

LAURA K. GROSS
Curriculum Vitae

Business Address:

Department of Computer Science
Bridgewater State University
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EDUCATION

B.S. cum laude in Applied Mathematics, 1991

Yale University, New Haven, CT

Concentration: Computer Science

Senior Project: Bootstrapping in principal component analysis

Unofficial Minor: Chinese Language and Literature

M.S. in Mathematics, 1993

Rensselaer Polytechnic Institute, Troy, NY

Ph.D. in Mathematics, 1997

Rensselaer Polytechnic Institute, Troy, NY

Advisors: V. Roytburd and G. Kovačič

Thesis: Weakly nonlinear dynamics of interface propagation

EMPLOYMENT

Professor, 2018–present

Bridgewater State University, Departments of Computer Science and Mathematics

Associate Professor, 2012–2018

Bridgewater State University, Departments of Mathematics and Computer Science

Assistant Professor, 2009–2012

Bridgewater State University, Department of Mathematics and Computer Science

Associate Professor, 2004–2009

The University of Akron, Department of Theoretical and Applied Mathematics

Assistant Professor, 1997–2004

The University of Akron, Department of Theoretical and Applied Mathematics

Consultant to Albrecht Inc., 2004–2006

Planned mathematical design elements in a commercial development in Akron, OH

RESEARCH EXPERIENCE

Visiting Scholar, 2008–2009

Center for BioDynamics, Boston University

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

Undergraduate Statistics Researcher, Summer 1990

Research Experience for Undergraduates, Mount Holyoke College

ADMINISTRATIVE EXPERIENCE

Chair, Deborah and Franklin Tepper Haimo Awards Committee, 2019–2021

Member, Deborah and Franklin Tepper Haimo Awards Committee, 2017–2018

Council on Prizes and Awards, Mathematical Association of America

Recommend to the Board of Governors for confirmation up to three winners of the Deborah and Franklin Tepper Haimo Award given annually to recognize college or university teachers who have been widely recognized as extraordinarily successful and whose teaching effectiveness has been shown to have had influence beyond their own institutions.

Acting Assistant Director, Honors Program, Fall 2013

Bridgewater State University

Worked with students, faculty and administrators to develop policy, curriculum and community for the Honors Program. Taught a colloquium Honors in Action, which helped build an Honors community, particularly among commuter students. Worked with Residence Life and Housing on programming to support community building in the Honors Residential Learning Community. Advised Honors students. Facilitated the offering of well-balanced Honors courses and colloquia. Served on the Honors Advisory Board.

Honors Advisory Board Member, 2011–2013

Bridgewater State University

Served as a founding member of the five-member Honors Advisory Board. Reviewed Honors course proposals from faculty, vetted student proposals for Honors theses, reviewed student essays and applications for admission to the Honors Program, served as a liaison between the Honors Program and Departmental-Honors Chairs in the sciences, and helped document and oversee the policies and procedures of the Honors Program.

Departmental-Honors Chair, 2009–2013, 2017–2019

Bridgewater State University, Department of Mathematics

Promoted, administered, and advised Departmental Honors in Mathematics.

Advisory Board Member for Student Retention and Enhancement Across Mathematics and the Sciences (STREAMS), 2011–2015

Bridgewater State University, Bartlett College of Science and Mathematics

Helped administer program supported by a five-year National Science Foundation grant to increase the graduation rate of mathematics and science majors at Bridgewater State University. A major component of the plan involved revamping courses that effectively serve as gateways to mathematics and science majors at Bridgewater State University.

Course Coordinator, Applied Calculus for Business, 2014–2015

Bridgewater State University

Implemented active, project-based, team-based learning in applied calculus for business. Provided paid professional development accordingly for part-time instructors with a grant I obtained from the Dean's Office. By leading two half days of pre-semester training and six term-time meetings, I recast the course into one in which business applications drive the students' need for calculus, rather than taking a traditional calculus perspective applicable to any major and injecting business problems.

Member of Peer Evaluation Committees in Computer Science, 2013, 2018, 2020

Bridgewater State University, Department of Computer Science

Served on committees for reappointment, promotion to Associate Professor, and promotion to Professor.

Member of Peer Evaluation Committees in Mathematics, 2018, 2020

Bridgewater State University, Department of Mathematics

Served on committees for reappointment, tenure, promotion to Associate Professor, and Chair review.

Member of Peer Evaluation Committee in Physics, 2020

Bridgewater State University, Department of Physics

Served on a committee for reappointment.

Hiring Committee Chair, 2011–2012, 2017–2018

Bridgewater State University, Department of Mathematics and Computer Science

Hired and subsequently mentored three tenure-stream faculty in mathematics.

HONORS AND AWARDS

Certificates of Recognition for Service in Faculty Development, 2013, 2014

Bridgewater State University

For contributions to the Honors Program

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

Award for Excellence in Student Leadership, Rensselaer Polytechnic Institute, 1994

For founding and serving as chair of the Women Students Association

GRANTS

Martin Richard Institute of Social Justice (MRISJ), 2020

Resource Acquisition Grant to purchase 15 copies of *Unconscious Bias in Schools* for a faculty/staff reading group under the auspices of the Office of Teaching and Learning (OTL) at Bridgewater State University

Office of Teaching and Learning (OTL), 2018

Microgrant to design curricular materials and departmental events to promote the use of computer algebra systems (CAS) in mathematics courses at Bridgewater State University

Center for the Advancement of Research and Teaching, 2011-2012

Faculty Librarian Research Grant from Bridgewater State University to support research

National Science Foundation, 2000–2002

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

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

Grant to found an organization to make careers in mathematics more appealing and accessible to women students at The University of Akron

SCIENTIFIC PUBLICATIONS

1. **On a generalized free-interface model of solid combustion**

K. Chen, **L. K. Gross**, J. Yu, and Y. Yang

Journal of Engineering Mathematics, **117**(1) (2019)

2. **Asymptotic and numerical analysis of dynamics in a generalized free-interfacial combustion model**

J. Yu, K. Chen, and **L. K. Gross**

Finite Difference Methods. Theory and Applications, I. Dimov, I. Farag, and L. Vulkov (eds), *Lecture Notes in Computer Science*, **11386**, pp. 31–45 (2019)

3. **Comparison study of dynamics in one-sided and two-sided solid-combustion models**

Y. Yang, **L. K. Gross**, and J. Yu

SIAM Journal on Applied Mathematics, **70** (8), pp. 3086–3104 (2010)

4. **Frontal reaction in a layered polymerizing medium**

D. Golovaty, **L. K. Gross**, and J. T. Joyner

SIAM Journal on Applied Mathematics, **70** (8), pp. 3022–3038 (2010)

5. **Complex dynamic behavior during transition in a solid combustion model**

Jun Yu, **L. K. Gross**, Christopher M. Danforth

Complexity, **14** (6), pp. 9–14 (2009)

6. **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)

7. **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)

8. **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)
9. **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)
10. **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)
11. **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)
12. **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)
13. **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)
14. **Weakly nonlinear stability analysis of frontal polymerization**
L. K. Gross and V. A. Volpert
Studies in Applied Mathematics, **110** (4), pp. 351–375 (2003)
15. **Weakly nonlinear dynamics of interface propagation**
L. K. Gross
Studies in Applied Mathematics, **108** (4), pp. 323–350 (2002)
16. **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)

17. **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)
18. **Thermo-kinetically controlled pattern selection**
M. Frankel, **L. K. Gross**, and V. Roytburd
Interfaces and Free Boundaries, **2** (3), pp. 313–330 (2000)

PUBLICATIONS IN TEACHING AND LEARNING

1. **Strengthening information literacy in a writing designated course in the mathematics major**
Laura K. Gross, Sheau-Hwang Chang, and Marcia Dinneen, *College & Undergraduate Libraries*, **23** (1), pp. 56–78 (2016)
2. **Improving proof-writing skills through weekly student presentations**
Laura K. Gross, “Beyond Lecture: Resources and Pedagogical Techniques for Enhancing the Teaching of Proof-Writing Across the Curriculum,” Rachel Schwell, Aliza Steurer, and Jennifer F. Vasquez (Editors), *Notes*, **85**, MAA Press, Washington, DC, pp. 83–90 (2016)

BOOK REVIEWS

1. **Review: *Advanced Mathematics for Applications* by Andrea Prosperetti**
L. K. Gross
SIAM Review, **55** (2), pp. 403–405 (2013)
2. **Review: *Essential Mathematical Methods for Physicists* by Weber and Arfken**
L. K. Gross
SIAM Review, **47** (3), pp. 606–608 (2005)
3. **Featured review: Selected books on advanced engineering mathematics**
L. K. Gross
SIAM Review, **46** (3), pp. 549–561 (2004)

SHORT ESSAY

Listening In: Three faculty members share their thoughts about racial justice in America 2020

Jakari Griffith, **Laura K. Gross**, Tina Mullone, John Winters (ed.), *Bridgewater Magazine*, pp. 34–36 (Fall 2020)

SELECT PRESENTATIONS

Integrating calculus and computer algebra, 2019

Laura K. Gross and Vignon Oussa

Center for the Advancement of Research and Scholarship (CARS), May Celebration XXIII, Bridgewater State University, Bridgewater, MA

Programming and computer algebra: A 100-level course, 2018

SIAM Conference on Applied Mathematics Education, Portland, OR

Using math software to enhance students' learning in an upper level physical chemistry course, 2017

Saritha Nellutla (presenter), Laura K. Gross, and Marjorie Partridge (undergraduate)
Chemistry Education Research & Practice, Gordon Research Conference, Lewiston, ME

Why I showed up: Students advise faculty on how to increase attendance at office hours, 2016

Poster Presentation with undergraduates Carla Acosta (Sociology), Chris Laguerre (Biology), and Emma Lantieri (Communication)

Teaching and Learning Conference, Bridgewater State University, Bridgewater, MA

Teaching mathematical writing in an upper-level elective, 2016

MathFest, Columbus, OH

On a generalized free-interface model of solid combustion, 2016

Joint Mathematics Meetings, Seattle, WA

Convincing your colleagues to adopt a common intra-departmental peer cooperative learning program, 2015

With T. Kling (Physics), S. Waratuke (Chemistry), M. Salomone (Mathematics), and J. Williams (Physics), all of Bridgewater State University

Crossing Boundaries: Transforming STEM Education, Association of American Colleges & Universities, Seattle, WA

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

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

TEACHING EXPERIENCE

University Courses, 1997–present

Taught analysis of algorithms, data structures and algorithms, Computer Science 1 and 2, programming and computer algebra, computing for mathematics educators, Advanced Engineering Mathematics 1 and 2, Introduction to Analysis 1, applied mathematics, differential equations, linear algebra, Calculus 1–3, applied calculus for business, precalculus, algebra with business applications, Elementary Statistics 1, mathematics for liberal arts, and honors in action at Bridgewater State University and The University of Akron.

Kenneth I. Gross and Anthony Trono Governor’s Institute on Mathematical Sciences, 2019

Designed and delivered a mini-course to top high-school students from Vermont on interactive iterative maps in the computer-algebra system Sage at the University of Vermont.

Inaugural BSU International Summer Session II Program in Shanghai, 2017

Taught Elementary Statistics I in China to students who had come home to China for the summer from their universities in North America. The students transferred the credits from Bridgewater State University to their home institutions.

Online Teaching Institute, 2016

Participated in a ten-week fully online Online Teaching Institute at Bridgewater State University offered by the Teaching Technology Center. Learned to teach in a hybrid or fully online modality and created Blackboard course sites that align with Quality Matters online course development guidelines. [That certainly came in handy.]

Science of Learning, 2016

Organized and participated in a summer book group at Bridgewater State University. We discussed *Make It Stick: The Science of Successful Learning*. The group included Mathematics Faculty and the Director of the Office and Teaching and Learning.

Coach, Crazy 8s Math Club, 2015–2016

Led a recreational after-school math club for Grades 3–5 in Cambridgeport School in the Cambridge Public Schools. Used lesson plans and materials from Bedtime Math to help kids enjoy the mathematics behind a wide variety of fun activities. Piloted new Season-4 lessons during Season 3.

Kids' Career Day, 2005, 2003

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

Vermont Mathematics Initiative (VMI), 2000–2001

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

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.

ADVISING**Academic Advisor for approximately twenty computer-science and mathematics majors each semester**

Bridgewater State University, 2010–present

Honors Thesis Advisor with Dr. LaBelle for Amber Souza

BA in Secondary Education and BS in Mathematics, Bridgewater State University, 2021

Faculty Advisor

Academic Advising, Academic Achievement Center

Bridgewater State University, 2016–2017

Advised a total of approximately 300 first-year students over three semesters.

Honors Thesis Advisor for Terry Mullen

BS in Mathematics, Bridgewater State University, 2015

Honors Thesis Advisor for Kassaundra Przelomski

BS in Physics, Bridgewater State University, 2015

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

MS in Applied Mathematics, The University of Akron, 2006

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

MS in Applied Mathematics, The University of Akron, 2005

Master's Thesis Advisor with Drs. Golovaty and Zhu for Stephen Cardarelli
MS in Applied Mathematics, The University of Akron, 2003

Honors Thesis Advisor for Mary Knust
BS in Mathematics, The University of Akron, 2003

Advisor for numerous undergraduate poster presentations, expository research papers, and “math-chat” presentations
Bridgewater State University and The University of Akron, 2002–present

Reader for undergraduate Honors theses in physics (1), computer science (2), statistics (2), and mathematics (10)
Bridgewater State University, 2011–present

RACIAL JUSTICE AND EQUITY AT BSU

Panelist, Black History Month Celebration, 2021

Served on the panel Redefining Our Community at the Lewis and Gaines Center for Inclusion and Equity (LGCIE).

Member, Steering Committee on Racial Justice in the Bartlett College of Science and Mathematics, 2020–present

Organize activities such as conversations, trainings, and talks to promote racial justice in the College and work to represent the College at the University level, as well.

Member, Racial Justice Task Force Subcommittee on Police and Public Safety, 2020–2021

Addressed institutional practices, policies, and cultural dynamics that can impede racial equity in actions of the Bridgewater State University Police Department and in management of public safety; reviewed police-community relations; assessed police diversity, recruitment, and training; evaluated student disciplinary procedures and crisis intervention/support systems through an equity lens. Made recommendations for enactment.

Member, De-Centering Whiteness, 2021

Completed the workshop series de-centering whiteness with other white faculty/staff, work on associated on-going projects of my own design to stand and act for racial justice, and participate in the De-Centering Whiteness Alumni Group that continues to educate ourselves and hold ourselves accountable in anti-racism.

Organizer and Leader, Book Group, Unconscious Bias in Schools, 2020

Received a Resource Acquisition Grant from the MRISJ to purchase 15 copies of Unconscious Bias in Schools for a faculty/staff reading group I led under the auspices of the Office of Teaching and Learning (OTL) at Bridgewater State University. Submitted the grant proposal March 2020 and offered the reading group by video conference in fall 2020. One of the authors joined the last meeting.

Retreat Participant, STEM Pedagogy Institute Focusing on Inclusive Excellence (SPIFIE), 2016

Attended events in the program at the Bartlett College of Science and Mathematics, such as the student panel “What is the experience of students of color in the College of Science and Mathematics?”, introduced myself to panelists afterward, enacted their recommendations, and keep in touch with some of the students through the present.

Participant, Power and Privilege Discussion Series, 2011

Derived monumental insights into the perspectives of my fellow employees during weekly conversations led by the Office of Institutional Diversity.

MENTORING**Faculty Mentor, Lewis and Gaines Center for Inclusion and Equity (LGCIE), 2016–present**

Hold a weekly office hour at LGCIE (called Center for Multicultural Affairs pre-2020) at Bridgewater State University and attend cultural events.

Faculty Mentor, LGBTQA Pride Center, 2020–present

Hold a weekly office hour at the LGBTQA Pride Center at Bridgewater State University and attend cultural events.

Consultant, Project NExT (New Experiences in Teaching), 2011–present

Mentor NExT Fellows (new mathematics faculty) and share perspectives on a wide variety of issues confronting junior faculty, including improving teaching, furthering scholarship, and serving the mathematical and academic communities.

Founder and Organizer, Mentoring Women in Mathematics (WIM), 1998-2000, 2002-2007

Co-founded and co-organized WIM to foster communication among women math students at the University of Akron. Hosted alumnae and distinguished external visitors. Arranged tours of area laboratories. Sponsored women students to give conferences talks.

Founder and Organizer, 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.

Invited Colloquium Speaker for Mathematics Club, 2003

Gave invited colloquium to the Mathematics Club at Case Western Reserve University on Mathematical Description of Crystal Growth.

Leader of Women in Science and Engineering Roundtable, 2003

Led discussion on scientific article Form From Fire, Case Western Reserve University.

Career Panelist, 2003

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

Invited Career Speaker, 2001

Sonia Kovalevsky Day, University at Albany, State University of New York

Pi Mu Epsilon (PME) Advisor, 2004-2008, 2010-2015

Advised chapters of PME mathematics honor society at The University of Akron and Bridgewater State University.

Math Club Advisor, 2010-2015

Advise the Math Club at Bridgewater State University.

OTHER PROFESSIONAL ACTIVITIES**Representative, New England Regional Meeting on Upper-Division Pathways, 2018**

Transforming Post-Secondary Education in Mathematics, Worcester, MA
 Joined Chair of the Mathematics Department in representing Bridgewater State University.

Focus Group Member, Joint Mathematics Meetings, 2016

Provided input on the MAA's Instructional Practices Guide, Seattle, WA

Minisymposium Organizer, U. S. National Congress on Computational Mechanics, 2007
 Frontal Phenomena

With Stephen B. Margolis (Sandia National Laboratory)

And D. Golovaty (The University of Akron)

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

Proposal Reviewer, National Science Foundation, 2009

Served on a panel reviewing research proposals in applied mathematics.

Proposal Reviewer, Association for Women in Mathematics, 2010

Reviewed research travel-grant proposals in three funding cycles in 2010.

Organizer, Student Poster Sessions, 2003-2006

Organized a poster session for mathematics students at all levels at Celebration of Excellence in Teaching and Learning (**CELT**) at The University of Akron.

LANGUAGES

Native speaker of English with proficiency in French, German, and Mandarin Chinese and a basic working knowledge of Spanish

DATA TRAINING

Data Analysis and Statistical Inference, 2015
Coursera (Duke University)

Identified a research question and created a fully reproducible project in R/RStudio and RMarkdown using statistical methods for confidence intervals and hypothesis testing on real data. Obtained Statement of Accomplishment with Distinction for this online non-credit course.

PROGRAMMING AND COMPUTER SKILLS

Python, Java, R, Scratch, Matlab, Maple, RMarkdown, Emacs, LaTeX, Learning Management Systems, Microsoft Office