Catherine A. Roberts
Curriculum Vitae

Contact Information

Home:
12 Piccadilly Circle
Jefferson MA 01522 USA
Tel: 508-829-7006

Office:
Department of Mathematics & Computer Science, Box 100A
College of the Holy Cross
Worcester, MA 01610 USA
Tel: 508-793-2456, Fax: 508-793-3040
Email: croberts@holycross.edu
Web: http://mathcs.holycross.edu/~croberts

Education

1987 A. B., *magna cum laude*, Bowdoin College (Mathematics & Art History with teacher certification)

1992 Ph.D., Northwestern University (Applied Mathematics & Engineering Sciences)

Current Positions

Associate Professor of Mathematics, College of the Holy Cross (2001-present)

Director of Environmental Studies Program, College of the Holy Cross (2006-present)

Editor-in-Chief, the journal *Natural Resource Modeling* (2004-present)

Faculty Appointments

Instructor, Bowdoin College's Upward Bound Program (summers 1987-1990, 1992, 1994)

Instructor, Northwestern University's Minorities Educational Opportunities Program (summer 1991)

Assistant Professor of Mathematics, University of Rhode Island (1992-1995)
advisor for doctoral student, K. Fuller

Assistant Professor of Mathematics, Northern Arizona University (1995-1998)

Associate Professor of Mathematics, Northern Arizona University (199-2001)

Associate Professor of Mathematics, College of the Holy Cross (2001-present)

Administrative Experience

Co-director, NSF Research Experiences for Undergraduates Program, Northern Arizona University (1998-1999)

Presidential Faculty Fellow, Northern Arizona University (spring 1999)

University Space Management Team, Northern Arizona University (1999-2001)

Director of Modeling & Simulation Lab, Northern Arizona University (1999-2001)

Project manager for Grand Canyon Online Launch Calendar (budget $182,268) (1999-2001)

Editor-in-Chief, the journal *Natural Resource Modeling* (2004-present)

Director of Environmental Studies Program, College of the Holy Cross (2006-present)

Professional Activities

American Mathematical Society
- Committee on Professional Ethics (Feb 2006-Jan 2009)
- Committee on Meetings and Conferences, Member at Large (Feb 2006-Jan 2009)
- Panelist for Discussion on Future of AMS-MAA Meetings (Feb 1994), Cincinnati OH

Association for Women in Mathematics
- Executive Committee Member-at-Large (Jan 2002-Jan 2006)
- Chair of the Selection Committee for Executive Director (Apr 2005-Oct 2005)
- Infrastructure Task Force member (Oct 2004-May 2005)
- Chair of the Fundraising Committee (Jan 2004-Jan 2006)
- Co-organizer for AWM Joint Meeting workshops (1997, 1998, 1999, 2002, 2003, 2004)
- AWM Mentor Network member (Aug 2001-present)
- Judge for AWM Essay contest: Biographies of Contemporary Women Mathematicians (2002)
- Selection committee for AWM workshops (five times since 1998)
- Nominating Committee (Oct 2000-June 2001)

Bowdoin College
- Panelist, Bicentennial Finale Symposium (May 1994)
- Arizona Representative, Bowdoin Alumni Schools and Interviewing Committee (2000-2001)
- Career Advisory Network (1987 – 2006)

College of the Holy Cross
- Director of the Environmental Studies Program (Sep 2006-Jun 2008)
- Alumni Association Board of Directors (Sep 2006 – Jun 2007)
- Faculty Fellowship to develop ties to Blackstone (Sep 2005-Aug 2006)
- Director of the Calculus Workshop (fall 2002-spring 2005)
- Chair, Committee on the Economic Status of the Faculty (fall 2004-spring 2005)
- Academic Standing Committee (fall 2003-spring 2005)
- Committee on Faculty Affairs, at large member (Jul 2004-June 2005)
- Danforth Fellow (Jul 2003-Jun 2005)
- Departmental Liason to the Teacher Education Program (fall 2001-present)
- Department Representative to the Avon Scholarship Committee (spring 2002)
- Communication & Rhetoric Committee - member & webmaster (fall 2002-spring 2003)
- Department Liason to MAA, AWM, AMS (fall 2002-spring 2003)
- Homecoming Weekend Continuing Education Featured Speaker (fall 2002)
- Curricular Goals Collaborative Teaching Committee (spring 2004)
- Faculty Mentor for first year ALANA students (Aug 2004-May 2005)

Editorial Experience
- Editor-in-Chief, NRM Natural Resource Modeling (since 2004)
- Associate Editor, UMAP Journal of Undergraduate Mathematics and Its Applications (since 2005)
- Co-editor of Creative Math Teaching Newsletter (1994-1999)
- Co-editor for the Rhode Island Calculus Consortium (1992-1995)
- Editorial Advisory Board, Journal of Interdisciplinary Feminist Thought (since 2005)

Grand Canyon River Group
- Founding member and technical advisor (Jan 2001-Apr 2006)

Professional Activities (continued)

Journal Reviewer
- SIAM J. Applied Math
- Journal Math Analysis and Applications
- Arabian Journal for Science & Engineering
- Journal Difference Eqns and Appl
- Journal Methods in Applied Sciences
- Journal of Integral Equations & Applications
- UMAP Journal of Undergraduate Mathematics & its Applications
- Journal of Computational and Applied Mathematics
- Computers and Mathematics
- Proceedings of the Conference on Research on the Colorado Plateau, USGS

Mathematical Association of America/ Project NExT (New Experiences in Teaching)
- Workshop Instructor for new professors (summers 2002 & 2003 & 2004)
- Panelist on *Finding out what your students have learned* (summers 2003 & 2004)

National Science Foundation
- NSF Review panel for UFE/CCD program (1997)
- NSF Review panel for CCLI (20005, 2006)
- Reviewer of grant proposals for Program in Applied Mathematics (twice)

Northern Arizona University (1995-2001)
- Commission on the Status of Women (one year)
- Faculty Senate (two years)
- Steering Committee for Office of Teaching & Learning (two years)
- Steering Committee for Masters of Engineering Program (two years)
- Departmental Undergraduate Curriculum Committee (one year)
- Departmental Graduate Curriculum Committee (one year)
- Departmental Graduate Operations Committee (four years)
- Chair of Search Committee for Math Education position (once)
- Departmental Tenure-track Faculty Search Committee (three times)
- Departmental Faculty Workload Committee (one year)
- Departmental Annual Faculty Review Committee (four years)
- Departmental Faculty Tenure/Promotion Committee (three years)
- Departmental Planning Committee for Sonia Kovalevsky Day (one year)

Regional Environmental Council of Central Massachusetts
- Board of Directors (Nov 2004-present)

Resource Modeling Association
- Board of Directors (June 2002-present)
- Organizer of the World Conference on Natural Resource Modeling (June 2007)

Rocky Mountain Math Consortium
- Board of Directors (Sep 1998–Jun 2001)

Society for Women Environmental Professionals
- Massachusetts Chapter, Member (since 2006)

Society for Industrial & Applied Mathematics
- Judge for Morgan Prize for Outstanding Research by an Undergraduate Student (1997-1999)
- Judge for Mathematical Contest in Modeling (1994, 1995, 1997, 1998, 1999, HiMCM 2001)
- SIAM Education Committee (1993-1995)

Professional Activities (continued)

State of Rhode Island Office of Higher Education

- Development Team for the higher education component of the Rhode Island Frameworks Development Project (1993 – 1995)

University of Rhode Island

- Teaching Felllow (1993-1994)
- Coordinator of Math Colloqium (1993-1995)
- Truman Foundation Committee (1994 – 1995)
- Team Member of Partnerships in Rhode Island for Women and Girls (1992-1993)

Volunteer Activities

- Wachusett Regional School District Volunteer (Sep 2001-present)
- Earth Day clean-up coordinator of site in Worcester, MA (Apr 2006)
- Davis-Hill Elementary School Math/Science Night Coordinator (Mar 2003, Mar 2004)
- Cookout for Service Professionals & their Families (summers 2001-2006)
- Volunteer dinner host for incoming freshmen in the Odyssey Program (fall 2003, fall 2004)

Teaching Description – Philosophy & Courses

I am devoted to achieving excellence in every aspect of my teaching. I have an established record of quality teaching, as well as publications in mathematics education. I involve students in research projects that have ranged from community-based projects in a liberal studies course for non-majors up to published refereed research by both undergraduate and graduate students. Relating the significance of mathematics as a tool for understanding and explaining the world is a fundamental component of my approach to teaching.

Courses reflect my interest in applied mathematics. One special feature includes my use of Activity Points, where students select from an extensive menu of assignments intended to introduce them to aspects of the topic outside of the traditional fare. Students must earn a minimum number of Activity Points, choosing from writing assignments, special lectures, group enrichment projects, field trips, technology assignments, etc. Two of my courses have a community-based service-learning component, where quantitatively-based group projects directly assist local nonprofit agencies.

College Algebra
† Topics in Mathematics: Environmental Mathematics
Topic Course: The Science of Art (honors, team taught with chemist & art historian)
Applied Calculus I & II
Calculus for the Physical and Life Sciences 1 & 2
Advanced Placement Calculus
Principles & Techniques of Applied Mathematics
† Mathematical Modeling
Ordinary Differential Equations
Partial Differential Equations (undergraduate & graduate)
Integral Equations (graduate)
Applied Mathematics (graduate on-line course)

† Community-based learning course

Research Description – Nonlinear Volterra Integral Equations

My primary research area is the analysis of nonlinear Volterra integral equations that arise in studies involving diffusive media. The objective of these studies is to investigate the phenomena of explosion, quenching and absorption within a diffusive medium in the context of nonlinear Volterra integral equations. These problems are characterized by spatially localized nonlinearities, which distinguishes them from the work of earlier researchers. Such nonlinearities are motivated, for example, by applications where the event occurs within a very confined area (e.g. from an internal electrode energy stimulation within a flame or on a heated surface).

These phenomena are of wide importance in applications. Studies of explosion have been conducted on theoretical models that are originally presented as nonlinear partial differential equations. Unlike previous studies, which have required a smoothness property for spatially dependent nonlinearities, our research replaces such requirements by strongly localized behavior. In this case, conversion of the theoretical models from partial differential equations to integral equations represents a very effective format for the analysis. This reformulation permits a more direct and efficient inquiry into the challenging scenario of spatially localized nonlinear behavior.

I have written the section on integral equations for two editions of the CRC Standard Mathematicsl Tables and Formulae. In addition to several publications of original research, I have authored two invited reviews of research on nonlinear Volterra integral equations related to blow-up in the Journal of Computational & Applied Mathematics.

Research Description – Natural Resource Modeling

This work seeks to characterize complex human-environment interactions on a river. This research develops traffic models that simulate the responses of humans to an ever-changing natural environment. Already, we have developed the Grand Canyon River Trip Simulator. This model uses artificial intelligence and statistical techniques to capture the unique nature of this interaction. Current work includes a re-engineering of our mathematics to other environmental settings and an examination or the robustness of these approaches to modeling natural resources. A new research direction connected to the Blackstone River is underway.

Techniques used in developing this model include intelligent agent design, artificial intelligence, fuzzy logic and statistical optimization algorithms. The simulation engine uses object oriented programming (VisualBasic). The objective is to develop a robust computational tool that not only simulates the current human-environment scenarios but that can also be modified to consider the implications of various policy changes in managing the resource. While we develop a simulation engine along with an adaptive learning and statistical analysis module, we are developing the artificial intelligence algorithms required for such complex, multi-variable scenarios.

The mathematical model developed for use by the managers at the Grand Canyon National Park assisted in the development of the new Colorado River Management Plan (2006). This project involved several undergraduate and graduate student researchers and lead to several publications. It was also featured as a news item in Science, as well as on a number of National Public Radio programs.

Grants & Awards

1988 Northwestern University Walter P. Murphy Fellowship (tuition & stipend)
1989 General Electric Teaching Award for Graduate Studies ($5000)
1991 Association for Women in Science Citation of Merit Award ($500)
1992 NSF Calculus Reform Grant ($180,000 - I received $2,000 stipend)
Univ. Rhode Island Honors Program Visiting Scholars Fund ($380)
Univ. Rhode Island Foundation ($200) & Council for Research ($5,670)
Association for Women in Mathematics Workshop ($275)
1993 Univ. Rhode Island Foundation Competitive Grant Program ($1,014)
Univ. Rhode Island Honors Program Visiting Scholars Fund ($410)
Association for Women in Mathematics Workshop ($300)
1994 Univ. Rhode Island Dean's Enhancement of Teaching Award ($200)
Univ. Rhode Island Alumni Association Faculty Development Award ($250)
Univ. Rhode Island Council for Research Proposal Development Fund ($9,984)
1995 NSF Research Planning Grant ($18,000)
Northern Arizona Univ. New Century Honors Program Course Development Grant ($4,000)
1996 Northern Arizona Univ. Organized Research Grant ($6,200)
1997 Northern Arizona Univ. Organized Research Grant ($9,000)
Northern Arizona Univ. Instructional Improvement Grant ($300)
Northern Arizona Univ. Instructional Technology Grant (25 hours Faculty Studio support)
Northern Arizona Univ. Cultural Orientation Navajo Workshop Tuition Grant ($255)
Northern Arizona Univ. Ponderosa Group Environmental Sustainability in Classroom Grant ($1000)
1998 National Park Services Grant for Grand Canyon River Trip Simulation ($30,000)
Northern Arizona Univ. - Historically Black Colleges & Univ. Grant for Student Research ($3,120)
Northern Arizona Univ. Supplementary Faculty Stipends for REU Faculty ($3,000)
NSF Research Experiences for Undergraduates - co-PI w/T. Blows ($60,000)
Northern Arizona Univ. Masters in Engineering Course Development Grant ($4,000)
Northern Arizona Univ. Organized Research Grant ($10,000)
Northern Arizona Univ. Instructional Improvement Grant ($185)
1999 Dept. of Interior, National Park Services: Grand Canyon River Trip Simulation Project ($10,178)
Northern Arizona Univ. Student Assistant Funds - Provost for Research ($350)
Dept. of Interior, National Park Services: Grand Canyon River Trip Simulator Project ($2971)
Northern Arizona Univ. Organized Research ($6,500)
Northern Arizona Univ. Dept of History Course Rotation Project ($200)
Northern Arizona Univ. VP Business Affairs space planning project ($21,000)
2000 USGS Bureau of Reclamation: Glen Canyon Low Steady Summer Flow ($14,890)
Dept. of Interior, National Park Services: Grand Canyon River Trip Simulator Project ($5,500)
Northern Arizona Univ. Organized Research Grant ($8,500)
Northern Arizona Univ. VP Business Affairs Space Planning Project ($15,250)
2002 Dept. of Interior, National Park Services: Grand Canyon Simulator Calibration Project ($3,000)
Dept. of Interior, National Park Services: Grand Canyon Simulator Final Report Project ($2,500)
National Research Council, COBASE Grants Program ($9,200)
2003 3M Foundation, Vision Award ($14,200)
National Security Agency: AWM Workshop Grant (co-PI) ($15,697) 10/1/03 – 9/30/04
2004 College of the Holy Cross: Committee on Fellowships, Research and Publications ($250)
College of the Holy Cross: Charles and Rosanna Batchelor Ford Foundation Grant ($3,000)
3M Foundation, Vision Award ($10,000)
National Security Agency: AWM Workshop Grant (co-PI) ($15,697)
Office of Naval Research: AWM Workshop Grant (co-PI) ($123,759)
2005 National Security Agency: AWM Workshop Grant (co-PI) ($15,697)
2006 Association for Women in Mathematics Travel Grant ($1,000)
College of the Holy Cross: Committee on Fellowships, Research and Publications ($1000)
3M Foundation Vision Grant ($50,000 – pending)
O'Leary Faculty Recognition Award ($10,000)

Publications – Volterra Integral Equations (refereed)

1. *Volterra Equations that Model Explosion in a Diffusive Medium*, C. A. Roberts, D. G. Lassiegne and W. E. Olmstead, J. Integral Eqns. Appl., Vol. 5, No. 4, 1993, 531-546.

2. *Explosion in a Diffusive Strip Due to a Concentrated Nonlinear Source*, W. E. Olmstead and C. A. Roberts, Methods Appl. Analysis, Vol. 1, No. 4, 1994, 434-445.

3. *Quenching for the Heat Equation with a Non-local Nonlinearity*, W. E. Olmstead and C. A. Roberts, in Nonlinear Problems in Applied Math, eds. Angell et. al., SIAM, 1995, 199-205.

4. *Growth Rates of Blow-up Solutions for Nonlinear Volterra Equations*, C. A. Roberts and W. E. Olmstead, Quart. Appl. Math., Vol. 54, No.1, 1996, 153-160.

5. *Coupled Volterra Equations with Blow-up Solutions*, W. E. Olmstead, C. A. Roberts and K. Deng, J. Integral Eqns. Appl. , Vol. 7, No. 4, 1995, 499-516.

6. *Explosion in a Diffusive Strip Due to a Source with Local and Non-local Features*, W. E. Olmstead and C. A. Roberts, Methods Appl. Analysis, Vol. 3, No. 3, 1996, 345-357.

7. *The one-dimensional Heat Equation with a Non-local Initial Condition*, W. E. Olmstead and C. A. Roberts, Applied Math Letter., Vol. 10, No.3, 1997, 89-94.

8. *Characterizing the Blow-up Solutions for Nonlinear Volterra Integral Equations*, C. A. Roberts, Nonlinear Analysis, Proc. of Second World Congress of Nonlinear Analysts (WCNA96), Vol. 30, No. 2, 1997, 923-933.

9. *Quenching for a Diffusive Equation with a Concentrated Singularity*, K. Deng and C. A. Roberts, Differential and Integral Eqns, Vol. 10, No. 2, 1997, 369-379.

10. *Analysis of Explosion for Nonlinear Volterra Equations*, C. A. Roberts, J. Compl. Appl. Math., Vol. 97, 1998, 153-166.

11. *Local and Non-local Boundary Quenching*, C. A. Roberts and W. E. Olmstead, Math. Meth. Appl. Sci., Vol. 22, 1999, 1465-1484.

12. *A Method to Determine Growth Rates of Nonlinear Volterra Equations,* C. A. Roberts, in Volterra Equations & Applications, eds. Corduneanu/Sandberg, Gordon & Breach, UK, 2000, 427-431.

13. *A Critical Speed for Quenching,* W. E. Olmstead and C. A. Roberts, in Advances in Quenching, Dynam. Contin. Discrete Impulsive Systems, Series A: Math Anal, 8, 2001, 77-89.

14. *A Quenching Problem for the Heat Equation,* C. M. Kirk and C. A. Roberts, J. Int. Eqns. Appl., Vol. 14, No. 1, 2002, 1-20.

15. *A Review of Quenching Results in the Context of Nonlinear Volterra Equations,* C. M. Kirk and C. A. Roberts, Dynamics of Continuous, Discrete and Impulsive Systems, Series A: Math Anal, Vol. 10, 2003, 343-356.

16. *Blow-up Solutions to a System of Nonlinear Volterra Equations,* W. Mydlarczyk, W. Okrasiński and C. A. Roberts, J. Math Anal. Appl., Vol. 301, 2005, 208-218.

17. *Recent Results on Blow-up and Quenching for Nonlinear Volterra Equations,* C. A. Roberts, J. Comput. Appl. Math., accepted Jan 2006, available online 28 Jul 2006.

Publications – Environmental Modeling (refereed)

1. *Evaluation of river beach carrying capacity information utilized by the Grand Canyon River Trip Simulator: Analysis and recommendations for future study,* G. O'Brien and C. A. Roberts, Grand Canyon Science Center (CA8210-99-002), Final Report. May 1, 1999, 17pp.

2. *Intelligent Agent Modeling for Simulating and Evaluating River Trip Scheduling Scenarios for the Grand Canyon National Park*, H. R. Gimblett, C. A. Roberts, T. Daniel, M. Mitner, S. Cherry, D. Kilbourne, M. Ratliff, D. Stallman, R. Bogle, J. Bieri in Integrating GIS and Agent based modeling techniques for Understanding Social and Ecological Processes, ed. H. R. Gimblett, Oxford Press, 2000, 245-275.

3. *Computer Simulation for Rafting Traffic on the Colorado River*, C. A. Roberts and H. R. Gimblett, Proc. 5th Conf. Research on Colorado Plateau USGS, 2001, 19-30.

4. *Impacts of Low Flow Rates on Recreational Rafting Traffic on the Colorado River in Grand Canyon National Park,* C. A. Roberts and J. A. Bieri, Bureau of Reclamation, Grand Canyon Monitoring and Research Center, Final Report. May 15, 2001, 18pp.

5. *Modeling Complex Human-Environment Interactions: The Grand Canyon River Trip Simulator*, C. A. Roberts, D. Stallman and J. A. Bieri, J. Ecological Modeling, Vol. 153, Issue 2, 2002, pp. 181-196.

Publications – Mathematics Education Research (refereed)

1. *How to Get Started with Group Activities*, C. A. Roberts, Creative Math Teaching, Vol. 1, No. 1, 1994.

2. *Group Testing*, C. A. Roberts, in Assessment Practices in Undergraduate Mathematics, eds. B. Gold, S. Keith and W. Marion, MAA Notes, Mathematical Association of America, Washington DC, 1999, 137-139.

3. *A Liberal Arts Course Linking Art, Art History, Mathematics and Chemistry*, C. Kelley, A. Jordan and C. A. Roberts, J. Clg. Sci. Teaching, Vol. 31, 2001, 162-166.

4. *Perspectives on Modeling Applications in a Service-Learning Framework*, C. A. Roberts, in Mathematics in Service to the Community: Concepts and Models for Service-Learning in the Mathematical Sciences, edited by Charles R. Hadlock, MAA Notes #66, Mathematical Association of America, Washington DC, 2005.

Articles (non-refereed)

1. *Graduate Students Look at Changing the Culture,* C. A. Roberts and F. Evangelista, Math. & Educ'l Reform Network, Vol. 4, No. 3, Spring 1992.

2. *Launching a Career: The Early Years*, C. A. Roberts, AWM Newsletter, Vol. 25, No. 2, Mar-Apr 1995.

3. *A Mathematics Buffet: Introducing Choice In Calculus*, C. A. Roberts, UME Trends, Vol. 6, No. 5, Nov 1994.

4. *Book Review: A Ph.D. is Not Enough! by P. Feibelman*, C. A. Roberts and R. A. Bryant, AWM Newsletter, Vol. 25, No. 4, Jul-Aug 1995.

5. *Integral Equations*, C. A. Roberts, in CRC Standard Mathematical Tables and Formulae, 30th ed, edited by D. Zwillinger, CRC Press, 1996, 426 - 430.

6. *Update on River Research at the Grand Canyon: Grand Canyon River Trip Simulator Project*, R. Gimblett, T. C. Daniel, C. A. Roberts, M. Ratliff, Soundings, Grand Canyon National Park, 1998, 1-2.

7. *Using the Grand Canyon River Trip Simulator to Test New Launch Schedules on the Colorado River*, J. Bieri and C. Roberts, AWIS Magazine, Vol. 29, No. 3, Association for Women in Science, Washington DC, 2000, 6-10.

8. *Integral Equations*, C. A. Roberts, in CRC Standard Mathematical Tables and Formulae, 31st ed, edited by D. Zwillinger, CRC Press, 2003, 478-482.

9. *How Can a Computer Program Aid the Colorado River Planning Process?,* C. A. Roberts, The Waiting List: The Grand Canyon Private Boaters Association Quarterly, Vol. 5, No. 4, 6-8, 2002.

10. *A Computer Model for the Colorado River Management Plan,* C. A. Roberts, The River Management Society NEWS, Winter 2002, 6-7.

11. *Me, a Mathematician?* in Complexities: Women in Mathematics, Chapter 5: Into a New Century, edited by B. A. Case and A. M. Leggett, Princeton University Press, 2005, 370-372.

Presentations

1. *A Class of Integral Equations that Models Explosion Phenomena,* ICIAM'91 & AWM Wkshp: Wash. DC (Jul 1991).

2. *A Class of Integral Equations that Models Explosion Phenomena,* Univ. of New Hampshire (Feb 1992).

3. *Integral Equations in Combustion*, Univ. of Rhode Island (Feb 1992).

4. *Art Forgery and Diabetes: Mathematical Modeling with Differential Equations*, Providence College Pi Mu Epsilon Lecture (Apr 1993 and Apr 1994), Univ. of Richmond Pi Mu Epsilon Lecture (Nov 1992).

5. *Explosion Phenomena*, Brown University, Center for Fluid Mechanics: Providence RI (Jan 1993).

6. *Integral Equations that Model Diffusive Media*, Joint Mathematics Meetings: San Antonio TX (Jan 1993).

7. *A Mathematics Buffet: Introducing Choice in Calculus,* Second Conference on Teaching Calculus: Cambridge MA (Jun 1993).

8. *Applications of Integral Equations: An Introduction & Current Research*, AWM Workshop: Philadelphia PA (Jul 1993).

9. *Nonlinear Volterra Equations which Model Explosion in a Diffusive Medium*, SIAM Annual Meeting: Philadelphia PA (Jul 1993).

10. *Modeling Explosive Phenomena with Volterra and Parabolic Equations*, Cygnus Therapeutic Systems: Redwood City CA (Aug 1993).

11. *Asymptotic Forms for Nonlinear Volterra Equations,* AMS Annual Mtg: Cincinnati OH (Jan 1994) - special session.

12. *Inverse Problems,* Bowdoin College (Feb 1994).

13. *The Changing Classroom: Activities and Projects,* Third Conf. on Teaching Calculus: Ann Arbor MI (Jun 1994).

14. *Technology in Teaching and Learning in the Next Century*, The Education Symposium: Brunswick ME (Jun 1994).

15. *Growth Rates for Blow-up Solutions for Volterra Equations,* SIAM Annual Meeting: San Diego CA (Jul 1994).

16. *Existence & Growth Rates of Blow-up Solutions for Nonlinear Volterra Equations,* 25th Univ. Southwestern Louisiana Math Conf: Lafayette LA (Oct 1994).

17. *Blow-up Results for Nonlinear Parabolic Partial Differential Equations*, Univ. of Connecticut (Nov 1994).

18. *Blow-up Results for Nonlinear Integral Equations,* Univ. of Delaware (Dec 1994).

19. *Growth Rates for Blow-up Solutions for Nonlinear Volterra Equations,* S. Illinois Univ. (Feb 1995).

20. *Calculus Reform: Testing the Waters*, Clark University (Apr 1995).

21. *Blow-up for a System of Nonlinear Volterra Equations*, SIAM Annual Meeting: Charlotte NC (Oct 1995) - co-organizer of mini-symposium with M. Z. Nashed.

22. *Quenching for the Heat Equation with a Non-local Nonlinearity,* Joint Mathematics Meetings: Orlando FL (Jan 1996).

Presentations (continued)

23. *Growth Rates for Blow-up Solutions of Nonlinear Volterra Equations,* Volterra Centennial Symposium: Arlington TX (May 1996).

24. *An Examination of the Asymptotic Behavior at Blowup for Diffusion Problems with Concentrated Nonlinear Source Terms,* 2nd World Congress of Nonlinear Analysis: Athens, Greece (Jul 1996) - special session.

25. *Explosion due to a Source with Local and Non-local Features,* Joint Mathematics Meetings: San Diego CA (Jan 1997).

26. *Families* panelist & *Launching a Career* panel moderator AWM Workshop: Baltimore MD (Jan 1998).

27. *Launching a Career* panel moderator AWM Workshop at Joint Mathematics Meetings: San Antonio TX (Jan 1999).

28. *Authenticating Works of Art*, MAA Annual Meeting: San Antonio TX (Jan 1993), MAA-ARIZMATYC Joint Spring Meeting (Apr 1996), College of the Holy Cross (Feb 1992), St. Lawrence Univ. (Feb 1992), Univ. of Maine, Farmington (Jan 1992), Franklin & Marshall College (Feb 1994), Lafayette College (Feb 1995), U. S. Air Force Academy (Feb 1995), Univ. of Redlands (Feb 1995), Bowdoin College Upward Bound (Jul 2000).

29. *The Grand Canyon River Trip Simulator*, Joint Mathematics Meetings: San Antonio TX (Jan 1999).

30. *The Grand Canyon River Trip Simulator Project,* Northwestern University (Oct 1999).

31. *The Rafting Simulator Project,* 5th Conf. on Research on the Colorado Plateau: Flagstaff AZ (Oct 1999).

32. *Simulating Rafting the Colorado River: A Prototype,* 1999 Congress on Recreation and Resource Capacity: Aspen CO (Dec 1999).

33. *Update on the Grand Canyon River Trip Simulator* - Twelve presentations to public, the Grand Canyon National Park, the River Outfitters, Private Boaters, and River Guides Associations, var. locations in Arizona (Jul 1998 - Nov 2000).

34. *Modeling Complex Human/Environment Interactions,* Modeling Complex Systems: Montreal Canada (Aug 2000).

35. *Computer Simulation for the Grand Canyon National Park*, Computer Science Dept., Northern Arizona University: Flagstaff AZ (Oct 2000).

36. *Computerized River Trip Simulator to Achieve Management Goals & Calendar for River Outfitters,* Confluence: Tampa FL (Dec 2000*).*

37. *Modeling River Rafting for the Grand Canyon National Park,* Resource Modeling Association: Logan UT (Jul 2001)*.*

38. *Analysis of Quenching in the Context of Volterra Equations,* International Conference of Continuous, Discrete and Impulsive Systems: London Canada (Jul 2001).

39. *Providing real research opportunities to undergraduates,* Joint Math Meetings, MAA Special Session: San Diego CA (Jan 2002).

40. *How to model complex human/environment interactions*, Olin College of Engineering seminar: Needham MA (Jan 2002).

41. *How an applied mathematician solves a problem,* Worcester Polytechnic Institute plenary speaker, Department of Biology special event: Worcester MA (Apr 2002).

Presentations (continued)

42. *The Grand Canyon Research project*, Worcester Polytechnic Institute, Department of Mathematics seminar: Worcester MA (Apr 2002).

43. *Applied Mathematics in Action*, Ursinus College, Howard-Hughes Undergraduate Summer Research Program: Collegeville PA (June 2002).

44. *Math Modeling in the Curriculum*, Invited presenter to Project NexT New Experiences in Teaching: Burlington VT (Jul 2002).

45. *A Course Called the Science of Art*, special session on Innovative Methods in Courses for Non-majors, MathFest annual summer meeting of the Mathematical Association of America: Burlington VT (Aug 2002).

46. *The Grand Canyon Research Project*, Department of Mathematics seminar, University of Rhode Island: Kingston RI (Sep 2002).

47. *White water rafting in the Grand Canyon*, continuing education seminar during Homecoming Weekend, College of the Holy Cross: Worcester MA (Sep 2002).

48. *How can we share the resources of the Grand Canyon?*, First-Year Program seminar: College of the Holy Cross, Worcester, MA (Dec 2002).

49. *An Intelligent Agent Model for Human-Environment Interactions*, Joint Math Meetings: Baltimore MD (Jan 2003).

50. *Carrying capacity, seasonality & group size,* expert panel for Colorado River Management Plan: Phoenix AZ (Jan 2003).

51. *Modeling whitewater rafting patterns on the Colorado River*, keynote banquet speaker, NYSMATYC Conference: Rochester NY (Apr 2003).

52. *Modeling river rafting for the Grand Canyon National Park* keynote speaker for Math Awards Day, University of Connecticut:, Storres CT (Apr 2003).

53. *Allocating use in managing rivers as life-sustaining corridors*, panel session speaker, Interagency River Management Workshop, U.S. Fish & Wildlife Agency and the River Management Society: Shepardstown WV (May 2003).

54. *White Water Rafting Traffic Patterns at the Grand Canyon*, 2003 World Conference on Natural Resource Modeling: Beaufort NC (Jun 2003).

55. *Finding out what your students have learned with projects*, panel session speaker, Project NExT New Experiences in Teaching: Boulder CO (Jul 2003).

56. *Math Modeling in the Curriculum*, Invited presenter to Project NExT New Experiences in Teaching: Boulder CO (Jul 2003).

57. *Rafting in the Grand Canyon: History, Politics and how a mathematician plays a role,* Colloquium speaker, Humboldt State University: Acadia CA (Nov 2003).

58. *Rafting in the Grand Canyon: History, Politics and how a mathematician plays a role,* keynote speaker at Dana Scholars Dinner, College of the Holy Cross: Worcester MA (Nov 2003).

Presentations (continued)

59. *Rafting in the Grand Canyon: History, Politics and how a mathematician plays a role,* Graduate School of Geography, Clark University: Worcester MA (Feb 2004).

60. *How a mathematician has played a role in the management of white-water rafting in the Grand Canyon,* Brown Symposium for Undergraduates in the Mathematical Sciences, Brown University: Providence RI (Feb 2004).

61. *Mathematics in the Grand Canyon*, Dept. Environmental Engineering, Northwestern University: Evanston IL (Mar 2004).

62. *Rafting in the Grand Canyon: History, Politics and how a mathematician plays a role,* Lyceum Program, Dutchess Community College: Poughkeepsie NY (Mar 2004).

63. *Modeling in the Grand Canyon*, Department of Geography, Clark University, Worcester MA (Mar 2004).
64. *Life as a College Professor*, Career Day speaker, Doherty Memorial High School, Worcester MA (Mar 2004).

65. *Rafting in the Grand Canyon: History, Politics and how a mathematician plays a role,* The 22nd annual Classroom Revisited, College of the Holy Cross: Worcester MA (Apr 2004).

66. *Incorporating Environmental Themes and Problems into Undergraduate Research and Teaching*, Council on Undergraduate Research 10th National Conference, LaCrosse WI (June 2004), panelist.

67. *River Running on the Colorado River in the Grand Canyon: History, Current Practice and the Role of a mathematician*, Holy Cross Continuing Education Day, General Alumni Association. Worcester MA (June 2004).

68. *Mathematical Modeling in the Curriculum*, Short-course Instructor & Presenter for Project NExT New Experiences in Teaching: Providence RI (Aug 2004).

69. *Finding out what your students have learned*, panel session speaker, Project NExT New Experiences in Teaching: Providence RI (Aug 2004).

70. *Environmental Themes in Research*, First Mellon Works-in-Progress series event, panelist. Ursinus College, Collegeville PA (Sep 2004).

71. *Asthma in the Urban Environment: A Project in Environmental Mathematics*. Third Annual Undergraduate Environmental Research Symposium. Bridgewater State University, Bridgewater MA (Nov 2004).

72. *Dealing with the Two-Body Problem*. Panelist. The Young Mathematician's Network. Joint Mathematics Meeting. Atlanta GA (Jan 2005).

73. *Community-based Projects for Environmental Mathematics*. Mathematical Association of America Session on Environmental Mathematics and the Interdisciplinary, Joint Mathematics Meeting. Atlanta GA (Jan 2005).

74. *A Mathematician Runs the Colorado River in the Grand Canyon: History, Issues and the Role of a Mathematicia.,* colloquium speaker, Rhode Island College: Providence RI (Feb 2005).

75. *Rafting in the Grand Canyon: History, Politics and how a mathematician plays a rol.,* colloquium speaker, Colgate University: Hamilton NY (Apr 2005).

76. *Research Partnerships in Worcester MA with the Regional Environmental Council, Mass Audubon at Broad Meadow Brook, and the EcoTarium*. Symposium on Environmental Issues in Worcester sponsored by the Colleges of Worcester Consortium, Mechanics Hall, Worcester MA (Apr 2005).

77. *Annual Report on the journal Natural Resource Modeling*. World Conference of the Resource Modeling Association. Arcata, CA (June 2005).

Presentations (continued)

78. *Research Partnerships in Worcester MA with the Regional Environmental Council, Mass Audubon at Broad Meadow Brook, and the EcoTarium*. World Conference of the Resource Modeling Association. Arcata, CA (June 2005).

79. *How does the solution grow?* Departmental Seminar, College of the Holy Cross, Worcester MA (Oct 2005)

80. *Perspectives on Community-based Learning at a Liberal Arts College*. panelist. The Civic Engagement Imperative: Student Learning and the Public Good, Conference of the Association of American Colleges and Universities, Providence RI (Nov 2005).

81. *Rafting in the Grand Canyon: History, Politics and how a mathematician plays a role*. Seminar Speaker, University of Delaware: Newark DE (Nov 2005).

82. *Rafting in the Grand Canyon: History, Politics and how a mathematician plays a role*. Plenary Speaker, Eastern Pennsylvania and Delaware section of the Mathematical Association of America: Philadelphia PA (Nov 2005).

83. *Rafting in the Grand Canyon: History, Politics and how a mathematician plays a role.* Keynote Speaker, Pi Mu Epsilon and Tau Sigma Kappa induction ceremony, Manhattan College: Riverdale NY (Apr 2006).

84. *A model for white water rafting in the Grand Canyon.* Invited Paper Session on Environmental Mathematics, Joint Mathematics Meetings: San Antonio TX (Jan 2006).

85. *An equation runs through it: river rafting in the Grand Canyon.* Seminar Speaker, Sigma Xi & the Natick Soldier Center's Senior Technical Advisory Council: Natick MA (Feb 2006).

86. *Rafting in the Grand Canyon: History, Politics and how a mathematician plays a roe.* Colloquium Sspeaker, Middlebury College: Middlebury VT (Feb 2006).

87. *Mathematical Modeling of White Water Rafting*. Colloquium Speaker, Bentley College, Waltham MA (Mar 2006).

88. *Research Partnerships in Worcester MA*. Poster Presentation, Blackstone Heritage Symposium, College of the Holy Cross: Worcester MA (Apr 2006).

89. *Research Partnerships in Worcester MA*. Poster Presentation, Earth Day Celebration, EcoTarium: Worcester MA (Apr 2006).

90. *Rafting in the Grand Canyon: History, Politics and how a mathematician plays a role*. Keynote Speaker, Pi Mu Epsilon and Tau Sigma Kappa induction ceremony, Manhattan College: Riverdale NY (Apr 2006).

91. *Environmental Mathematics & Social Justice*. Keynote Speaker, Workshop on Mathematics & Social Justice, Lafayette College, Easton PA (May 2006).

92. *Rafting in the Grand Canyon: History, Politics and how a mathematician plays a role*. Keynote Speaker, MAA Northeastern section meeting, Boston University: Boston MA (June 2006).

93. *Annual Report on the journal Natural Resource Modeling*. World Conference of the Resource Modeling Association. Bergen, Norway (June 2006).

94. *Rivers, Recreation, and the Environment*. Speaker & Instructor, Short Course on Environmental Modeling, Mathematical Association of America: Knoxville TN (Aug 2006).

95. *An Equation Runs Through It: River Rafting Model for the Grand Canyon.* Featured Speaker, Women in Mathematics Colloquium Series, St. Mary's College: Winona MN (Oct 2006).

Publicity related to my research & teaching

1. *Software to help handle raft of Canyon trips,* Tucson Citizen Aug 29, 1998 (A. Denogean).
2. *NAU, UA team up to help ease canyon congestion*, NAU Press Release Aug 25, 1998.
3. *Virtual Colorado River reality*, Arizona Daily Sun, Flagstaff AZ Aug 28, 1998 (L. Velush).
4. *Headline unknown*, Tucson Citizen, Tucson AZ Aug 29, 1998.
5. *Headline unknown*, Daily News, Sun City Aug 29, 1998.
6. *Virtual Rafting will help manage Colorado*, Daily Courier, Prescott AZ, Aug 31, 1998.
7. *NAU, UA team up to help ease canyon congestion*, Lumberjack, NAU Sept 2, 1998.
8. *Canyon Simulation software brings NAU recognition*, Lumberjack, NAU Oct 21, 1998.
9. *NAU, UA team up to help ease canyon congestion,* NAU Today Aug 31, 1998 (K. Knights).
10. *Mathematicians Offer Answers to Everyday Conundrums: Shooting the Virtual Rapids,* SCIENCE Vol. 283, Feb 12, 1999, pg. 925. (B. Cipra)
11. *Computer program lets river managers "raft" downstream,* Arizona Daily Sun, Sept 15, 1999 (G. Ghioto).
12. UTV story broadcast about GCRTSim on NAU-TV October 13, 1999.
13. Radio Interview for KNAU, aired on local portion of All Things Considered by T. Crumb, Dec 16, 1999.
14. Lauerman, L., entry in the year 2000 volume of Science & Technology Almanac (Oryx Press).
15. Live one hour panel/call-in radio show on Grand Canyon, KNAU moderator: M. Teich, July 25, 2000.
16. *And an equation runs through it*, Holy Cross Magazine, Vol. 36, No. 2, Spring 2002 (D. Unger).
17. *Ausgetretene Wasserpfad,* www. wissenschaft-online.de, by Jan 14, 2003 (L. Carone).
18. *Mathematicians find path less traveled,* www.nature.com, Jan 14, 2003 (P. Ball).
19. *Gemeinsam einsam: eine simulation soll berechnen, wie viele Touristen der Grand Canyon verträgt,* Süddeutsche Zeitung, www.sueddeutsche.de, Mar 18, 2003 (K. Lischka).
20. *Digging Deeper: HC Earth Day project tracks tainted water,* Telegram & Gazette, April 24, 2003 (E. Astell).
21. *Professor Catherine Roberts named editor of scholarly journal,* The Crusader News, Jan 30, 2004 (K. Scheinberg).
22. *Roberts lectures on mathematical Grand Canyon model, how to maximize awesomeness*, The Crusader News, Feb 27, 2004 (M. McLaughlin).
23. *Asthma Rates on the Rise,* Worcester News Tonight, New England Cable Network, April 20, 2004 (B. Dobsen).
24. *Asthma in Worcester a Growing Problem*, WTAG radio, aired April 22 – 24, 2004 (G. Brown).

Publicity related to my research & teaching (continued)

25. Mentioned in newspaper column in story titled *HC to offer environmental studies*, Sunday Telegram, Nov 21, 2004 (J. Monahan).

26. Mentioned as the visit organizer in story titled *Author Devra Davis speaks out against air pollution, relates personal experience*, The Crusader News, Nov 19, 2004 (E. Mackell).

27. Featured in a chapter about women in mathematicians in a book titled *Change is Possible: Stories of Women and Minorities in Mathematics* by P. Kenschaft, American Mathematical Society, 2005.

28. Profiled in Bowdoin, Winter 2006, Volume 77, Number 2, page 59. (Alix Roy).