

LAURA K. GROSS

Curriculum Vitae

Business Address:

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EDUCATION

Ph.D. in Mathematics, 1997

Rensselaer Polytechnic Institute, Troy, NY
Advisors: V. Roytburd and G. Kovačič

M.S. in Mathematics, 1993

Rensselaer Polytechnic Institute, Troy, NY

B.S. cum laude in Applied Mathematics, 1991

Yale University, New Haven, CT
Concentration: Computer Science
Minor: Chinese Language and Literature

EMPLOYMENT

Associate Professor of Applied Mathematics, 2004–present

The University of Akron, Department of Theoretical and Applied Mathematics

Assistant Professor of Applied Mathematics, 1997–2004

The University of Akron, Department of Theoretical and Applied Mathematics

Consultant to Albrecht Inc., 2004–2006

Planning of mathematical design elements in a commercial development in Akron, OH

RESEARCH EXPERIENCE

Visiting Scholar, 2008–2009

Center for BioDynamics, Boston University

Minisymposium Organizer, 2007

Frontal Phenomena

With Stephen B. Margolis (Sandia National Laboratory), D. Golovaty (The University of Akron)
U. S. National Congress on Computational Mechanics, San Francisco, CA

Visiting Scholar, 2001–2002

Northwestern University, Department of Engineering Sciences and Applied Mathematics

Visiting Assistant Professor, 2000–2001

The University of Vermont, Department of Mathematics and Statistics

Visiting Scientist, Summer 2000

National Aeronautics and Space Administration, Goddard Space Flight Center

Graduate Research Assistant, Summer 1996

Los Alamos National Laboratory, Center for Nonlinear Studies

TEACHING EXPERIENCE**University Courses, 1997–2000, 2002–2008**

Taught a full spectrum of classes including Calculus I, II, and III, differential equations, linear algebra, Advanced Engineering Mathematics I and II, mathematics for liberal arts, algebra with business applications, and precalculus at The University of Akron. Developed curricula in Advanced Engineering Mathematics I and II and coordinated concurrent precalculus classes at The University of Akron. Supervised in-class exercises in “studio” differential equations at Rensselaer Polytechnic Institute and held problem sessions in calculus and differential equations.

Summer Experience in Engineering (SEE), 2005–2007

Developed and taught calculus overviews to, as well as mentored, top high-school girls from Ohio and Pennsylvania in SEE, a recruitment program at The University of Akron.

Northeast Ohio Center of Excellence for Science and Math Education, 2005, 2006

Collaborated with faculty at regional universities and K-12 schools to promote the effective teaching and learning of mathematics. In particular, wrote algebra modules with middle-school teacher and with professors of mathematics and of education. The team taught the algebra modules to middle-school teachers at Cleveland State University. We designed and presented “Use of Real Life Experience for Teaching Algebra Concepts and Instructional Assessment” at Symposium on Mathematics and Science Teaching and Learning: Connecting and Collaborating for Success held at The University of Akron. Attended workshops at area universities.

Student Poster Sessions at The University of Akron, 2003–2006

Organized a poster session for mathematics students at all levels at Celebration of Excellence in Teaching and Learning (CELT). Supervised student presentations of an honor thesis, a masters thesis, Advanced Engineering Mathematics I and II, Calculus I–III, and mathematics for liberal arts at annual departmental and university-wide poster sessions.

Vermont Mathematics, Science, and Technology High School Summer Institute, 2003

Designed and delivered a mini-course to top high-school students from Vermont on “Fair Division: The Mathematics of Sharing” at the University of Vermont at what is now the Governor’s Institute in Mathematics.

Vermont Mathematics Initiative (VMI), 2000–2001

Taught algebra and trigonometry and supervised related hands-on activities for in-service elementary and middle-school teachers. By teaching active teachers in subjects up to and including calculus, the VMI promotes high quality mathematics instruction and high levels of mathematics learning in elementary schools across Vermont. It now serves as a template for a variety of programs around the country.

Project Links, 1995

Planned curriculum and wrote web-based activities on differential equations for NSF-funded project at Rensselaer Polytechnic Institute. Modules connect concepts of higher mathematics with their applications in science and engineering. Each module easily integrates into a mathematics course or a science or engineering course existing at any university, taking one or several class sessions. The project garnered the ASME Curriculum Innovation Award (2001) and NEEDS Premier Award for Excellence in Engineering Education (2000).

Ohio Project NExT (New Experiences in Teaching), 1998–2000

As a new Ph.D., gave a talk and attended workshops at the Mathematical Association of America semi-annual Ohio Section meetings with NExT, a program to develop skills in teaching, research, communication, and service in new faculty in the mathematical sciences.

PUBLICATIONS, PAGE 1**Complex dynamic behavior during transition in a solid combustion model**

Jun Yu, L. K. Gross, Christopher M. Danforth
Complexity, accepted (2008)

Snell's Law of Refraction observed in thermal frontal polymerization

John A. Pojman, V. Viner, B. Binici, S. Lavergne, M. Winsper, D. Golovaty, and L. K. Gross
Chaos, **17**, p.033125 (2007)

The enhancement of weakly exothermic polymerization fronts

D. M. G. Comissiong, L. K. Gross, and V. A. Volpert
Journal of Engineering Mathematics, **57** (4), pp. 423–435 (2007)

On a completely residual-based method for computer code verification

L. Brubaker, L. K. Gross, and J. Zhu
Journal of Neural, Parallel, and Scientific Computing, **14** (4), pp. 337–344 (2006)

Frontal polymerization in the presence of an inert material

D. M. G. Comissiong, L. K. Gross, and V. A. Volpert
Journal of Engineering Mathematics, **54** (4), pp. 389–402 (2006)

Nonlinear dynamics of frontal polymerization with autoacceleration

D. M. G. Comissiong, L. K. Gross, and V. A. Volpert
Journal of Engineering Mathematics, **53**, pp. 59–78 (2005)

Weakly nonlinear and numerical analyses of dynamics in a solid combustion model

L. K. Gross and J. Yu
SIAM Journal on Applied Mathematics, **65** (5), pp. 1708–1725 (2005)

Review: *Essential Mathematical Methods for Physicists* by Weber and Arfken

SIAM Review, **47** (3), pp. 606–608 (2005)

A numerical study of one-step models of polymerization: Frontal vs. bulk mode

Stephen A. Cardarelli, Dmitry Golovaty, L. K. Gross, Vitaliy T. Gyrya, and Jianping Zhu
Physica D, **206** (3–4), pp. 145–165 (2005)

PUBLICATIONS, PAGE 2**Featured review: Selected books on advanced engineering mathematics**

L. K. Gross

SIAM Review, **46** (3), pp. 549-561 (2004)**Bifurcation analysis of polymerization fronts**

D. M. G. Comissiong, L. K. Gross, and V. A. Volpert

Nonlinear Dynamics in Polymeric Systems, ACS Symposium Series No. 869, J. A. Pojman, Q. Tran-Cong-Miyata, Eds., American Chemical Society, Oxford University Press, pp. 147-159 (2004)**Weakly nonlinear stability analysis of frontal polymerization**

L. K. Gross and V. A. Volpert

Studies in Applied Mathematics, **110** (4), pp. 351-375 (2003)**Weakly nonlinear dynamics of interface propagation**

L. K. Gross

Studies in Applied Mathematics, **108** (4), pp. 323-350 (2002)**The onset of linear instability in a solid combustion model**

J. Yu and L. K. Gross

Studies in Applied Mathematics, **107** (1), pp. 81-101 (2001)**On instability of a bend Fréedericksz configuration in nematic liquid crystals**

D. Golovaty, L. K. Gross, S. I. Hariharan, and E. C. Gartland, Jr.

Journal of Mathematical Analysis and Applications, **255** (2), pp. 391-403 (2001)**Thermo-kinetically controlled pattern selection**M. Frankel, L. K. Gross, and V. Roytburd, *Interfaces and Free Boundaries*, **2** (3), pp. 313-330 (2000)**GRANTS****National Science Foundation**, 2000-2002

Grant from Professional Opportunities for Women in Research and Education (POWRE)

Travel grants, 1999, 2003

Support to attend conferences, including Women of Applied Mathematics Research and Leadership Conference at the University of Maryland (through the Mathematical, Information, and Computational Sciences program in the Office of Science at the U.S. Department of Energy), a workshop at the Institute for Mathematics and its Applications in Minnesota, and International Conference on Industrial and Applied Mathematics in Scotland.

Extracurricular Activity Funds, 2004-present

Support for Pi Mu Epsilon (PME) Mathematics Honor Society from The University of Akron

Internal grants, 1998, 1999

Support for summer research from The University of Akron

Mathematical Association of America/The Tensor Foundation, 1998, 1999

Support to found an organization to make careers in mathematics appealing and accessible to female students at The University of Akron

HONORS

Chairs' Award, 2002

Buchtel College of Arts and Sciences, The University of Akron

For outstanding achievements in early career

Alpha Delta Pi Faculty and Staff Recognition Award, 1999

The University of Akron

For outstanding efforts in teaching and support of students

Trainer of Master Teaching Fellows, 1996–1997

Rensselaer Polytechnic Institute

Sole student selected institute-wide to train Master Teaching Fellows

Master Teaching Fellow, 1995–1996

Rensselaer Polytechnic Institute

One of six fellows selected institute-wide to orient all new teaching assistants

The Rensselaer Union Volunteerism Award, 1995

Rensselaer Polytechnic Institute

For developing programs to recruit and mentor women students

SELECT PRESENTATIONS

Frontal polymerization in a heterogeneous medium, 2008

Seminar on Dynamical Systems, Boston University

Frontal polymerization in a medium with periodic monomer distribution, 2007

Symposium on Frontal Phenomena, U. S. National Congress on Computational Mechanics, San Francisco, CA

Complex dynamic behavior on transition in a solid combustion model, 2006

International Conference on Complex Systems, Quincy, MA

Weakly nonlinear and numerical analyses of dynamics in solid combustion, 2004

Symposium on Transient Behavior and Stability in Fluid and Combustion Models, SIAM Conference on Nonlinear Waves, University of Central Florida

Pattern prediction in frontal polymerization, 2003

Invited presentation, Women of Applied Mathematics Research and Leadership Conference, University of Maryland

Weakly nonlinear stability analysis of self-propagating polymerization fronts, 2002

Symposium on Nonlinear Dynamics of Polymeric Systems, Division of Polymer Chemistry and Division of Physical Chemistry, American Chemical Society annual meeting, Boston, MA

Homoclinic orbits in second harmonic generation, 2001

Applied Mathematics Seminar, The University of Vermont

ADVISING

PhD Thesis Adviser with Drs. Golovaty and Kreider for Lauren Brubaker

PhD in Applied Mathematics, in progress

Master's Thesis Adviser with Dr. Golovaty for James T. Joyner

MS in Applied Mathematics, 2006

Master's Thesis Adviser with Dr. Zhu for Lauren Brubaker

MS in Applied Mathematics, 2005

Master's Thesis Adviser with Drs. Golovaty and Zhu for Stephen Cardarelli

MS in Applied Mathematics, 2003

Honors Thesis Adviser for Mary Knust

BS in Mathematics, 2003

Committee Member for Arpita Nandi

MS in Geology, 2002

Committee Member for Anis Al-shatnawi

PhD in Civil Engineering, 2001

Committee Member for Guifa Zhang

MS in Mechanical Engineering, 1999

MENTORING

Mentoring Women in Mathematics (WIM), 1998-2000, 2002-present

Founded and organized WIM together with colleagues to foster communication among women mathematics students. The program also seeks to make careers in mathematics appealing and accessible to female students at The University of Akron. Activities include a luncheon conversation series for women majors and prospective majors. Speakers for this series have consisted primarily of graduates of our department, as well as distinguished external visitors. The group has also taken scientific tours at area government and industry labs and has sponsored women students to give talks at national conferences. Participants have designed and led hands-on mathematical activities on campus at Kids' Career Day for girls of elementary-school age. Moreover, female students from several neighboring universities have participated in the organization.

Pi Mu Epsilon (PME), 2004-2008

Advised chapter of PME mathematics honor society. Secured Extracurricular Activities Funds (EAF) from The University of Akron and organized activities like undergraduate lectures and social events, including annual picnic and annual initiation and awards banquet.

English Conversation Sessions, 1998-1999

Founded and organized lunchtime conversations for international students to practice their English at the then Department of Mathematics and Computer Science at The University of Akron.

Teaching Seminar for New Mathematics Teaching Assistants, 1995, 1996

Developed and led a teaching seminar for new mathematics teaching assistants at Rensselaer Polytechnic Institute and implemented the program for other departments on campus.

Kids' Career Day, 2005, 2003

Designed and led hands-on mathematical activities at The University of Akron for girls of elementary school age.

Student Presentation Adviser, 2003

Advised undergraduate honors thesis presentation by Mary Knust ("Crystal Growth") at Mathematical Association of America Ohio Section meeting, Columbus, OH.

Career Panel, 2003

Addressed career-related questions at Vermont Mathematics, Science, and Technology High School Summer Institute, Burlington, VT.

Mathematics-Club Colloquium, 2003

Gave invited colloquium ("Mathematical Description of Crystal Growth") at Mathematics Club, Case Western Reserve University.

Women in Science and Engineering Roundtable, 2003

Led discussion ("Form From Fire"), Case Western Reserve University.

Sonia Kovalevsky Day (SKD), 2001

Gave invited presentation on career at University at SKD for local secondary-school students at Albany, State University of New York.

Research Experience for Undergraduates (REU), 2000

Gave invited colloquium ("Sea Surface Temperatures") as REU alumna, Mt. Holyoke College.

LANGUAGES

Native speaker of English, fluent in French, German, and Mandarin Chinese

MEMBERSHIPS

Society of Industrial and Applied Mathematics

Sigma Xi