186-189.
2. Book review of the Calculus Consortium Based at Harvard's book "Multivariable Calculus", by William McCallum et. al. Review appeared in the newsletter "Focus on Calculus (A Newsletter for the Calculus Consortium Based at Harvard University)", Fall 1997 Issue No. 13, page 6, published by John Wiley & Sons, Inc.
3. I have reviewed or refereed works for the following organizations: NSF Geometric Analysis, NSF Division of Elementary, Secondary, and Informal Education (ESIE) for the Centers for Learning and Teaching (CLT) program (invited panelist June 2003), Mathematical Reviews, Proceedings of the American Mathematical Society, Transactions of the American Mathematical Society, Michigan Mathematical Journal, Contemporary Mathematics, Acta Applicandae Mathematica, The Cooperative Grants Program of the U.S. Civilian Research and Development Foundation, International Journal of Mathematics and Mathematical Sciences, International Journal for Technology in Mathematics Education, mathematics reviewer for Journal for Research in Mathematics Education.
I have served as Mathematics test reviewer and test question writer for the ACT Corporation, Iowa City, Iowa.

Grants Funded (*duration, agency, total \$, status—PI co-PI*)

External

- On August 3, 2012 we received funding from the Title IIA program administered by the Iowa Board of Regents for a one-year mathematics professional development project (MILES) for about \$110,000. We submitted the application as PI in June 2013. The work planned consisted of 100 hours of mathematics professional development with the entire teaching staff at an Iowa City elementary school (about 25 teachers). After the funding was received, the school administration changed and the new administration decided to implement a different pd project so the MILES project was canceled.
- On March 7, 2011 the EMPOWER project (see next two items, I am a PI on this funded project) won a grant extension for a fourth year of the project in the amount of about \$134,000. This amount is funded with Title II funds administered through the Iowa Board of Regents. The funded amount was about 90% of the requested amount. The PIs (Walter Seaman and Vicki Burketta) are in the process of seeking additional funds to make up the difference. The project was continued through the 2011-2012 AY with this new extension.
- On April 9, 2010 the EMPOWER project (see next two items, I am a PI on this funded project) sent a grant extension application for \$26,000 to the Iowa Department of Education to fund a number of additional evaluation and teacher training initiatives beyond those planned in the original three-year EMPOWER proposal. On May 3, 2010 IDE notified EMPOWER that about \$22,000 of the grant request would be funded (roughly 85% of the requested amount). IDE declined to fund the graduate student support and indirect cost components of the original proposal at the time of the notification.

- PI (one of two). Three year funding (2008-2011), \$160,000 from the Iowa Mathematics & Science Education Partnership (IMSEP) <http://www.iowamathscience.org/> to provide support for the EMPOWER mathematics teacher training Mathematics and Science Partnership (MSP) grant (see next item), beyond the initial MSP funding.
- PI (one of two). Three year funding (2008-2011), \$450,000. Title II allocations to Iowa from the No Child Left Behind Act. (*EMPOWER (Elementary Mathematics Partnership Opening Windows to Excellence, Rigor and Relevance)*). The EMPOWER grant delivers mathematics teacher training to approximately 70 elementary school teachers in the Grant Wood Area Education Agency.
- I am serving as a mathematics and lesson study consultant on the Iowa Mathematics and Science Partnership grant IMAP2 (Eric Hart and Cos Fi PIs). That is a math professional development program for secondary teachers in the Fairfield/Ottumwa area. On Friday June 18, 2009 I gave a two-hour talk about the mathematics of pattern recognition/algebraic representations and solutions to polynomial equations. There were about 30 teachers. Applications and connections with secondary school mathematics were also discussed.
- I gave a talk about the SMARTS project and its lesson study components at the Iowa Lesson Study Coordinating Group Inaugural Meeting at the University of Iowa on May 19, 2008. This group was formed as part of Cos Fi and Eric Hart's MSP project IMAP2 (Important Mathematics and Powerful Pedagogy).
- PI (one of two). Three year funding (2005-2008), \$450,000. Title II allocations to Iowa from the No Child Left Behind Act. (*SMARTS Project--Science and Mathematics Avenues to Renewed Teachers and Students*).
- Co-PI. Two Year Funding (1990-1992). \$130,000. NSF Grant USE-9053383, "Calculus with Computing: A National Model Course." with Professor K.D. Stroyan.
- Senior Personnel on NSF Grant DUE 9252486. "Fully Renewed Calculus at Three Large Universities." Principal investigator K.D. Stroyan. Funding \$80,472 from September 1992 to February 1994.
- Participant in a project funded by a mini grant (\$1500) from the RAMS III (Jan. 2004) meeting and from the Iowa Mathematics and Sciences Coalition (\$1500) with focus on the mathematics content knowledge and preparation of elementary school teachers. Other participants come from UNI, ISU, DMACC and NIACC.
- I am served as a mathematics and lesson study consultant on the Iowa Mathematics and Science Partnership grant IMAP² (Eric Hart and Cos Fi PIs). I gave a two-hour presentations in June, 2007, 2008 and 2009 in Ottumwa, IA to the roughly 30 secondary math teachers in this group. The topics of that presentation were mathematics, geometry and applications in two and three dimensions with technology

Internal

- University of Iowa James Van Allen Natural Science Fellowship for Summer 1987 (stipend \$6000).
- University of Iowa Old Gold Fellowship for Summer 1986 (stipend \$3000).

Funding Proposals Submitted but not funded

- Project Math Consultant on a three-year grant application titled "The Distributed Practice-Questioning Strategies (DQ) Project." The PI on the application is Dr. Vicki Burketta, Mathematics Curriculum Consultant for The Iowa City Community School District (ICCS). This is an application to the U.S. Department of Education (Teacher Quality Research – Math/Science Grants CFDA number: 84.305) Teacher Quality Goal Two (Development) project is designed to document evidence-based strategies for improving math teaching and learning in grades K-8 and contribute to the research literature on effective professional development (PD) practice. My role will be to assist in the design and delivery of summer and academic year workshops and to contribute to the design and refinement of the student math achievement assessment tools. This proposal was denied.

Invited Lectures and Conference Presentations (*Title, Date, Place, Institution*)

National

- I gave a one-hour talk at the Iowa Council of Teachers of Mathematics meeting in West Des Moines, Iowa on February 17, 2012 on the mathematics content and pedagogy work in the Iowa Board of Regents/Iowa Department of Education Mathematics and Science Partnership grant EMPOWER II, on which I serve as a PI. The talk was titled EMPOWER I, II and the Core.
- I gave a one-hour talk at the Iowa Council of Teachers of Mathematics meeting in West Des Moines, Iowa on February 18, 2011 on the mathematics content and pedagogy work in the Iowa Board of Regents/Iowa Department of Education Mathematics and Science Partnership grant EMPOWER, on which I serve as a PI. The talk was titled EMPOWER Courses and Cores.
- I gave a half of a one-hour talk at the Iowa Council of Teachers of Mathematics meeting in West Des Moines, Iowa on February 19, 2010 on the mathematics content and pedagogy work in the Iowa Board of Regents/Iowa Department of Education Mathematics and Science Partnership grant EMPOWER, on which I serve as a PI. The other half was given by the other project PI. The talk was titled *EMPOWER at the Core*.
- A one-hour talk “Mathematics and Lesson Study in SMARTS and EMPOWER” at the Iowa Council of Teachers of Mathematics meeting in West Des Moines, Iowa on February 20, 2009 on the mathematics content and pedagogy work in the two Iowa Board of Regents/Iowa Department of Education Mathematics and Science Partnership grants SMARTS and EMPOWER, on which I serve as a PI. At this meeting I also served as part of a two-hour eight-person panel presentation/discussion titled “Discussing the NCTM Focus on High School Mathematics, the Transition Guide, and the Iowa Core Curriculum: What’s a Teacher to Do?”
- “Planning for Successful Math Transition Iowa High Schools to Regent Universities.” February, 15, 2008, Iowa Council of Teachers of Mathematics, West Des Moines, Iowa,
- “The SMARTS (Science and Mathematics Avenues to Renewed Teachers and Students) project.” January 9, 2008, The Annual Joint AMS-MAA. San Diego, CA.
- Content Course Impact on Elementary School Teachers” Mathematical Knowledge.” March 22, 2007 National Council of Teachers of Mathematics meeting in Atlanta, GA
- “The mathematics component of the Science and Mathematics Avenue to Renewed Teachers and Students (SMARTS) Project.” February 23, 2007. Iowa Council of Teachers of Mathematics, West Des Moines, IA
- "When is Rotation a Translation?" February 24, 2006. The Iowa Council of Teachers of Mathematics, West Des Moines, Iowa.
- “The role of Technology in Teaching and Discovery in Mathematics,” Teacher Professional Development Activities in the UI Department of Mathematics. February 25, 2006. Sonia Kovalevsky High School Mathematics Day at University of Iowa.
- "When is Rotation a Translation?" February 24, 2006 Iowa Council of Teachers of Mathematics Annual Conference, Des Moines, Iowa.
- “The Goals of the SMARTS Grant.” October, 2005. The American Mathematical Society Committee on Education, Washington, DC.
- “Mainstreaming in-depth mathematical experiences for Students,” March 25 - 28, 2004. AMS-MER Workshop on Excellence in Undergraduate Mathematics. Loras College, Dubuque, IA.
- “Two New Math Courses for Elementary Education Majors — Design and Procedures for Implementation.” October 17, 2003. 42nd Annual K-12 University of Northern Iowa Fall Mathematics Conference. Ames, Iowa.
- ‘Understandings About Mathematics, and Mathematics Learnings Needed By Secondary Teachers for New Curricula,” “Thoughts on Teacher and Student Understanding in Three Dimensions.” March 14-16, 2002. Pennsylvania Council of Teachers of Mathematics, Philadelphia, Pennsylvania.
- "Higgs Bundles and Holomorphic Forms." March 1999. A.M.S. Meeting # 941, University of Illinois Urbana-Champaign.

- “Technology and Teaching on Integrating Computers into the Teaching of Differential Geometry. June, 1997. Sixth Conference on the Teaching of Mathematics "Focusing on the Next Century: Reshaping Curriculum and Pedagogy." Milwaukee, Wisconsin.
- “Pointwise Curvature Characterizations in Practice." March 1992. "Geometry of Connections" at the A.M.S. Meeting. Springfield, Missouri.
- “Existence and uniqueness of algebraic curvature tensors with prescribed properties and an application to the sphere theorem." May 1988. Geometry and Topology Conference. Lehigh University,
- "Two-forms on Four-Manifolds." October, 1985. A.M.S. meeting. U Mass, Amherst, MA.

Pending Decisions

SERVICE

Profession

- January 2013 I served as a reviewer for the National Council of Teachers of Mathematics (NCTM) Essential Understandings Project. This is a major initiative of the NCTM, the goal of which is to produce a series of 16 books that collectively focus on important mathematics content knowledge for teachers of PreK-12 mathematics. I reviewed materials developed for Pre K-2 teachers to support their content and pedagogy knowledge about geometry in Mathematics for those grade levels.
- July 2011 I served as a reviewer for the National Council of Teachers of Mathematics (NCTM) Essential Understandings Project. This is a major initiative of the NCTM, the goal of which is to produce a series of 16 books that collectively focus on important mathematics content knowledge for teachers of PreK-12 mathematics.. I reviewed materials developed for High School teachers to support their content and pedagogy knowledge about proofs in Mathematics for those grade levels.
- February 2010 I served as a reviewer for the National Council of Teachers of Mathematics (NCTM) Essential Understandings Project. This is a major initiative of the NCTM, the goal of which is to produce a series of 16 books that collectively focus on important mathematics content knowledge for teachers of PreK-12 mathematics. They anticipate publication of the first books in time for the NCTM Annual Meeting in spring 2010. I reviewed materials developed for primary grade teachers to support their content and pedagogy knowledge about addition and subtraction for those grade levels.
- On October 2, 2009 I attended the second Annual Fall Title II conference organized by the Iowa Board of Regents and the Iowa Department of Education, in West Des Moines. I gave a 10-minute presentation on the EMPOWER project. I spoke briefly about the EMPOWER evaluation components and their uses in improving the project.
- I was an invited participant at the Situations Development Conference March 27-29, 2009 in at Penn State University, organized by Penn State University and the University of Georgia. The Situations Project is an attempt to characterize Mathematical Knowledge for Teaching (MKT) at the secondary school level. The participants worked on this task in a variety of sessions. Participation expenses and stipend were funded through the conference organizers through the PSU Mid-Atlantic Center for Mathematics Teaching and Learning and the UG Center for Proficiency in Teaching Mathematics.
- I am a member of the Iowa Department of Education Assessment Advisory Committee. This committee was mandated in legislation in 2008 as part of the adopted Iowa Core Curriculum. The job of the AAC will be to look at end-of-course assessments that support the implementation of the Iowa Core Curriculum. Those assessments will be used in evaluation the components of the ICC which focus on disciplines including Mathematics, Language Arts, Social Studies, etc. The committee will work in the winter and spring of 2009 with a completion target date of June 2009. The first meeting of this committee occurred on January 21, 2009 in Des Moines.
- Invited participant to the AMS-MER Workshop on Excellence in Undergraduate Mathematics: Mathematics for Teachers and Mathematics for Teaching March 13-16, 2003, Ithaca College, Ithaca NY.

- Invited panelist at the Baltimore January 2003 Joint AMS-MAA meeting for the Thursday, January 16, 2003 MAA Committee on the Mathematical Education of Teachers panel discussion titled "The nature of mathematics knowledge and knowledge of mathematics learning needed by secondary school mathematics teachers in an era of technology." I gave a ten minute presentation about my work on math teacher education.
- Spring/Fall 2001: I collaborated with the University of Michigan Geriatrics Center, Dr. Jeffrey B. Halter, MD, Chief and Oscar A. Linares, MD. Dr. Linares is a medical researcher and mathematical modeler. We continue working on applying Differential Geometry and Mathematica to understand physiological changes that occur in the body due to the kinetics and dissipation of certain neurochemicals, such as norepinephrine. A key idea is to apply Differential Geometric techniques to understand how and when this dissipation occurs.
- Visiting Associate Professor of Education Fall 2000 through Spring 2002, at The Pennsylvania State University, in State College, PA. I worked on several NSF-funded projects on the development and delivery of Mathematics materials for in-service K-12 teachers, undergraduate and graduate students in Mathematics Education.
- I run a web-based course 22M:160 Introduction to Differential Geometry 1 using the Mathematica programs I wrote. See the home pages for the [Spring 2000](#) and [Fall 2002](#) courses. This course is listed as part of Wolfram's on-line courseware catalog <http://library.wolfram.com/courseware/> (see Mathematics/Geometry).
- My work on integrating the world wide web tools into my courses using the WebCT homepage program was cited in an article "Workshops and Mini Grants" Give Iowa Professors a Technological Edge" in the Chronicle of Higher Education, October 10, 1997 page A26.

Mathematics Department

- I was actively involved in the planning, design and organization of the First, Second and Third Annual Sonia Kovalevsky High School Mathematics Day in 2006-2011 .
- I have been actively involved in the planning, design and running of all of the annual University of Iowa High School Mathematics competitions starting in 1997. I am currently helping with the most current one to be held March 3, 2012.
- Undergraduate Committee (2011-2012)
- Evaluation of Teaching Effectiveness Committee (2011-2012)
- Colloquium Committee
- Graduate Committee
- Undergraduate Committee
- Hiring Committees in Mathematics and in Curriculum and Instruction
- Evaluation of Teaching Effectiveness Committee
- Scholar's Day Department of Mathematics Representative
- Orientation Services Committee

College

- College of Liberal Arts Committee on faculty use of learning technologies
- College of Liberal Arts Committee on Fostering Course Development for Science General Education Colloquium Committee
- Scholar's Day Department of Mathematics Representative College of Liberal Arts Committee on Fostering Course Development for Science General Education
- Review committee member (Internal reviewer) for the University of Iowa School of Social Work

University

- Fall 2011/Spring 2012 I served as chair of one Departmental Review Committee of the Department of Teaching and Learning for a third year review.
- Fall 2010/Spring 2011 I served as chair of three Departmental Review Committees of the Department of Teaching and Learning. There were two second years reviews and one lecturer review.
- I have been serving as the College of Education Mathematics Education Program Coordinator since Summer 2009.
- Spring 2010 I served as a member of the Departmental Review Committee of the Department of Teaching and Learning for a First-Year Faculty Review. I worked with the committee to produce the First Year Review report
- Fall 2009 /Spring 2010 I served as the Departmental Review Committee chair of the Department of Teaching and Learning Third-Year Faculty Review for an Assistant Professor. I worked with the committee to produce the Third Year Review report.
- Fall 2009 I served as the Departmental Review Committee chair of the Department of Teaching and Learning Faculty Review for a Clinical Associate Professor Vicki. I worked with the committee to produce the report on this professor's application for promotion to Clinical Full Professor.
- General Education Advising Committee (Fall 2007/Fall 2008)
- Faculty Search committee member for Mathematics Education, College of Education (Fall 2008/Spring 2009).
- Faculty review committee member for two Department of Teaching and Learning faculty members the (Spring 2008-Spring 2009).
- Planning, design and organization of The Midwest Geometry Conference held in the honor of Thomas P. Branson. May 17 - 21, 2007

Community

- On February 15, 2011, I gave a 20-minute presentation to the teaching and administrative staff at Kirkwood Elementary school (ICCSd) on ITBS math data analyses that the EMPOWERR math PD project has been doing.
- I participated in the Iowa Mathematics and Science Coalition's High School Student Summit on Mathematics and Science, at the Price Laboratory School Field house at UNI. November 7, 2007 and again on November 5, 2008. This all-day event brought together 250 high school students, as well as teachers, university academics and administrators, business representatives and state officials. The agenda was to investigate student perspectives on the questions "How can we increase the number of students taking higher-level mathematics and science courses in high school? Who influences students in their high school course selection? What are permeating misconceptions related to mathematics and science coursework/careers?"
- I participated in the Iowa Mathematics and Science Coalition's High School Student Summit on Mathematics and Science, at the Price Laboratory School Field house at UNI. November 7, 2007 and again on November 5, 2008. This all-day event brought together 250 high school students, as well as teachers, university academics and administrators, business representatives and state officials. The agenda was to investigate student perspectives on the questions "How can we increase the number of students taking higher-level mathematics and science courses in high school? Who influences students in their high school course selection? What are permeating misconceptions related to mathematics and science coursework/careers?"
- Faculty review committee member for two Department of Teaching and Learning faculty members the (Spring 2008-Spring 2009).
- I participated as one of the team members of a four-member Mathematics Curriculum Review Audit Team for the Iowa City Community School District. The charge of this team was to review the findings of the ICCSD Self Study of Mathematics Education Fall 2007 report and verify or refute its findings. A committee of ICCSD personnel wrote the Fall 2007 report after a year and a half review of curriculum, achievement data, and survey and interview data. The Audit Team's report was presented

- to the ICCSD Central Administration Office at the end of the second day of our review process. October 16 and October 17, 2007.
- Presentation to the members of the University of Iowa Undergraduate Academic Advising Center on the 22M:006 Logic of Arithmetic-course goals, statistics, history, and content on February 10, 2006.
 - University of Iowa representative at the American Mathematical Society Committee on Education. October 24-25, 2003. Washington, DC.
 - During the December 2003-February 2005, I worked with Grant Wood Area Education Agency 10 school science and mathematics content consultants and with the coordinator of the Secondary Science Teacher Education Program at the University of Iowa in designing Mathematics and science professional development programs for K-6 teachers. We designed a three-year program of institutes and in-school experiences in Mathematics and science for about fifty K-6 teachers. On February 14, 2005 we sent to the Iowa Department of Education an application for a Title IIB Iowa Mathematics and Science Partnership Program grant for the Spring 2005 funding round. On March 22, the Iowa Board of Regents office informed us that this project would be funded in full (\$150K per year for each of the three years).
 - Mathematics presentation at a "Science Night" fair at Hoover Elementary School in Iowa City, IA. January 1998. I demonstrated, for elementary school students and their parents, the use of computers in teaching mathematics and gave demonstrations of soap film surfaces and their relation to geometry problems.
 - Creative Project Director "PIVOT" (Powerful Innovations = Vision + Opportunity +Technology) Program. 1997-1998 a two-summer two weeks per summer residential program funded by the GTE Corporation (amount \$30,000) to encourage students in High School to study more Mathematics and science.
 - Tournament grader and assistant for the May 1999, April 2000 and April 2004 Iowa Statewide High School Mathematics Competitions.
 - Tournament Organizer and web page coordinator for the Second (March 7, 1998), Third (March 6, 1999), and Fourth (March 4, 2000), Sixth (March 9, 2002), Seventh (March 8, 2003), Eighth (March 6, 2004) and Ninth (March 5, 2005) and Tenth (March 4, 2006) University of Iowa Annual High School Mathematics Tournaments. I assisted with the Fifth (March 24, 2001) Annual High School Mathematics Tournament.
 - I gave an invited in-service teacher mathematics presentation at Iowa City West High for approximately twenty Iowa City secondary and middle school mathematics teachers from 2:45 p.m. to 4 p.m. on Thursday April 24, 2003. Teachers were engaged in technology-based (Geometer's Sketchpad and DPGraph) activities I had constructed illustrating the use of geometric settings for construction of functions of a single variable or several variables. The technology illustrated dynamic graphics with two- and three-dimensional representations of the functions constructed. The formed scaffolding for several mathematical explorations and questions posed.
 - On August 15, 2005 I gave a ninety-minute talk and question-and-answer session on mathematics topics in the Kendal Lakes Elementary School in the Miami-Dade, Florida school system. This was a talk in Ms. Cristy Nudd's REACH Talented and Gifted Program fifth grade class where I talked about some mathematics ideas involved in trying to understand higher dimensional space. The student had been reading the novel A Wrinkle In Time by Madeline L'Engle. In that book the fourth and fifth dimension play a part. I also showed some graphics, animations and manipulative demonstrations. The students had also constructed paper models of Mobius bands, and we talked about the geometry of those surfaces.
 - As part of my work on the SMARTS grant I attended meetings and classes at Lincoln Elementary School in Washington, IA on September 14, 2005 7:30 a.m.-2:30 p.m. A science lesson on water and slope was presented to two separate classes of fourth graders. A teacher research group from Lincoln Elementary and SMARTS project team members including me attended set up and debriefing meetings before and after each lesson was delivered. We participated in these meetings with the goal of facilitating the improved content and pedagogy of the lessons delivered.

- At the Iowa Council of Teachers of Mathematics meeting in West Des Moines, Iowa on February 18, 2011 I was given the ICTM Lifetime Achievement Award, at the ICTM Recognition/Business Meeting, 10:00-11:15 a.m. I was given a wooden plaque with the inscription “Presented to: Walter Seaman in grateful appreciation for his many contributions to mathematics education and constant support of the Iowa Council of Teachers of Mathematics 2011”.
- I am a member of the Iowa Department of Education Mathematics Leadership Team .The purpose of this team is to develop a pool of educators who serve as resources for AEAs and school districts who are familiar with best practice ideas in teaching of mathematics, coordinate and integrate school and community efforts that advance K-12 education in mathematics.
- On October 1, 2010 I attended the third Annual Fall Title II conference organized by the Iowa Board of Regents and the Iowa Department of Education, in West Des Moines. I gave a 20-minute presentation on the EMPOWER project. A Power Point presentation given at this meeting is available on request. The presentation focused on how evaluation components of the project have used to determine project impact
- In September 2010 I was invited by the Iowa Department of Education to join the State of Iowa Mathematics Leadership Team. The purpose of this team is to develop a pool of educators who serve as resources for AEAs and school districts who are familiar with best practice ideas in teaching of mathematics, coordinate and integrate school and community efforts that advance K-12 education in mathematics. Additionally the team is charged with working with educators to implement the Common Core State Standards and the Iowa Core Mathematics.
- I gave a poster presentation about the EMPOWER project at the IMSEP Iowa Science and Mathematics Teacher Educators Summit August 3, 2010 at Grinnell College. Along with EMPOWER joint-PI Vicki Burketta, I discussed various elements and outcomes of the EMPOWER project with a number of STEM educators and Iowa government representatives, Governor Chet Culver.
- On May 4, 2010 I participated in the Iowa Mathematics and Science Coalition's Third Annual Student STEM Symposium held on the University of Iowa campus (IMU for the opening events). This all-day event brought together middle school students, as well as teachers. The goal was to have middle school students experience first-hand STEM scientists’ work and have the opportunity to interact with them and learn about the wide variety of career and disciplinary options open to them if they continue working in science and mathematics classes.
- On October 9, 2009 I participated in the Iowa Community Colleges and Regent Universities Articulation Meeting held at the University of Northern Iowa (the meeting sponsors were the UNI Office of Admissions and UNI Department of Mathematics). The focus of this meeting was on issues pertinent to articulation among the various State institutions of higher learning. I served as a moderator for an afternoon whole-group discussion which brought together reports from course-focus breakout sessions, which included planning for follow-up actions.
- I am a member of the Steering Committee of the Regents Mathematics & Science Education Collaborative Initiative, headed by University of Northern Iowa President Ben Allen.
- I am one of the University of Iowa representatives for The Iowa Initiative for College Mathematics and Statistics Education (I2CMASE). This project involves the five departments in the mathematical sciences at the Regents’ universities. One of its many goals is to assist students in their transition from high school or community college to the university
- Reviewer for mathematics materials written in support of the IDE Iowa Core Curriculum. February 2008. I reviewed and gave suggestions and comments for Math II unit on Correlation and Regression. This entailed examination of a set of five activities for secondary school students, each activity requiring two 50-minute class periods.

- Part of the steering committee for the planning Board of Regents Mathematics and Science Education Collaborative Initiative hosted Mathematics Transitions Congress. March 31, 2007. UNI. This meeting brought together about 90 High School math teachers, regents institution mathematicians, statisticians, educators, as well as public policy people and IDE representatives, and several students to discuss issues related to the mathematics preparation of Iowa students making the transition from secondary school to post secondary at a Regents institution. I facilitated several table discussions with students and teachers and recorded student ideas on the agenda questions in electronic form. An electronic compilation of the day's results is planned. I gave a talk about this work at the Iowa Council of Teachers of Mathematics meeting in West Des Moines, Iowa on February 15, 2008 on Planning for Successful Math Transition Iowa High Schools to Regent Universities (with Jeffrey Weld of UNI).
- Starting on October 5, 2006, I became one of the two Co-Chairs of the Iowa Mathematics and Science Coalition. This job has a three-year term of office with responsibilities including planning and running IMSC Executive Board and Governing Board meetings, and helping to set the IMSC agenda for the future.
- Course organizer and teacher for the Iowa Secondary Student Training Program July 1999. I organized and ran a six-week course on Differential Equations and Mathematica, for a High School Senior. The focus of the course was the study of the Differential Equations arising from inhaled anesthesia.
- I participated in the two-day Iowa Mathematics and Science Coalition Governing Board meeting January 25-26, 2007 held at John Deere Credit in Johnston, IA. 35 members of the IMSC Governing Board were in attendance. A representative from Governor Culver's office attended and spoke about the Governor's support for and interest in the IMSC's work. Outcomes of these meetings included newly drafted IMSC vision and mission statements, and strategies for working toward achieving the mission and vision.
- Winter 2005: I participated in the *Mathematics, Science and Technology Day at the Capitol* at the Des Moines Capitol Rotunda held on Thursday, January 27. The Iowa Mathematics and Science Coalition sponsored this event. I exhibited a banquet display poster with facts about the new Logic of Arithmetic and Theory of Arithmetic courses. I also showed a laptop computer showing Mathematica animations and other information used in 22M:160 Introduction to Differential Geometry course I designed.
- I was a member of the planning committee for November 10-11, 2005 Iowa Summit on Mathematics, Science and Technology Education: Promoting Economic Development. This event brought together in Des Moines, IA 150 members from academia, government and private industry to discuss and take action on critical issues related to mathematics and science education in Iowa. I chaired several committee meetings which initiated three action plans and mini grant proposals to address this goal: Iowa's education system will be well-coordinated and research-based, providing learners seamless pathways across education sectors and into the workplace.
- Fall 2005/Winter 2006: I was a member of the Planning Committee for the Fifth Iowa Regent's Academy for Mathematics and Science. The charge of this committee was to organize themes and goals for the fifth Marshalltown meeting in January 2006 of the RAMS. I attended the RAMS V meeting and facilitated several of the sessions.
- Fall 2004/Winter 2005: I was a member of the Planning Committee for the Fourth Iowa Regent's Academy for Mathematics and Science. The charge of this committee was to organize themes and goals for the fourth Marshalltown meeting in January 2005 of the RAMS. I attended the RAMS IV meeting and facilitated two of the sessions.
- Fall 2003: I was a member of the Planning Committee for the Third Iowa Regent's Academy for Mathematics and Science. The charge of this committee was to organize themes and goals for the third Marshalltown meeting in January 2004 of the RAMS. I attended the RAMS III meeting and facilitated two of the sessions.
- Fall 2002: I was a member of the Planning Committee for the Second Iowa Regent's Academy for Mathematics and Science. The charge of this committee was to organize themes and goals for the second Des Moines meeting in January 2003 of the RAMS, and to decide on which projects proposed during that meeting would receive funding. I attended the RAMS II meeting and facilitated two of the sessions.
- Fall 2002-Winter 2006: University of Iowa representative for the Iowa Mathematics and Science Coalition

TEACHING AT THE UNIVERSITY OF IOWA

Teaching Assignments

| SEMESTER/YR | ADVISEES | | COURSES TAUGHT | |
|-------------|-----------|----------|-----------------------------------------------|-------------------|
| | Undergrad | Graduate | Course Number and Title | Students Enrolled |
| Spring 2012 | 7 | 0 | 22M:006 Logic of Arithmetic | 87 |
| | | | 07S:095 Introduction & Practicum: Mathematics | 4 |
| | | | 07S:236 Teaching of Geometry | 4 |
| | | | | |
| Fall 2011 | 7 | 0 | 22M:006 Logic of Arithmetic | 88 |
| | | | 22M:012 Theory of Arithmetic | 29 |
| | | | 07S:134 Methods Middle School Mathematics | 10 |
| | | | | |
| Spring 2011 | 10 | 3 | 22M:006 Logic of Arithmetic | 115 |
| | | | | |
| Fall 2010 | 10 | 2 | 22M:006 Logic of Arithmetic | 90 |
| | | | 22M:012 Theory of Arithmetic | 35 |
| | | | | |
| Spring 2010 | 9 | 1 | 22M:006 Logic of Arithmetic | 113 |
| | | | | |
| Fall 2009 | 9 | 1 | 22M:006 Logic of Arithmetic | 95 |
| | | | 22M:012 Theory of Arithmetic | 19 |
| | | | | |

| | | | | |
|-------------|---|---|------------------------------|-----|
| Spring 2009 | 9 | 0 | 22M:006 Logic of Arithmetic | 119 |
| | | | | |
| Fall 2008 | 9 | 0 | 22M:006 Logic of Arithmetic | 106 |
| | | | 22M:012 Theory of Arithmetic | 24 |
| | | | | |
| Spring 2008 | 9 | 0 | 22M:006 Logic of Arithmetic | 117 |
| | | | | |
| Fall 2007 | 5 | 0 | 22M:006 Logic of Arithmetic | 110 |
| | | | 22M:012 Theory of Arithmetic | 23 |
| | | | | |
| Spring 2007 | 5 | 0 | 22M:006 Logic of Arithmetic | 120 |
| | | | | |
| Fall 2006 | 5 | 0 | 22M:006 Logic of Arithmetic | 100 |
| | | | 22M:012 Theory of Arithmetic | 27 |
| | | | | |
| Spring 2006 | 4 | 0 | 22M:006 Logic of Arithmetic | 114 |
| | | | | |
| Fall 2005 | 5 | 0 | 22M:006 Logic of Arithmetic | 123 |
| | | | | |
| Spring 2005 | 4 | 0 | 22M:006 Logic of Arithmetic | 107 |
| | | | | |
| Fall 2004 | 5 | 0 | 22M:006 Logic of Arithmetic | 122 |
| | | | 22M:012 Theory of Arithmetic | 26 |
| | | | | |

Courses Taught:

Precalculus Mathematics:

Logic of Arithmetic, Theory of Arithmetic, Geometry for Elementary School Teachers, Finite Mathematics

Calculus:

Introduction to Calculus with Applications, Calculus for the Biological Sciences, Quantitative Methods 1 (Calculus for Business Majors), Calculus with Modeling 1 (technology-based), Calculus with Modeling 2(technology-based), Calculus 1, Calculus 2, Calculus 2 Honors, Calculus 3, Engineering Calculus 1, Engineering Calculus 2, Vector Calculus for Engineers, Accelerated Calculus 1 (technology-based), Accelerated Calculus 2 (technology-based)

Mathematics Beyond Calculus:

Linear Algebra, Matrix Algebra for Engineers, Differential Equations for Engineers, Fundamental Properties of Spaces and Functions 1, Complex Analysis, Discrete Mathematical Models, Introduction to Differential Geometry 1, Introduction to Differential Geometry 2, Readings in Mathematics

Mathematics Education:

The following courses were developed and taught at The Pennsylvania State University by PSU Mathematics Education faculty and myself:

Mathematical Modeling in Secondary School Mathematics, Computer Graphics and Other Topics for Teaching Secondary School Geometry Concepts, Foundations of Secondary Mathematics I, Foundations of Secondary Mathematics II

•The following course was developed and taught via pictel at The Pennsylvania State University, The University of Maryland and The University of Delaware by Mathematics faculty at PSU, UM, UD and myself as part of the Mid-Atlantic Center for Mathematics Teaching and Learning:

Foundations of Mathematics 1, Foundations of Mathematics 2

Mathematics Courses for In-Service Mathematics School Teachers:

The following course was developed and taught in the Pittsburgh Public School system by PSU Mathematics Education faculty and myself:

Mathematical Ideas that Cross School Mathematics Curriculum

Graduate Mathematics Courses Taught:

Differential Geometry 1, Differential Geometry 2, Topics in Differential Geometry, Seminar: Differential Geometry, Reading Research

Students Supervised

| Degree Objective | Student Name | Years | Outcome |
|--------------------|------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ph.D. | Stephen P. Bean | | PhD awarded Sp,1996 |
| BA | Matthew Martin | 1 semester (<i>Sp,1997</i>) | |
| BA | Ryan Therkelsen | 1 semester (<i>Fall 1999</i>) | |
| BA | Luke Gutzwiller | 1 semester (<i>Spring 2000</i>) | |
| PhD (in education) | Claudia Aguirre | 2 semesters (Fall 2008/Spring 2009) | <i>Ms. Aguirre is doing data analysis for data collected in two teacher professional development grant projects (SMARTS and EMPOWER) on which I serve as a PI.</i> |
| PhD (in education) | Doris De Mayo Figueroa | 1 semesters (Spring 2010) | <i>Ms. De Mayo Figueroa is doing data analysis for data collected a teacher professional development grant projects (EMPOWER) on which I serve as a PI.</i> |

PhD Committees

1. Ph.D. Thesis committee member for Mijia Lai (Chairs H. Fang and L. Wang) in Mathematics. Thesis defense 04/06/11
2. Ph.D. Thesis advisor for Douglas Dalman (Chair W. Seaman) in Mathematics Education
3. Ph.D. Thesis committee member for Will Hager (Chair J. Simon) in Mathematics. Thesis defense 07/01/10
4. Ph.D. Thesis committee member for Arvind Rao (Chair H. Fang) in Mathematics. Thesis defense 02/25/10
5. Ph.D. Thesis advisor for Doris De Mayo Figueroa (Chair W. Seaman) in Mathematics Education.
6. Ph.D. Thesis committee member for Yangho Choi (Chair P. Jorgensen) in Mathematics. Thesis defense 07/06/07
7. Ph.D. Thesis committee member for Alfredo Villanueva (Chair P. Jorgensen) in Mathematics. Thesis defense 04/19/07
8. Ph.D. Thesis committee member for Michael Matthews (Chair W. Nibbelink) in Mathematics Education. Thesis defense 04/03/06.
9. Ph.D. Thesis committee member for Joo Kim (Chair K. Abdel-Malek) in Engineering. Ph.D. Comprehensive Exam 03/08/05.
10. Ph.D. Thesis committee member for Doojin Hong (Chair T. Branson) in Mathematics. Thesis defense 07/13/04.
11. Ph.D. Thesis committee member for Doojin Hong (Chair T. Branson) in Mathematics. Thesis defense 07/13/04.
12. Ph.D. Thesis committee member for Cos Fi (Chair D. Grouws) in Mathematics Education. Prospectus meeting 10/14/02. Thesis defense 05/23/03.
13. Ph.D. Thesis committee member for Oleg Svidersky (Chair T. Branson) in Mathematics. Thesis defense 07/15/02.
14. Ph.D. Thesis committee member Cynthia McCabe (Chair R. Randell) in Mathematics, 1998. Thesis defense 6/18/98.
15. Ph.D. Thesis committee member Lawrence Peterson (Chair T. Branson) in Mathematics, 1998. Thesis defense 6/24/98.
16. Ph.D. Thesis committee member for Theo Davis (Chair D. Grouws) in Mathematics Education. Prospectus meeting attended 8/22/97.
17. Ph.D. Thesis committee member for Monica Meissen (Chair R. Randell) in Mathematics. Thesis defense 7/9/97.
18. Ph.D. Thesis committee member for Bettie Truitt (Chair H. Schoen) in Mathematics Education. Prospectus meeting attended 5/1/97. Thesis defense 5/29/98.
19. Ph.D. Thesis committee member for Julie Graham (Chair H. Schoen) in Mathematics Education. Prospectus meeting attended in 11/96. Thesis defense 10/28/97.
20. Ph.D. Thesis Advisor for Stephen P. Bean in Mathematics. Thesis title: "Riemannian Manifolds Satisfying $\text{Ric}^\alpha g, W=0$ and their Isotropic Curvatures", degree dated May 1996. Ph.D. Thesis committee member for David Feil (Chair R. Oehmke) in Mathematics, Ph.D. 8/95
21. Ph.D. Thesis committee member for Asuman Oktac (Chair R. Oehmke) in Mathematics, Ph.D. 8/94
22. Ph.D. Thesis committee member for Bettie Truitt (Chair H. Schoen) in Mathematics Education. Prospectus meeting attended 5/1/97. Thesis defense 5/29/98.
23. Ph.D. Thesis committee member for Beng-Chong Teo (Chair O. Durumeric) in Mathematics, Ph.D. 5/92.
24. Ph.D. Thesis committee member for Dirk Garner (Chair L. Fritts) in Music. Thesis defense 7/19/99.
25. Ph.D. Thesis committee member for Nomusic Morobe (Chair R. Zbiek) in Mathematics Education. Prospectus meeting attended 6/22/99, thesis defense 5/25/00.

