

## VITA: Richard S. Millman

### POSITIONS HELD

1. University of Kentucky, Lexington, Kentucky  
  
Outreach Professor of Mathematics, 8/04 to Present (tenured)  
  
Interim Chair and Professor of Mathematics Education, Department of Curriculum and Instruction, 7/07 to Present.
2. National Science Foundation, Arlington, Virginia, 9/02–8/04  
Program Director, Division of Mathematical Sciences
3. Knox College, Galesburg, Illinois  
President, 12/98-9/01  
Professor of Mathematics, 12/98–8/04
4. Whittier College, Whittier, California, 7/95–12/98  
Provost and Dean of Faculty and Professor of Mathematics
5. California State University, San Marcos, California, 7/91–6/95  
Provost and Vice President for Academic Affairs and Professor of Mathematics
6. Wright State University, Dayton, Ohio, 7/86-7/91  
Dean, College of Science and Mathematics  
Professor of Mathematics and Electrical Engineering
7. National Science Foundation, Washington, D.C., 7/84–7/86  
Program Director, Geometric Analysis
8. University of Maryland, College Park, Maryland, 9/85-86  
Lecturer in Electrical Engineering
9. Michigan Technological University, Houghton, Michigan, 4/81-7/84  
Head, Department of Mathematical and Computer Sciences and Professor of Mathematics
10. Southern Illinois University, Carbondale, Illinois  
Assistant to the President, 8/78-4/81  
Assistant, Associate, Full Professor of Mathematics, 9/71-4/81
11. Ithaca College, Ithaca, New York, 1970-71  
Assistant Professor of Mathematics

### ACADEMIC BACKGROUND

B.S., Massachusetts Institute of Technology, Mathematics, June, 1966

Ph.D., Cornell University, Mathematics, January, 1971

## **GRANTS, LEADERSHIP, AND SERVICE**

### **A. External Grant and Honors**

1. Principal Investigator and Project Director, GK12, ALGEBRA CUBED, co-PIs, G.T. Lineberry, Xin Ma, Paul Prater, and Jeff Osborn, National Science Foundation, 3/06 - 3/09, \$1,829,662. (<http://www.ms.uky.edu/algebracubed/>)
2. Principal Investigator: "Integrating the Assessment Principle into Math Content for Preservice Elementary Teachers," Xin Ma Co-PI, KY Educational Professional Standards Board, 1/05-7/06, \$100,039
3. Co-PI "University of Kentucky NOYCE Fellows Program: New Opportunities Yielding Classroom Excellence" Margaret J. Mohr (PI), Bruce L. Walcott and Jeffrey Osborn, National Science Foundation, 9/07-8/11, \$748,625
4. Co-PI: "Making Algebra Accessible," with Kimberly Ziedler (PI) et. al., KY Council on Postsecondary Education, 2/15/05-7/30/05, \$ 299,806
5. Partner: "Three Tiered Mentoring," Fayette County Public Schools, Kentucky Department of Education, 8/05-8/06, \$249,356 (Natalee Feese, Fayette County Schools, PI)
6. Principal Investigator; "Quality and Cost Containment Issues in a Curriculum," Irvine Foundation Project, 1996-97, \$20,000
7. Principal Investigator: "Service-Learning as a Degree Requirement," The Commission on National and Community Service, Higher Education Innovation Projects, 1993-95, \$155,158 (with co-PI Peggy Hashemipour)
8. Principal Investigator: "Service-Learning as a Degree Requirement," The Commission on National and Community Service, Higher Education Innovative Projects, 1992-93 \$26,000
9. Principal Investigator: "Conference on Differential Geometric Control Theory," NASA/Ames Research Center and AFOSR, 1/82-7/82, \$19,000
10. Executive of the Year, 1994, Professional Secretaries International, Palomar Chapter
11. Recipient, 1992 Excel Awards, First Place, Scholarly Journals, Feature Article for "Artist's View of Points and Lines," Mathematics Teacher (with R. Speranza)
12. Outstanding Performance Award, National Science Foundation, 6/86

## B. Written Materials

Dr. Millman has published 4 co-authored books on calculus and various aspects of geometry, co-edited two others, and authored or co-authored over 35 peer reviewed articles.

## C. Service to Professional Societies

1. Mathematics Association of America:
  - a. Panel of Visiting Lecturers, 1990-1995
  - b. Coordinating Council of Area of Human Resources, 1991-92
  - c. Ad hoc MAA Committee on Guidelines, 1990-92
  - d. Chair, MAA Committee on Consultants, 1987-92
  - e. Ford Prize Committee, 1983-86 (Chair, 1985-86)
  - f. Associate Editor of the *American Mathematical Monthly*, 1983-86
2. Member, Interview Panel, American Council on Education Fellows Program, 2/01
3. American Council on Education, Presidents' Network on International Education, January 1999-December 2001
4. American Council on Education, Commission on Leadership and Institutional Effectiveness, 1999-2001
5. Member, Advisory Committee for Academic Affair Resource Center, AASCU, 9/94-6/95
6. Counselor in Mathematics, Council on Undergraduate Research, 9/91-6/95
7. Joint Policy Board for Mathematics (JPBM), Committee on Preparation for College Teaching (through MAA), 1987-92
8. American Mathematical Society: Member-at-large, Council of the AMS, 1983-86 (elected)

## D. Community Service (selected)

1. Galesburg, Illinois: Member, Wells Fargo Community Board, 9/00 to 9/03; Member, GREDA (Galesburg Regional Economic Development Agency), 7/00 to 9/01 (known as Galesburg 2000 for its first year); Member, Rotary, 2/99-9/02
2. Member, Board of Directors, Native American Preparatory School, Rowe, New Mexico, 6/97 to 1/00
3. San Marcos, California: Member of the Board of San Marcos Rotary Club, 1992-94; San Diego North County Visitors Bureau, 1993-94; CSU San Marcos Foundation, 1992-95;

LEAD San Diego, Executive Series, 1993-94; Professional Secretaries International, 9/94-6/95

4. MIT: Educational Counselor, MIT, 1973-80, 1993-95; Evaluation Sub-Committee, MIT Enterprise Forum, San Diego, 1993-94
5. Dayton, Ohio: Member of the Board of Dayton Art Institute, 1988-91; Dayton Montgomery County Mathematics Collaborative, 1988-91; Guest Columnist, Dayton Daily News, 1989-90; Continuing Education Committee, Affiliate Societies Council of Dayton Science and Engineering Foundation, 1990-91

E. Presentations on Higher Education Issues

1. Many informal talks about the National Science Foundation, Whittier College, Knox College, the Appalachian Math Science Partnership, and California State University, San Marcos at local Rotary Club, Kiwanis Club, etc.
2. "Views of change across the horizon: Using policy to create partnerships that change practice" Association for American Colleges and Universities (AAC&U), 1/08, Washington, DC (with P. Earley and P. Maloney)
3. "Making Good on Our Word: STEM Faculty and K-16 Partnerships", American Society for Higher Education Irvine, CA 11/06 and at American Association of College Teacher Educators, N.Y., N.Y. (2/07) (with P. Earley, P. Maloney, L. Mangurian)
4. Teacher Quality Summit VI, Louisville, KY (EPSB sponsored conference): "Capstone Course for Future High School Teachers" (with David Leep) 10/05.
5. Focused Discussion Group leader "How can we help preservice students understand the difference between procedural and conceptual classroom tasks?" Appalachian Association of Math Teacher Educators, Lexington, KY 9/05
6. American Mathematical Society/Mathematical Association of America, Annual Meeting, "Service Learning in Mathematics," San Francisco, California, 1/95
7. AAC&U, 81st Annual Meeting, "Designs for Learning in New Institutions," San Francisco, California, 1/95
8. AASCU, Academic Vice President Meeting, "Reward System for Service Learning," Tucson, Arizona, 1/94
9. Sixth Annual California Regional Meeting of American Conference of Academic Deans, "Provost's View of the Role of Deans," Oakland, California, 10/92
10. University of California System Office, "Building a New University," Oakland, California, 12/92

11. Council of Colleges of Arts and Sciences, "Relationship of Deans, Chairs, and Faculty," New Orleans, Louisiana, 11/90
12. Annual Seminar for New Deans, "A Practicum in College Administration," Council of College of Arts and Sciences, Williamsburg, Virginia, 6/90, 6/91

F. Invited or Peer Reviewed Academic Presentations

1. "Infusing Assessment into Mathematics Content Courses for Pre-Service Elementary School Teachers" (with X. Ma (first author) and M. Wells), TSG 29, ICMI-11, Monterrey, Mexico, 7/08, (accepted subject to revisions)
2. "A Self and Peer Assessment Intervention in Mathematics Content Courses for Pre-Service Elementary School Teachers" (by invitation, with X. Ma and M. Wells), Symposium on the Occasion of the 100th Anniversary of ICMI, Rome, Italy 3/08
3. "Bluma's Method: A Different/New Way to Solve Quadratics", Kentucky Council of Teachers of Mathematics, Lexington, KY, 10/07, Fayette County Public School Math Teachers, 12/07 (lightly refereed)
4. "Constructing a Conceptual Mathematics Content course with Integrated Assessment for future teachers" Athens Institute for Education and Research Math Conference, Athens, Greece, 6/07 (joint work with X. Ma and M. Wells), (lightly refereed)
5. "The Algebra Cubed GK12 program of the University of Kentucky in Bath and Powell counties", A.M.S./M.A.A. special session, annual meeting, 1/08, San Diego, CA
6. "Influence on Content Courses for Preservice Teachers Resulting from the Participation of Mathematicians and Math Graduate Students in ALGEBRA CUBED", COMET session, A.M.S./M.A.A. special session, annual meeting, 1/08, San Diego, CA
7. "ALGEBRA CUBED: A rural GK12 project in middle and high school", California State University, Northridge, CA, 4/07
8. "The space of Riemannian metrics and geometric properties" California State University, Northridge, CA, 4/07
9. "Constructing a Conceptual Mathematics Content Sequence with Integrated Assessment", Research on Undergraduate Mathematics Conference, San Diego, CA, 2/07 (with M. Wells)
10. "Spaces and Subspaces of the Space of Riemannian Metrics", University of Nevada, Las Vegas, NV, 4/06
11. "Topology of the Space of Riemannian Metrics" Tennessee Technological University, Cookeville, TN, 2/06

12. "Curves, Frames, and Differential Geometry" Morehead State University, Morehead, KY, 3/06
13. "Design of a Mathematics Content Course to Integrate the Assessment Principle: Recent Results", 4<sup>th</sup> Annual Hawaii Conference on Education, Honolulu, HI, 1/06, with Xin Ma (lightly refereed)
14. "Conceptual Ideas behind Fractions," PK-16 Miniworkshop, Tennessee Technological University, Cookeville, TN, 11/05
15. "Partnership Enhancement Projects in the area of Mathematics" NSF/ED Math Science Partnership State Coordinators' Meeting, Washington, D.C., 10/05 (with Paul Eakin and John Yopp)
16. "Use of Video Clips of Children in a Content Math Course for Future Elementary Teachers" with Kelly Svec and Dana Williams (UK undergraduates), Appalachian Association of Math Teacher Educators, Lexington, KY 9/05 (lightly refereed)
17. "Integrating the Assessment Principle into Mathematics Content Courses for Preservice Elementary Teachers," International Commission on Mathematics Instruction, 15<sup>th</sup> Study, Aguas de Lindoia, Brazil, 5/05 (with Xin Ma)
18. "Mathematical Mathematics Education with examples from the AMSP," Department of Mathematics and Statistics, Wright State University, Dayton, Ohio, 5/05
19. "A Brown Bag on the Math Strand of AMSP," CREMSE, San Diego State University, San Diego, California, 10/04
20. "AMSP: A Partnership to Create Opportunities Through Math and Science, K-20," Dept. of Statistics, North Carolina State University, Raleigh, North Carolina, 9/04
21. "Spectrum of Laplace Operator on Manifolds," Dalian, People's Republic of China, 8/97
22. "Writing in Mathematics/Science," North County Professional Development Foundation, Sullivan Middle School, Bonsall, California, 11/94 (day long workshop)
23. "Mathematics Education in USA via the NCTM Standards," Institute of Mathematics, Chinese Academy of Science (Academia Sinica), Beijing, People's Republic of China, 6/94
24. "NCTM Standards and School Reform," Hangzhou Teacher's College, Hangzhou, People's Republic of China, 5/94
25. "Writing Math in Middle School," University of Nevada, Reno, Nevada, 7/93
26. "Use of Writing to Assess Math Studies," Louisville, Kentucky, National Council of Teachers of English 11/92
27. "Writing in Mathematics," California State University, San Bernadino, California, 11/92

28. "Writing in Mathematics," University of Nevada, Las Vegas, Nevada, 9/92
29. "Conference on College Composition and Communications, "Writing Across the Curriculum and Mathematics," Cincinnati, Ohio, 3/92
30. "Writing in Science and Math," University of Toledo (2 hour workshop), Toledo, Ohio, 4/91
31. "Mathematics in English: Writing as a Tool to Learn," Greater Cleveland Council of Teachers of Mathematics," Cincinnati, Ohio, 1/91
32. "Writing to Learn Mathematics," Western Ohio Education Day, Celina, Ohio, 10/90
33. "Writing as a Tool to Learn Mathematics," Ohio Council of Teachers of Mathematics, Zanesville, Ohio, 3/90
34. "Spectrum of Riemannian Manifolds," National Security Agency, 11/88
35. "Laplace Operators on Riemannian Manifolds," University of Cincinnati, Cincinnati, Ohio, 11/86
36. "Geometric consequences of the Laplacian on Surfaces," Georgetown University, Washington, D.C., 11/85
37. "Superspace: An Introduction to Global Analysis," Smith College, Northampton, Massachusetts, 9/85
38. "Laplace-Beltrami Operator on Homogenous Spaces," Auburn University, Auburn, Alabama, 5/85
39. "Connectedness in the Space of Riemannian Metrics" and "Spectrum of Laplacian Operator," University of Petroleum and Minerals, Dharhan, Saudi Arabia, 4/84
40. "Recent Results about the Spectrum of the Laplacian," Colorado State University, Fort Collins, Colorado, 3/83
41. "Helices on Surfaces," Southern Illinois University, Carbondale, Illinois, 5/82
42. "Completeness in the Space of Riemannian Metrics," Central Michigan University, Mount Pleasant, Michigan, 5/82
43. "Laplace-Beltrami Operator on Riemannian Manifolds: Especially Lie Groups," Tulane University, New Orleans, Louisiana, 10/79
44. "Controllability of the Wave Equation on a Riemannian Manifold," NATO Advanced Study Institute/AMS Summer Institute in Applied Mathematics, Harvard University, Cambridge, Massachusetts, 6/79

45. "Laplace-Beltrami Operator on Riemannian Manifolds: Controllability, Applications and Computability," Texas Tech University, Lubbock, Texas, 4/79
46. "Riemannian Geometry: A Complete Discussion," Howard University, Washington, D.C., 10/78
47. "Spectra of the Laplace-Beltrami Operator on Homogenous Spaces," Oakland University, Rochester, Michigan, 3/78
48. "Spectra of the Laplace-Beltrami Operator on Homogenous Spaces," Texas A&M University, College Station, Texas, 3/78
49. "Spectra of the Laplace-Beltrami Operator on Lie Groups," Indiana University - Purdue University, West Lafayette, Indiana, 11/77
50. "Spectra of the Laplace-Beltrami Operator on Homogenous Spaces," University of Connecticut, Storrs, Connecticut, 2/77
51. "Spectra of the Laplace-Beltrami Operator on Lie Groups," AMS Meeting, Ann Arbor, Michigan, 11/76 (20 minutes)
52. "Spectra of the Laplace-Beltrami Operator for Semisimple Lie Groups," Washington University, St. Louis, Missouri, 4/76
53. "Spectra of the Laplace-Beltrami Operator on Differential Forms on Lie Groups," Princeton University, Princeton, New Jersey, 4/76
54. "Holomorphic Connections and Homotopy Invariance of the Dolbeault Cohomology," AMS Summer Institute in Several Complex Variables, 8/75 (45 minutes)
55. "A Non-synthetic Approach to Transformation Geometry," MAA Meeting, Rockford College, Rockford, Illinois, 4/75
56. "F-Structures Motivated by the Cousin Problem," A.M.S. Summer Institute in Differential Geometry, 8/74 (45 minutes)
57. "Geometry of Connection," University of Windsor, Windsor, Ontario, 11/72
58. "Holomorphic Connections on Real Product Bundles," AMS Meeting, St. Louis, Missouri, 7/72 (20 minutes)
59. "Structures of Real Product Bundles," Washington University, St. Louis, Missouri, 4/72

#### G. Refereed Publications

- Books – Authored

1. *Mathematical Reasoning for Elementary Teachers*, Boston, Massachusetts, Pearson-Addison/Wesley, fifth edition (2008, with C. Long and D. DeTemple)
  2. *Geometry: An Axiom and Models Approach*, New York, New York: Springer-Verlag (with G. Parker), first edition, (1981), 2nd edition (1991)
  3. *Calculus: A Practical Introduction*, New York, New York: McGraw-Hill Book Company, 1979 (with G. Parker)
  4. *Elements of Differential Geometry*, Englewood Cliffs, New Jersey: Prentice-Hall, 1977 (with G. Parker)
- Books – Edited
    1. *Effective Tasks in Primary Mathematics Teacher Education*, Springer-Verlag (with Barbara Clarke (first author) and Barbro Grevholm), to appear, 2008
    2. *Proceedings of Conference on Differential Geometric Control Theory*, Boston, Massachusetts: Birkhauser, 1983 (with R. Brockett and H. Sussman)
    3. *Symmetries in Science*, New York, New York: Plenum Press, 1980 (with B. Gruber)
  - Journal Articles (all math articles have authors listed alphabetically, Millman is the first author on all math ed articles except #2)
    1. “Promoting a Mathematical Habit of the Mind in Preservice Teachers” (with Tim Jacobbe, submitted)
    2. Fostering Creativity in Preservice Teachers through Mathematical Habit of the Mind (with Tim Jacobbe, submitted)
    3. “Infusing Assessment into Mathematics Content Courses for Pre-Service Elementary School Teachers” (with X. Ma (first author) and M. Wells), *Education Research for Policy and Practice* (accepted subject to revisions)
    4. “Educators and teacher training context”, invited chapter, (with P. Iannone, P. Johnston-Wilder), *ICMI Study Volume 15, Professional Education and Development of Teachers of Mathematics*, Springer, NY, Deborah Ball and Ruhama Even, Eds. (to appear)
    5. “Tasks Using Video Clips of Children in a Content Math Course for Preservice Elementary School Teachers”, *Effective Tasks in Primary Mathematics Teacher Education*, Barbara Clarke, R. Millman, and B. Grevholm, eds., Springer-Verlag, 2008 (with Kelly Svec and Dana Williams, to appear)
    6. “Design of a Mathematics Content Course to Integrate the Assessment Principle: Recent Results”, *Proceedings of the 4<sup>th</sup> Annual Hawaii International Ed Conference*, with Xin Ma, (2006), 4552-4558, lightly reviewed

7. "Using Self-Assessment and Peer-Assessment," NCTM Bulletin 42 (2005), p. 9, with Xin Ma
8. "Using Writing to Assess Mathematics Pedagogy and Students' Understanding," *Evaluating Writing, the Role of Teachers' Knowledge, NCTE Yearbook*, ed by C. Cooper and L. Odell, (1998): 154-169.
9. "Mathematicians' Concepts of Audience in Mathematics Textbook Writing," *Primus*, Volume 2, (1992): 335-347 (with R. Bullock)
10. "Artist's View of Points and Lines," *Mathematics Teacher* 84, No. 2 (February, 1991): 132-138 (with R. Speranza)
11. "Labor/Management Issues in Drug Testing From a Probabilistic Viewpoint," (with J. Brawley): *Mathematics in College*, (1991): 3-11
12. "Writing Around Humor as a Tool to Learn Mathematics," *Mathematics in College*, (1991): 3-11
13. "Circles in New Worlds," *Ohio Journal of School Mathematics* 8, (1990): 22-28
14. "Writing in a Non-Euclidean Geometry Course," *Using Writing to Teach Mathematics*, ed. by A. Sterrett, Mathematical Association of America, MAA Notes Number 16, (1990): 134-137
15. "Calculus from an Administrative Perspective," *Calculus for a New Century*, ed. by L.A. Steen, National Academy of Sciences, Mathematical Association of America, (1987): 141-144
16. "MacDonald's Eta Function Formula and Some Developments in Differential Geometry," *American Mathematical Monthly* 93, (1986): 369-371 (with H.D. Fegan)
17. "Laplace Operator on Differential Forms for Lie Groups," *Differential Topology-Related Fields and Their Applications to the Physical Sciences and Engineering*, ed. by G.M. Rassias, Teubner-Texte zur Mathematik, Band 76, (1985): 155-165 (with C. Givens)
18. "Manifolds with the same Spectrum," *American Mathematical Monthly* 90, (1983): 553-555
19. Review of: R. Hermann, "Cartanian Geometry, Nonlinear Waves and Control Theory, Parts A and B," *Bulletin of the American Mathematical Society* 6 (1982): 467-478
20. "Control Theory for the Wave Equation in Compact Riemannian Manifolds," *Funkcialaj Ekvacioj* 23, (1980): 39-62 (with G. Chen)
21. "Denseness of Bounded and Unbounded Riemannian Metrics," *Tensor* 34, (1980): 9-12 (with G. Parker)

22. "Remarks on Spectrum of Laplace-Beltrami Operator in the Middle Dimensions," *Tensor* 34, (1980): 94-96
23. "The Normal Degree of Immersions," *Bulletin of the Institute of Mathematics, Academia Sinica* 8, (1980): 241-249
24. "Topology of the Pin (n) Group," *Tensor* 34, (1980): 9-12 (with G. Parker)
25. "Upper Half Plane Model for Hyperbolic Geometry," *American Mathematical Monthly* 87, (1980): 48-53
26. "Quadrants in the Space of Riemannian Metrics," *Michigan Math* 25, (1978): 3-7 (with H.D. Fegan)
27. "Kleinian Transformation Geometry," *American Mathematical Monthly* 84, (1977): 338-349
28. "The Spectra of Laplace-Beltrami Operator on Compact, Semisimple Lie Groups," *American Journal of Mathematics* 99, (1977): 801-807 (with B.L. Beers)
29. "Analytic Vector Harmonic Expansions on SU(2) and the 2-sphere," *Journal of Mathematical Physics* 16, (1975): 11-19 (with B.L. Beers)
30. "Bundle Homogeneity and Holomorphic Connections," *Journal of Differential Geometry*, (1974): 531-536
31. "Geometry of Connections," *American Mathematical Monthly* 80, (1973): 487-500 (with A.K. Stehney)
32. "The Holomorphic Connection as a Smooth Phenomenon," *Canadian Mathematical Congress--Proceeding of the 13th Biennial Seminar*, Vol 2 (1973): 93-101
33. "Complex Structures on the Real Product Bundles with Applications to Differential Geometry," *Transactions of the American Mathematical Society* 166, (1972): 71-99
34. Review of Gratton-Guiness, I., "The Development of the Foundation of Mathematical Analysis from Euler to Riemann," *American Mathematical Monthly* 79, (1972): 315-316
35. "Geodesics in Metrical Connections," *Proceedings of the American Mathematical Society* 30, (1971)
36. "How to Measure Holes in the Plane: An Introduction to Modern Topology," *New York State Mathematics Teachers' Journal* 21, (1971): 107-140
37. Review of Hall T., "Carl Friedrich Gauss: A Bibliography," *New York State Mathematics Teachers' Journal* 21, (1971): 119

38. "Representatives of Semisimple Lie Groups," mimeographed notes, Cornell University, 1970 (from lectures of C.J. Earle, W.H.J. Fuchs, J.S. Halperin, A.W. Knap, O.S. Rothaus, and H.C. Wang)
39. "Numerical Stability of One Evaluation Predictor--Corrector Algorithms for Numerical Solution for Ordinary Differential Equations," *Mathematics of Computation* 22 (1968): 557-564 (with R. Klopfenstein)

4-4-08