Curriculum Vitae

ANNIE SELDEN

Ph.D. Clarkson University 1974
M.A. Yale University 1962
B.A. Oberlin College 1959

Research interests: Mathematical reasoning and problem solving, logic, definition, proof, validation, teachers' knowledge and beliefs. Semigroups.

EMPLOYMENT HISTORY

2003-	New Mexico State University, Las Cruces, New Mexico	Adjunct Professor
2003-	Tennessee Technological University, Cookeville, Tennessee	Professor Emerita
1999-00	Arizona State University, Tempe, Arizona	Visiting Professor
1995-03	Tennessee Technological University, Cookeville, Tennessee	Professor
1990-95	Tennessee Technological University, Cookeville, Tennessee	Assoc. Professor
1985-90	Tennessee Technological University, Cookeville, Tennessee	Asst. Professor
1978-85	Bayero University, Kano, Nigeria	Sr. Lecturer
1974-78	Bosphorus University (formerly Robert College of Istanbul)	Asst. Professor
1973-74	Hampden Sydney College, Hampden Sydney, Virginia	Asst. Professor
1969-71	S.U.N.Y. College at Potsdam, New York	Instructor

Other jobs in programming, statistical research, actuarial work.

PROFESSIONAL SERVICE

- Editor (with F. Hitt and D. Holton), *Research in Collegiate Mathematics Education*, a series of volumes published by CBMS, 2001-2006 .
- Guest Editor (with J. Selden), Special Issue on Advanced Mathematical Thinking, *Mathematical Thinking and Learning*, Vol. 7, No. 1, 2005.
- Member, Editorial Panel, *Journal for Research In Mathematics Education*, 1997-2000 . Entailed reviewing 17-20 manuscripts/yr. and attending two working weekend meetings/yr.
- Associate Editor of *MAA Online*'s Teaching and Learning, 1997- . Member, Editorial Board, *Focus/MAA Online*, 1999- .
- Coordinator, MAA's Special Interest Group for Research in Undergraduate Mathematics Education 1999-2002.
- Department Editor of the Research Sampler column in *MAA Online*'s Teaching and Learning Section, 1997- and previously in *UME Trends*, 1989-96 . Also wrote numerous news and feature articles regarding mathematics education for *UME Trends.*
- Associate Editor of Media Highlights, *The College Mathematics Journal*, 1994-2006. Entails writing 10-15 abstracts/yr., as well as editing the rest.
- Member, Editorial Board, MAA *Illustrative Resources for the CUPM Curriculum Guide 2004* (CUPM-IR), 2003-2005.
- Member, National Advisory Committee, MAA Project, *Preparing Mathematicians to Educate Teachers*, 2003-2005.

- Member, Editorial Board, *Journal of Computers in Mathematics and Science Teaching*, 1994-96.

- External Evaluator for Hiring/Tenure/Promotion at a variety of universities in the U.S., Canada, and Israel.

- External Evaluator for a PhD dissertation in undergraduate mathematics education research at the University of Arizona, 2004.

- External Evaluator for the PhD proposal in collegiate mathematics education at Georgia State University, 2004.

- External Evaluator, research grant applications, Social Sciences and Humanities Research Council of Canada, 2004.

- Review additional papers and proposals for *Research in Collegiate Mathematics Education, The College Mathematics Journal, American Mathematical Monthly, Journal of Mathematical Behavior, Journal of Computers in Mathematics and Science Teaching, Journal of Mathematics Teacher Education, Canadian Journal of Science, Mathematics and Technology Education, Educational Studies in Mathematics, Journal for Research in Mathematics Education, Proceedings of PME* and *PME-NA*, AERA's SIG/RME, Israel Science Foundation.

- Mentor to mathematicians trying to get into research in undergraduate mathematics education.

Invited Speaker/Organizer of Professional Sessions:

- Invited speaker (with J. Selden), "Understanding the Proof Construction Process,"19th ICMI Study Conference on Proof and Proving, Taipei, Taiwan, May 10-15, 2009.

- Invited speaker, "Understanding and Constructing Proofs: A Design Experiment," University of Texas at Arlington, Mathematics Department Colloquium, January 30, 2009. Also presented at the Southwestern Section of the MAA, April 4, 2009.

- Invited speaker, "Research Collaborations between Mathematicians and Mathematics Educators," Project NeXT panel presentation, Joint AMS/MAA Mathematics Meetings, Washington, DC, January 7, 2009.

- Invited speaker (with J. Selden), "Habits of Mind for Proving," AMS-MAA-MER Special Session on Mathematics and Education Reform, Joint AMS/MAA Mathematics Meetings, Washington, DC, January 6, 2009.

- Invited speaker, "ICME-11 in Retrospect," panel presentation, AMS/MAA Joint Mathematics Meetings, Washington, DC, January 5, 2009.

- Invited speaker (with J. Selden), "A Beginning Graduate Transition-to-Proof Course," AMS/MAA MER Special Session, Joint AMS/MAA Mathematics Meetings, San Diego, January 9, 2008.

- Invited speaker, "Two Habits of Mind and How They Can Be Developed," Project NeXT panel presentation, Joint AMS/MAA Mathematics Meetings, San Diego, January 8, 2008.

- Invited speaker (with J. Selden), "Overcoming students' difficulties in learning to understand and construct proofs," SIGMAA on RUME Session, Joint AMS/MAA Mathematics Meetings, San Diego, January 6, 2008.

- Invited speaker (with J. Selden), "Research on Student Proving and a Course to Improve It," Teaching and Learning Seminar, Department of Mathematical Sciences, UTEP, November 18, 2005. Also presented to the New Mexico State University Mathematics Department Colloquium, October 27, 2005.

- Invited speaker, Project NExT, Mathfest, "Two Research Traditions Separated by a Common Subject: Mathematics and Mathematics Education," Albuquerque, August 2, 2005.

- Invited speaker, PMET Workshop, "Learning Mathematics and Constructing Understanding," Southwestern Indian Polytechnic Institute, Albuquerque, July 25, 2005.

- Invited speaker, Southwest Section MAA, "Two Research Traditions Separated by a Common Subject:

Mathematics and Mathematics Education," El Paso, April 1, 2005.

- Co-organizer, CTUM Session, *Learning to Prove: Strategies to Improve Students' Proof Writing Skills*, AMS/MAA Annual Meeting, Atlanta, January 2005.

- Invited speaker, TSG3: *New developments and trends in mathematics education at the tertiary level*, ICME-10, Copenhagen, July 2004.

- Invited speaker, Panel on Research in Undergraduate Mathematics Education, 7th Annual R. L. Moore Legacy Conference, *Some Research to Inform the Teaching of Proof-Based Courses*, March 2004.

- Invited speaker, Symposium: *The Changing Nature of Proof in Mathematics: Past, Present, Future*, AAAS Annual Meeting, Seattle, Washington, February 2004.

- Invited speaker, Project NExT Panel: *Being a Good Consumer of Mathematics Education Research*, AMS/MAA Annual Meeting, Phoenix, Arizona, January 2004.

- Invited speaker presenting, "Validations of Proofs Considered as Texts: Can Undergraduates Tell Whether an Argument Proves a Theorem?", New Mexico State University Mathematics Colloquium, March 13, 2003.

- Invited speaker presenting, "Contrasting Research in Mathematics and Mathematics Education," University of Arizona Conference *Mathematics Education and Mathematics in the 21st Century: The Roles of Outreach, Teacher Preparation, and Research on Teaching and Learning in a Research I Mathematics Department*, February 20-23, 2003

- AWM-MAA Invited Address, "Two Research Traditions Separated by a Common Subject: Mathematics and Mathematics Education," MAA Mathfest, Burlington, Vermont, August 3, 2002. Available as a Tennessee Technological University Mathematics Department Technical Report No. 2002-2; see http://www.math.tntech.edu/techreports/techreports.html.

- Invited speaker, "Logic Used in Students' Transition Course Proofs," Second International Conference on the Teaching of Mathematics (at the University Level), University of Crete, July 1-6, 2002.

- Invited speaker, University of Northern Colorado Mathematics Education Colloquia, February 4 and March 12, 2002.

- Invited speaker, MAA Panel on *Faculty Isolated by Discipline*, AMS/MAA Annual Meeting, New Orleans, January 11, 2001.

- Organizer of joint MER/ARUME session, AMS/MAA Annual Meeting, Washington, D.C., January 2000.

- Invited speaker presenting "A Potpourri of Research in Undergraduate Mathematics Education, University of Arizona Mathematics Education Colloquium, November 23, 1999.

- Invited Address, "Questions from Mathematics Education Research We Might Ask Our Students," Association for Research in Undergraduate Mathematics Education (ARUME), MAA Mathfest, Providence, RI, July 31, 1999.

- Coordinator, Research Forum: *Learning and Teaching Undergraduate Mathematics*, 23rd Annual Conference of the International Group for the Psychology of Mathematics Education (PME), Haifa, Israel, July 25-30, 1999.

- Invited speaker, Mathematics Department Seminar, Middle Tennessee State University, April 7, 1999.

- Co-organizer, ARUME paper session, AMS/MAA Annual Meeting in San Antonio, January 1999.

- Working Group Co-Chair: *The Future of Research in Tertiary Mathematics Education*, ICMI Study Conference on the Teaching and Learning of Mathematics at University Level, Singapore, December 8-12, 1998. Wrote chapter for the ICMI Study volume published by Kluwer in September 2001.

- Invited speaker presenting, “Some Aspects of Research in Undergraduate Mathematics Education,” Tennessee Technological University Graduate Seminar, April 5, 2001.

- Invited speaker, MAA/SIAM Regional Meeting, "What's Really Going on in Students' Heads? How We Got into Math Ed Research," San Diego, March 1996.

- CRUME Panelist, "Implications of Research in Mathematics Education for Two-Year Colleges," AMATYC Annual Conference, Indianapolis, November 1992.

- Invited speaker, "Overview of preservice teachers' knowledge and beliefs about mathematics," NCTM Eastern Regional Conference, Columbus, Ohio, September 1992.

- ICME-7 Subgroup Coordinator: Calculus for Nonspecialists, Working Group on *Students' Difficulties with Calculus* at Seventh International Congress on Mathematical Education, August 1992.

- Organizer: AMS/MAA Special Sessions on Research in Undergraduate Mathematics Education, AMS/MAA Annual Meeting, Orlando, January 1996.

- Organizer: MAA CRUME Panel on Research Methods in Mathematics Education, AMS/MAA Annual Meeting, Orlando, January 1996.

- Reader: AP Calculus Exams, 1990-92.

- Organizer: Fifth Annual Nigerian Mathematical Society Conference, April 1984.

- External Examiner for the mathematics departments of the Federal Advanced Teachers college, Katsina and Advanced Teachers College, Gumel in Nigeria.

- Acting Head, Department of Mathematics, Bayero University, Spring Term 1983, and substantive head, 1983-85.

Professional Associations (with offices held):

- SIGMAA on RUME (Coordinator, 2000-2002), AERA, PME and PME-NA (International Group for the Psychology of Mathematics Education and its North American Chapter), NCTM, RCML, AMS, MAA, AWM, NSSE, AAAS, ASSC (Association for the Scientific Study of Consciousness).

- AAUP (local President, 1994-5, Vice President, 1992-3, and Secretary, 1991-2).

- Women in Higher Education in Tennessee (State President in 1992-3, produced first membership directory and articles for newsletter; local President, 1990-2).

- Tennessee ACE/NIP Conference Planning Committee, 1992-3.

- MAA Departmental representative, 1986-2000.

Professional Service Publications:

- 26 Research Sampler columns and 36 news/feature articles (many with J. Selden) in the Teaching and Learning section of *MAA Online* (1996-) and earlier in *UME Trends* (1989-96). The Research Sampler column also includes bibliographies and a glossary. Also, 9 other publications in *Focus*, etc. These are detailed below.

- 122 abstracts of mathematics education research articles (with J. Selden) for Media Highlights, *The College Mathematics Journal*, 1994 - present.

National/International Committee Memberships:

- International Program Committee, 19th ICMI Study on Proof and Proving, to be held in Taiwan in May 2009,

served 2007- .

- AWM's Louise Hay Award Selection Committee, 2002-2004 (Chairperson, 2004).
- Program Committee for the 1999, 2000, and 2001 Conferences on Research in Undergraduate Mathematics Education.
- MAA Search Committees for *Focus* and *Monthly* editors, 1997 & 2000.
- MAA Committee on Teaching Undergraduate Mathematics, 2001- . MAA Task Force on Graduate Education, reporting to Professional Development Committee, 1996-9 .
- AMS/MAA CRUME Subcommittee for the Special Session on Research in Math Ed., January 1993 Annual Meeting.
- Program Committee for the 1994, 1996, and 1997 Annual Meetings of PME-NA.
- SIGMAA on RUME Executive Committee 1998-2002; Governance Committee (Chairperson), 1998-2005, 2007- ; Publications Committee, 2002-2005, Nominating Committee (Chairperson), 2004, *RCME* Editor Search Committee, 2004 .

University Committee Memberships:

- TTU Faculty Senate 1990-93. TTU Administrative Council 1990-93.
- TTU Honors and Awards Committee, 1988-89. College of Arts and Sciences Women and Gender Studies Curriculum Committee, 1998-2001.
- Math. Dept. committees: Academic, graduate program planning, graduate, undergraduate, undergraduate program review, college self-study, chairman selection, faculty search, curriculum, tenure, promotion (chairperson, 1996 & 2000), textbook selection, public relations, level one review, complex variables, linear algebra, calculus (chairperson, 1997-2000), college algebra, SACS goals and assessment, schedule, maintenance, new faculty orientation.
- TTU Math. Dept. Graduate Advisor, 2000-2003.

RECOGNITION AND AWARDS

- Elected AAAS (American Association for the Advancement of Science) Fellow, 2003.
- Recipient of the 12th Annual Association for Women in Mathematics' Louise Hay Award for Contributions to Mathematics Education, 2002. For citation and response, see http://www.awm-math.org/hayaward/2002.html.
- Visiting Professor of Mathematics, Arizona State University, 1999-2000.
- Visiting Scholar: Center for Research in Mathematics and Science Education, San Diego State University, 1995-96.
- Visiting Scholar: EMST, Graduate School of Education, University of California, Berkeley, Fall Semester 1993.
- Nominated for AWM's Louise Hay Award for Contributions to Mathematics Education, 1999.
- Nominated for TTU Outstanding Faculty Award for Teaching , 1989 & 1994.
- Nomination for TTU Outstanding Faculty Award for Professional Service, 1999 & 2002.
- Selected for inclusion in the 22nd and 23rd Editions of *Who's Who in the South and Southeast*, the 30th and 32nd

Editions of *Who's Who in the South and Southwest*, the 17th , 18th, 24th, 25th, 27th Editions of *Who's Who of American Women*, the 7th and 2007-2008Editions of *Who's Who in American Education*, the 59th, 60th Diamond, and 64th Editions of *Who's Who in America*, and *Outstanding Academics of the 21st Century*. Nominated IBC International Educator of the Year 2004. Granted IBC *21st Century Award for Achievement.* Inaugural member of IBC's *Leading Educators of the World, 2005*. Biographical candidate for *Manchester Who's Who Among Executive and Professional Women.* Consider for 64th *Who's Who in America* in 2010.

- Grants awarded: 1 EAF (Educational Advancement Foundation) 2007-2009, 3 NSF, 12 internal TTU, NCTM Travel Grants to ICME-10 and ICME-11, SIGMAA on RUME Mentoring Mini-Grant, 2 other. Woodrow Wilson Fellow, 1960-61. Fulbright Scholar, 1959-60.

TEACHING

- Varied teaching methods for a broad spectrum of students from disadvantaged to gifted, from nonmajors to graduate students, as well as students whose native language is not English. Taught in universities abroad for 11 years: Turkey & Nigeria.

- **Courses Taught:** Math for elementary education majors, inservice math for teachers, math for B.Ed. students, math for liberal arts students, trigonometry, college algebra, finite mathematics, precalculus, calculus for business students, calculus for engineers, honors calculus, matrix algebra, linear algebra, transition to abstract mathematics, abstract algebra, history of mathematics, advanced calculus, real variables, complex variables, topology, applied mathematics, group theory, applied algebra, semigroups, topological algebra, graduate seminars on mathematics education research at the University of Kentucky and New Mexico State University, a transition-to-proof course for beginning graduate and advanced undergraduate students at New Mexico State University, a directed readings course on research in mathematics education at New Mexico State University, Understanding and Constructing Proofs – a design experiment at New Mexico State University, proof supplement for undergraduate real analysis..

- **Current Courses at NMSU:** In the Spring Dr. John Selden and I co-teach a graduate math course on research in mathematics education, and in the Fall and Spring we co-teach a graduate math course designed to improve the proving skills of beginning graduate students, a proof supplement for undergraduate real analysis.

- **Design Experiment:** In 2007, a two-year grant was received from the Educational Advancement Foundation to develop and study a course to improve the proving skills of beginning graduate and advanced undergraduate students.

- **Curriculum Development Project:** Enhanced calculus, a two-semester sequence taught using notes and available technology (originally HP-28S, then HP-48SX calculators) and containing only nonroutine problems, requiring justification for solution methods. Described in *Formula for Reform: The Role of the Comprehensive University in Undergraduate Science and Engineering Education*, AASCU, 1989 and *Priming the Calculus Pump: Innovations and Resources*, MAA Notes No. 17, 1990. The calculators were replaced with *Mathematica* on MAC IIs using funds obtained through grants (NSF ILI and Wolfram).

- **Ph.D. Students** (dissertations co-directed):
  Kadir Ahre, 1979. Kadir is now Professor in the Department of Mathematics, Ayazaga Campus of Istanbul Technical University in Turkey.
  Semih Koray, 1980. Semih is now Visiting Professor in the Faculty of Economics, Administrative and Social Sciences at Bilkent University in Turkey.

- **Masters Student** (thesis directed):
  Scott W. Baker, 2001. "Proofs and Logic: An Examination of Mathematics Bridge Course Proofs." Scott now teaches secondary school mathematics in Tennessee.

- **1 current Ph.D. student** (research in undergraduate mathematics education): Kerry McKee.

RESEARCH AND SCHOLARLY PUBLICATIONS

Collegiate Mathematics Education:

1. "Mathematical Habits of Mind," (with K. Lim). Proposal. Accepted for a PME-NA Working Group. June 11, 2009.

2. "Affect, Behavioral Schemas, and the Proving Process," (with K. McKee and John Selden). To appear in a special issue of *The International Journal of Mathematical Education in Science and Technology*.

3. "Understanding the Proof Construction Process," (with J. Selden). In F-L. Lin, F-J. Hsieh, G. Hanna, & M. deVilliers Eds.), *Proceedings of the ICMI 19 Study 19 Conference: Proof and Proving in Mathematics Education*, Vol. 2 (pp. 196-201). Department of Mathematics, National Taiwan Normal University, Taipei, Taiwan, May 2009.

4. "Difficulties First-year University Students Have in Reading Their Mathematics Textbooks," (with M. Shepherd and J. Selden). Tennessee Technological University Mathematics Department Tech Report No. 2009-1, March 2009.

5. "Teaching Proving by Coordinating Aspects of Proofs with Students' Abilities," (with J. Selden). In D.A. Stylianou, M. L. Blanton, & E. J. Knuth (Eds.), *Teaching and Learning Proof Across Grades: A K-16 Perspective* (pp. 339-354). New York/Washington, DC: Routledge/National Council of Teachers of Mathematics, 2009.

6. "Teaching Advanced Students to Construct Proofs," (with J. Selden & K. McKee). In O. Figueras, J. L. Cortina, S. Alatorre, T. Rojano, & A. Sepulveda (Eds.), *Proceedings of the Joint Meeting of PME 32 and PME-NA XXX* (p. I-305), 2008. Longer handout available.

7. "Improving Advanced Students Proving Abilities," (with J. Selden & K. McKee). A paper for *ICME-11 Topic Study Group 18: Reasoning, proof and proving in mathematics education,* 2008. Available online at: http://tsg.icme11.org/tsg/show/19.

8. "The Relation Between Affect and the Proving Process," (with K. McKee & J. Selden). A paper for *ICME-11 Topic Study Group 17: Research and development in the teaching and learning of advanced mathematical topics*, 2008. Available online at: http://tsg.icme11.org/tsg/show/18. A reprint is also available from The Legacy of R. O. Moore Project at: www.discovery.utexas.edu/rlm/reference/html .

9. "The Role of Nonemotional Cognitve Feelings in Constructing Proofs," (with John Selden and K. McKee). *Proceedings of the 11th Annual Conference on Research in Undergraduate Mathematics Education*, 2008 Available online at www.rume.org/crume2008/eproc.html.

10. "Consciousness in Enacting Procedural Knowledge," (with J. Selden). *Proceedings of the 11th Annual Conference on Research in Undergraduate Mathematics Education*, 2008. Available online at www.rume.org/crume2008/eproc.html.

11. "Overcoming Students' Difficulties in Learning to Understand and Construct Proofs," (with J. Selden). In M. P. Carlson and C. Rasmussen (Eds.), *Making the Connection: Research and Teaching in Undergraduate Mathematics Education* (pp. 95-110), MAA Notes Volume No. 73, 2008.

12. "Advanced mathematical thinking: Some PME perspectives," (with G. Harel and J. Selden). An invited chapter. In A. Gutierrez and P. Boero (Eds.), *Handbook of Research on the Psychology of Mathematics Education: Past, Present and Future* (pp. 147-172), Rotterdam, Netherlands: Sense Publishers, 2006.

13. "New Developments and Trends in Tertiary Mathematics Education: Or, More of the Same?" Special Issue of *International Journal of Mathematical Education in Science and Technology*, 36(2-3), 2005, 131-147. Shorter version prepared for ICME-10 TSG 3 and posted to ICME-10 website.

14. "Perspectives on Advanced Mathematical Thinking" (with J. Selden). *Mathematical Thinking and Learning*, 7(1), 2005, 1-13.

15. "Consciousness in Mathematical Problem Solving: The Focus, the Fringe, and Non-Sensory Perception (with J. Selden). Poster at the conference Toward a Science of Consciousness, Tucson, Arizona, April 2004. Available as *Tennessee Technological University Mathematics Department Technical Report No.2004-1*.

16. "Validations of proofs considered as texts: Can undergraduates tell whether an argument proves a theorem?", (with J. Selden). *Journal for Research in Mathematics Education*, 34(1), 2003, 4-36.

17. "Reflections on mathematics education research questions in elementary number theory," (with J. Selden). In S. R. Campbell and R. Zazkis (Eds.), *Learning and Teaching Number Theory: Research in Cognition and Instruction* (pp. 213-230), Monograph Series of the Journal of Mathematical Behavior Vol. 2, Westport, CT, Ablex Publishing, 2002.

18. "Tertiary mathematics education research and its future," (with J. Selden). In D. Holton (Ed.), *The Teaching and Learning of Mathematics at University Level: An ICMI Study* (pp. 237-254), Dordrecht, Netherlands: Kluwer Academic Publishers, 2001. Earlier version available as *Tennessee Technological University Mathematics Department Technical Report No. 1999-6.*

19. "Why can't calculus students access their knowledge to solve nonroutine problems?" (with J. Selden, S. Hauk, and A. Mason), *Research in Collegiate Mathematics Education*, IV, CBMS Series Issues in Mathematics Education, Vol. 8, 2000, 128-153.

20. "Do calculus students eventually learn to solve non-routine problems?" (with J. Selden, S. Hauk, and A. Mason), *Tennessee Technological University Mathematics Department Technical Report No. 1999-5*.

21. "Can you tell me whether this is a proof?" (with J. Selden). Paper presented at 23rd Annual Conference of the International Group for the Psychology of Mathematics Education, Haifa, Israel, July 25-31, 1999. Preprint available. A one-page summary can be found in Orit Zaslavsky (Ed.), *Proceedings of the 23rd Conference of the International Group for the Psychology of Mathematics Education*, Vol. 1, 364.

22. "The role of logic in the validation of mathematical proofs" (with J. Selden), *Technical Report of the Tennessee Technological University Mathematics Department*, No. 1, 1999. Also presented at the DIMACS Symposium on Teaching Logic and Reasoning, Rutgers University, 25-26 July 1996.

23. "Questions regarding the teaching and learning of undergraduate mathematics (and research thereon)" (with J. Selden). In A. H. Schoenfeld, J. Kaput, and E. Dubinsky (Eds.), *Research in Collegiate Mathematics Education, III*, CBMS Series Issues in Mathematics Education Vol. 7, 1998, 308-313.

24. "Unpacking the logic of mathematical statements" (with J. Selden), *Educational Studies in Mathematics* 29 (1995), 123-151.

25. "What is mathematics education research?" (with J. Selden). In B.A. Case (ed.), *"You're the Professor, What Next?"*, MAA Notes No. 35, 1994, 138-141.

26. "Even good calculus students can't solve nonroutine problems" (with J. Selden and A. Mason). In J. Kaput and E. Dubinsky (Eds.), *Research Issues in Undergraduate Mathematics Learning: Preliminary Analyses and Results*, MAA Notes No. 33, 1994, 19-26.

27. "Collegiate mathematics education research: What would that be like?" (with J. Selden), *The College Mathematics Journal* 24 (1993), 431-445.

28. "Research perspectives on conceptions of function: Summary and overview" (with J. Selden). In G. Harel and E. Dubinsky (Eds.), *The Concept of Function: Aspects of Epistemology and Pedagogy*, MAA Notes Vol. 25, 1992, 1-16.

29. "How undergraduates learn to read, write, and create proofs" (with J. Selden), discussion paper for the AMT Working Group, PME-14, Mexico, July 1990.

30. "The HP-28S, calculus, and programming"(with J. Selden, R. Weems, M. Morrison, and S. Yeager), *Proceedings of the 2nd Annual Ohio State University Conference on Technology in Collegiate Mathematics*, Addison-Wesley (1990), 283-286.

31. "Can average calculus students solve nonroutine problems?" (with J. Selden and A. Mason), *The Journal of Mathematical Behavior*, 8(1989), 45-50.

32. "Graphing with the HP-28S"(with J. Selden). *The College Mathematics Journal*, 20 (1989), 424-433.

33. "Using technology to implement a constructivist approach to calculus and abstract algebra" (with J. Selden), *Proceedings of the 1st Annual Ohio State University Conference on Technology in Collegiate Mathematics*, Addison-Wesley, (1989), 239-242.

34. "Errors and misconceptions in college level theorem proving" (with J. Selden), *Proceedings of the Second International Seminar on Misconceptions and Educational Strategies in Science and Mathematics* (Joseph D. Novak, Ed.), Vol. III, Cornell University, July 1987, 457-470. Available as Tennessee Technological University Tech Report No. 2003-3 at http://www.math.tntech.edu/techreports/techreports.html.

35. "Teaching the doing of mathematics," *The Journal of the Mathematical Association of Nigeria*, Extra-ordinary issue, September 1981, 41-53.

36. "Errors students make in mathematical reasoning" (with J. Selden), *Bosphorus University Journal*, 6(1978), 67-87.

Mathematics:

1. "The continuous extended bicyclic semigroup" (with J. Selden). Report presented at Oberwolfach Mathematical Research Institute, Conference on the Analytical and Topological Theory of Semigroups, January 29 - February 4, 1989.

2. "A nonlocally compact nondiscrete topology for the alpha-bicyclic semigroup," *Semigroup Forum*, 31(1985), 372-374.

3. "The kernel of the determining endomorphism of a bisimple omega-semigroup," *Semigroup Forum*, 14(1977), 265-271.

4. "On the closure of bisimple omega-semigroups," *Semigroup Forum*, 12(1976), 373-379.

5. "Bisimple omega-semigroups in the locally compact setting," *Bosphorus University Journal*, 3(1975), 15-77.

ADDITIONAL PROFESSIONAL PUBLICATIONS

Research Sampler columns, news/feature articles in *UME Trends*, other

The columns and articles appear in the Teaching and Learning section of *MAA Online* (1996 -) and in *UME Trends* (1989 - 96). For those on *MAA Online*, see http://www.maa.org/t_and_l/sampler/research_sampler.html.

Research Sampler columns:

1. "Examining How Mathematics is Used in the Workplace, " *MAA Online*, June 2001.

2. "The Role of Examples in Learning Mathematics, " *MAA Online*, February 1998.

3. "What Does it take to be an Expert Problem Solver?", *MAA Online*, September 1997.

4. "Preservice Teachers' Conceptions of Mathematics and How to Teach it," *MAA Online*, June 1997.

5. "Should Mathematicians and Mathematics Educators be Listening to Cognitive Psychologists?", *MAA Online* , February 1997.

6. "Of What Does Mathematical Knowledge Consist?", *MAA Online*, November 1996, updated September 2001.

7. "A Look Back," "Undergraduate Solving Nonroutine Calculus Problems," and "Connecting a Theorem's Statement to its Proof," *UME Trends*, Vol. 6, No. 6, January 1996, 13-14.

8. A Covariation Approach to Function -- The Exponential" and "Irrelevant Illustrations in U.S. Math Texts," *UME Trends*, Vol. 6, No. 4, September 1995, 7&9.

9. "Research on Learning Styles is Equivocal," "Students' Beliefs about Mathematics and Its teaching," "Learning Group Theory Concepts," and "The Transition to Formal Proof," *UME Trends*, Vol. 7, No. 2, May 1995, 6-7.

10. "CRUME's First Volume--What Will Mathematicians Think?", *UME Trends*, Vol. 6, No. 6, January 1995, 22-23.

11. "When is Small Group Learning Effective?", *UME Trends*, Vol. 6, No. 4, September 1994, 14-15.

12. "Vygotskian Perspectives," *UME Trends*, Vol. 5, No. 6, January 1994, 6-7.

13. "Nonverbal Learning Disability or Misconceptions?" and "Dealing with Change from an Early Age," *UME Trends*, Vol. 5, No. 4, September 1993, 12-13.

14. " Probability Redux," *UME Trends*, Vol. 5, No. 2, May 1993, 14-15.

15. "Update on the Students-and-Professors Problem," "Actually, There Are More Rectangles Than Squares," and "Finding Inverses of Products," *UME Trends*, Vol. 4, No. 6, January 1993, 6.

16. "The Diversity of Knowing" and "Personal Teaching Styles Resist Change," *UME Trends*, Vol. 4, No. 4, October 1992, 6.

17. "Now it's Reading to Learn Mathematics," "What's the Effect of Taking High School Calculus?", and "What Does it Mean to be Random?", *UME Trends*, Vol. 4, No. 2, May 1992, 6.

18. "Are We in the Business of Changing Students' Beliefs About Mathematics?" and "What Kind of Talk is Effective for Learning Mathematics in Small Groups?", *UME Trends*, Vol. 3, No. 6, January 1992, 6.

19. "What's a Microworld?" and "Diagram Drawing Competencies," *UME Trends*, Vol. 3, No. 4, October 1991, 6.

20. "Metacognition and Problem Solving" and "Concepts Maps on the Computer," *UME Trends*, Vol. 3, No. 2, May 1991, 6.

21. "Do Students Have a Sense of Function?", *UME Trends*, Vol. 2, No. 6, January 1991, 6.

22. "How Should Proof Be Taught?" and "Incorporating Learning Research into the Classroom," *UME Trends*, Vol. 2, No. 4, October 1990, 6.

23. "The Derivative as the Slope of the Graph Itself?", "Gem on Teaching Probability Goes Unnoticed," and "Undergraduates Cannot Solve Algebra Word Problems," *UME Trends*, Vol. 2, No. 2, May 1990, 6.

24. "Can We Improve People's Judgments Under Uncertainty?", "When Experts Solve Problems, What Do They Do That Novices Don't?", and "Teaching Away Misconceptions is Hard, but Not Impossible," *UME Trends*, Vol. 1, No. 6, January 1990, 6.

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