MATTHIAS K. GOBBERT

Matthias K. Gobbert
Department of Mathematics and Statistics
University of Maryland, Baltimore County
1000 Hilltop Circle
Baltimore, MD 21250
U.S.A.

Date: October 12, 2024
Office: Math/Psyc 416
Phone: (410) 455-2404
Fax: (410) 455-1066
E-mail: gobbert@umbc.edu
www.umbc.edu/~gobbert

Current Research Interests

- Scientific computing and parallel algorithms for computing clusters and other architectures
- Machine learning techniques for applications of Big Data in science and engineering
- Multiscale modeling and numerical simulation of chemically reactive flows
- Numerical methods for stationary and time-dependent partial differential equations
- Applications in the life sciences, computational biology, engineering, statistics, and other areas

Education

Ph.D.	1996	Arizona State University, Tempe, AZ, Mathematics Advisor Dr. Christian Ringhofer, "A Homogenization Technique for the Development of Mesoscopic Scale Models for Chemical Vapor Deposition"
M.N.S.	1993	Arizona State University, Tempe, AZ, Mathematics with minor in Control Engineering
Vordiplom (B.Sc.)	1990	Technische Universität Darmstadt, Darmstadt (Germany), Mathematics with minor in Mechanics

Employment

1997–present	Department of Mathematics and Statistics, University of Maryland, Baltimore County, Assistant Professor 1997–2003, Associate Professor 2003–2010, Professor 2010–present
1996–1997	Institute for Mathematics and its Applications (IMA), University of Minnesota, Postdoctoral Associate, Annual Program on Mathematics in High Performance Computing

Other Appointments

2017–2018	National Science Foundation, Division of Mathematical Sciences, Program Director (IPA)
2022–present	Affiliate Professor, Department of Information Systems, UMBC
2009–present	Affiliate Professor, Department of Computer Science and Electrical Engineering, UMBC
2005–present	Associate Director, Center for Interdisciplinary Research and Consulting, Department of Mathematics and Statistics, University of Maryland, Baltimore County
2012–2016	Undergraduate Program Director for programs leading to B.A. and B.S., Department of Mathematics and Statistics, University of Maryland, Baltimore County
2011–2012	Gastdozent, Institut für Mathematik, Universität Kassel (Germany), supported by DAAD
Fall 2004	General member, Institute for Mathematics and its Applications (IMA), University of Minnesota
Summer 2002	Research visitor, Institute of Mathematics, University of Vienna (Austria)
Summer 2001	Research visitor, International Erwin Schrödinger Institute for Theoretical Physics, University of Vienna (Austria)
Summer 2000	Long-term visitor (one month), Institute for Mathematics and its Applications (IMA), University of Minnesota
Summer 1996	Research Scientist (summer intern), Semiconductor Products Sector, Motorola

GRANTS AND AWARDS

External Support:

2024–2027 $362,755, National Science Foundation, OAC–2348755, "REU Site: Online Interdisciplinary Big Data Analytics in Science and Engineering," PI with co-PI Jianwu Wang, programs for 8 supported students in Summers 2024, 2025, and 2026, `bigdatareu.umbc.edu`

2024 $8,000, National Science Foundation, REU Supplement to "REU Site: Online Interdisciplinary Big Data Analytics in Science and Engineering," for undergraduate assistant Ruth Obe

2021–2024 $293,710, National Science Foundation, OAC–2050943, "REU Site: Online Interdisciplinary Big Data Analytics in Science and Engineering," co-PI with PI Jianwu Wang, programs for 8 supported students in Summers 2021, 2022, and 2023, `bigdatareu.umbc.edu`

2020–2023 $372,258, NSF/NIH-NIGMS, DMS–1953423, "Hybrid Mathematical Modeling for Cell Fate Determination in Clustered Cell Migration," co-I with PI Bradford E. Peercy and co-PI Michelle A. Starz-Gaiano and co-I Tagide N. deCarvalho

2019–2022 $428,571 (including $128,571 cost-sharing), National Science Foundation, CNS–1920079, "MRI: Acquisition of a Heterogeneous GPU Cluster to Facilitate Deep Learning Research at UMBC," co-I with PI Hamed Pirsiavash and co-PIs C. Matuszek, F. Ferraro, N. Karimi, D. Doyle

2019–2020 $48,000, National Science Foundation, REU Supplement to "CyberTraining: DSE: Cross-Training of Researchers in Computing, Applied Mathematics and Atmospheric Sciences using Advanced Cyberinfrastructure Resources," for six students, my portion for G. C. Kroiz and J. Basalyga

2017–2020 $789,076 (including $236,723 cost-sharing), National Science Foundation, OAC–1726023, "MRI: Acquisition of Cutting-Edge GPU and Phi Nodes for the Interdisciplinary UMBC High Performance Computing Facility," lead-PI for institutional proposal with 51 investigators from 13 departments and research centers across campus

2017–2020 $499,970, National Science Foundation, OAC–1730250, "CyberTraining: DSE: Cross-Training of Researchers in Computing, Applied Mathematics and Atmospheric Sciences using Advanced Cyberinfrastructure Resources," co-PI with PI Jianwu Wang and co-PIs Zhibo Zhang and Aryya Gangopadhyay

2017–2018 $55,000, National Security Agency, "REU Site: Interdisciplinary Program in High Performance Computing," with Nagaraj K. Neerchal, Kofi P. Adragni, and Bradford E. Peercy, program for 4 supported students in Summer 2017, `hpcreu.umbc.edu`

2016–2017 $125,000, National Security Agency, "REU Site: Interdisciplinary Program in High Performance Computing," with Nagaraj K. Neerchal, Kofi P. Adragni, and Bradford E. Peercy, program for 9 supported students in Summer 2016, `hpcreu.umbc.edu`

2015–2017 $514,286 (including $154,286 cost-sharing), CNS–1531491, National Science Foundation, "MRI: Acquisition of PI2, a CAVE2-Inspired Display for Discovery Science, Creativity, and Education," co-I with PI Jian Chen

2015–2018 $500,000, National Science Foundation and Department of Defense, DMS–1460652, "REU Site: Interdisciplinary Program in High Performance Computing," with Nagaraj K. Neerchal, Kofi P. Adragni, and Bradford E. Peercy, programs for 12 supported students in Summers 2015, 2016, and 2017, `hpcreu.umbc.edu`

2015–2016 $179,434, National Security Agency, "REU Site: Interdisciplinary Program in High Performance Computing," with Nagaraj K. Neerchal, Kofi P. Adragni, and Bradford E. Peercy, program for 12 supported students in Summer 2015, `hpcreu.umbc.edu`

2014–2017 $500,000, National Science Foundation, OAC–1440477, "CC*IIE Networking Infrastructure: Enabling Big Computing and Data Intensive Cyberinfrastructure (EBCDIC)," co-PI with PI Jack Suess and co-PI Don Engel

2013–2014 $10,000, IBM Faculty Award, for CIRC RA Sarah Swatski in Fall 2014

2013–2014 $40,000 (including $20,000 UMBC matching funds), University System of Maryland Carnegie Course Redesign Initiative Cohort 3, MATH 150 Pre-Calculus Mathematics Redesign, PI for departmental proposal with six co-PIs

2012–2013 $10,000, National Science Foundation and National Security Agency, REU Supplement to "REU Site: Interdisciplinary Program in High Performance Computing," for participant travel to national conferences

2012–2015 $428,571 (including $128,571 cost-sharing), National Science Foundation, CNS–1228778, "MRI: Acquisition of Hybrid CPU/GPU Nodes for the Interdisciplinary UMBC High Performance Computing Facility," lead-PI for institutional proposal with 30 investigators from 10 departments and research centers across campus

2012–2015 $450,000, National Science Foundation and National Security Agency, DMS–1156976, "REU Site: Interdisciplinary Program in High Performance Computing," with N. K. Neerchal, programs for 12 supported students in Summers 2012, 2013, and 2014, `hpcreu.umbc.edu`

2011 $8,000, National Science Foundation, REU Supplement to "SCREMS: Parallel Computing for Interdisciplinary Research in Mathematics and Statistics," for Michael Curtis

2010–2015 $699,995, National Science Foundation, BIO–1031420, "UBM: Interdisciplinary Training and Research for Undergraduates in Biological and Mathematical/Statistical Sciences at UMBC," co-I in interdisciplinary team of 10 researchers from Biology and Mathematics/Statistics, UBM@UMBC, `ubm.umbc.edu`, research projects with Ivan Erill and with Kevin Omland

2009–2011 $194,283, National Science Foundation, DMS–0851749, "REU Site: Interdisciplinary Program in High Performance Computing," with N. K. Neerchal, programs for 8 supported students in Summers 2010 and 2011, `hpcreu.umbc.edu`

2008–2011 $285,714 (including $85,714 cost-sharing), National Science Foundation, CNS–0821258, "MRI: Acquisition of an Interdisciplinary Facility for High-Performance Computing," lead-PI for institutional proposal with 23 investigators from 10 departments and research centers

2008–2011 $40,000, National Science Foundation, DMS–0821311, "SCREMS: Parallel Computing for Interdisciplinary Research in Mathematics and Statistics," lead-PI for departmental proposal with Andrei Draganescu, Nagaraj K. Neerchal, and Florian Potra

2006 $6,000, National Science Foundation, DMS–0620297, co-PI with PI Kathleen A. Hoffman, "Conference: Advances in Control of Partial Differential Equations"

2002–2005 $150,000 (including $75,000 cost-sharing), National Science Foundation, DMS–0215373, "Scientific Computing Research Environments for the Mathematical Sciences (SCREMS)," co-PI with Jonathan Bell (PI), Madhu Nayakkankuppam, and Florian Potra

1999 $1,000, SIAM travel grant to ICIAM 99 in Edinburgh, Scotland

1998–2001 $68,000, National Science Foundation, DMS–9805547, "Computational Methods for the Simulation of Chemical Vapor Deposition on Rough Surfaces"

Internal Support:

2014–2015 $10,000, Hrabowski Fund for Innovation, "Pilot Study of an Integrated Active Team-Based Learning Redesign of MATH 155 Applied Calculus," PI with co-PIs Elizabeth Stanwyck, Raji Baradwaj, and Brian Dean

2008–2009 $5,000, UMBC Alex. Brown Center for Entrepreneurship, "Development of Off-Campus Marketing for the Center for Interdisciplinary Research and Consulting," with Nagaraj K. Neerchal, Faculty Innovation Grant, sub-grant of Kauffman Foundation grant to UMBC

2007 $1,000, Alternate Delivery Program (ADP), Office of Summer, Winter, and Special Programs

2006 $2,000, Alternate Delivery Program (ADP), Office of Summer, Winter, and Special Programs

2004–2005 $13,545, UMBC DRIF Research Assistantship Support "Adaptive Mesh Refinement for Transient Problems with Non-Standard Refinement Criteria," with Thomas I. Seidman

2004 $2,500, UMBC DRIF Summer Faculty Fellowship

2002–2003	$500, UMBC Office of the Provost, education stipend for faculty teaching a First-Year Seminar in AY 2002–2003
2002–2003	$7,000, UMBC DRIF Research Assistantship Support "Parallel Multi Scale Simulation of Atomic Layer Deposition" (for Samuel G. Webster)
2001–2002	$12,000, UMBC DRIF Research Assistantship Support "Numerical Modeling of Calcium Waves in Heart Cells," with Thomas I. Seidman (for Alexander L. Hanhart)
2001	$4,000, UMBC DRIF Summer Faculty Fellowship
1998	$5,000, UMBC DRIF Summer Faculty Fellowship

Student Awards:

2021–2022	Gerson C. Kroiz, Goldwater Scholarship for STEM Research "Deep Learning Methods for Image Reconstruction in Proton Radiotherapy," $7,500
2020–2021	Gerson C. Kroiz, Undergraduate Research Award "Multi-site Daily Precipitation Generation of Satellite Precipitation Estimates using a Generative Adversarial Network," $200
2019–2020	Gerson C. Kroiz, Undergraduate Research Award "Analysis of the Introduction of a Calsequestrin Species in a System of Partial Differential Equations that Model the Calcium Dynamics of a Cardiomyocyte," $75
2015–2016	Jack Slettebak, B.S. December 2015, Undergraduate Research Award "Pushing the Limits of the Cluster Maya: Testing with the HPCG Benchmark," $1,000
2013–2014	Matthew W. Brewster, B.A. May 2014, Undergraduate Research Award "Numerical Methods and Modeling of Calcium Waves in Heart Cells," $1,500
2008–2009	Michael J. Reid, B.S. December 2008, Undergraduate Research Award "Numerical Simulation of Silicon Wafer Etching Using Parallel Programming," $1,500
2003–2004	Tomasz J. Macura, B.S. May 2004, Undergraduate Research Award "Detecting Spheres in Computed Tomography using Parallel Computers," $1,500
2003–2004	Kevin P. Allen, B.S. May 2003, Undergraduate Research Award "A Matrix-Free Implementation of the Conjugate Gradient Method for Cluster Computing," $1,500
2001–2002	Steven C. Foster, B.S. August 2003, Undergraduate Research Award "Numerical Simulation of Atomic Layer Epitaxy using MPI," $1,500

Honors and Awards

2022	Faculty Development Center (FDC) Active Learning, Inquiry Teaching (ALIT) Certificate
2010	University System of Maryland Board of Regents' Faculty Award for Excellence in Mentoring
1993	Phi Kappa Phi National Honor Society
1991–1993	Konrad-Adenauer-Stiftung full academic scholarship
1988–1993	Konrad-Adenauer-Stiftung book stipend

STUDENTS

Ph.D. Students

Harrison Lewis, on-going (Spring 2024–present), *committee chair and research mentor*

Ehsan Shakeri, on-going (Fall 2023–present), *committee chair and research mentor* for [96, 107] and for his RA in HPCF in Spring 2024 and in the Big Data REU Site in Summer 2024

Francesca R. McFadden, on-going (Fall 2022–present), *committee chair and research mentor*

Daniel J. Kelly, on-going (Fall 2021–present), *committee chair and research mentor* for [49, 98] and his RA in HPCF in Spring 2022

Michael Muscedere, on-going (Fall 2014–present), *committee chair and research mentor* for publications [22, 155, 159, 169, 171]

Carlos A. Barajas, Ph.D. May 2022, CNMS Graduate Research Award May 2021, "Neural Networks for the Sanitization of Compton Camera Based Prompt Gamma Imaging Data for Proton Radiotherapy" [206], *committee chair and research mentor* for publications [1–4, 6, 7, 10, 13, 14, 47, 50, 51, 53, 55–57, 59–61, 63, 99, 103–106, 108–113, 115–117, 122, 206, 209] and his RA in HPCF from Summer 2017–Spring 2022

Jonathan S. Graf, Ph.D. May 2017, "Parallel Performance of Numerical Simulations for Applied Partial Differential Equation Models on the Intel Xeon Phi Knights Landing Processor" [210], *committee chair and research mentor* for publications [8, 11, 14, 66, 67, 120–126, 128, 130, 131, 135], his RA in HPCF from Spring 2014–Spring 2017, and in the REU Site in Summers 2014, 2015, and 2016

Samuel Khuvis, Ph.D. May 2016, "Porting and Tuning Numerical Kernels in Real-World Applications to Many-Core Intel Xeon Phi Accelerators" [212], *committee chair and research mentor* for publications [15, 18, 71, 72, 123–125, 129–133, 136, 137], his RA in HPCF from Summer 2014 to Spring 2016, and in the REU Site in Summers 2013–2015

Xuan Huang, Ph.D. May 2015, "An MPI-CUDA Implementation of a Model for Calcium Induced Calcium Release in a Three-Dimensional Heart Cell on a Hybrid CPU/GPU Cluster" [214], *committee chair and research mentor* for publications [17, 67–69, 72, 127, 130, 131, 134, 138, 139], his RA in CIRC in Fall 2011, in HPCF from Spring 2012 to Spring 2015, and in the REU Site in Summers 2013 and 2014

Jonathan McHenry, Ph.D. December 2014, "Parallel Regularized Maximum Likelihood Estimation for Proportional Odds Models" [215], *committee chair and research co-mentor* with Nagaraj K. Neerchal (Statistics), *mentor* for his RA in CIRC from Fall 2011 to Fall 2013 and in the REU Site in Summer 2012 [142]

Zhibin Sun, Ph.D. August 2007, "Geomagnetic Data Assimilation Using Ensemble Methods to Estimate Forecast Error Covariance" [224], *committee chair and co-mentor* with Andrew Tangborn (NASA/JCET)

Samuel G. Webster, Ph.D. May 2004, "Stability and Convergence of a Spectral Galerkin Method for the Linear Boltzmann Equation" [225], *committee chair and research mentor* for [27, 36, 86, 88, 178]

Committee member for

- Mostafa Cham (Information Systems), *mentor* for his RA in the Big Data REU Site and HPCF from Summer 2023 to Spring 2024 and for publications [48, 97];
- Seraj Mostafa (Information Systems), 2024–present;
- Naghmeh Akhavan, 2023–present;
- Zhen Qie (Electrical Engineering), Ph.D. December 2022;
- Tiantian Xie (Computer Science), Ph.D. August 2021; Janita Patwardhan, Ph.D. May 2020;
- Lai Wang (Mechanical Engineering), Ph.D. December 2019, and *research mentor* for [5, 119];
- Ari Rapkin Blenkhorn (Computer Science), Ph.D. December 2018, and *research mentor* for [123–125];
- Yu Wang (Computer Science), Ph.D. December 2015, *co-mentor* for her RA in HPCF from Fall 2011 to Spring 2012 and for publications [73, 130, 145];
- Zhengtao Cui (Environmental Engineering), Ph.D. December 2015;

Zana Coulibaly, Ph.D. August 2015, *research mentor* for publications [16, 67];
Nuno Pinto, Ph.D. (Chemical Engineering) December 2013; Dan Wang, Ph.D. August 2008;
Hai Zhang, Ph.D. (Physics) May 2006; Valeriy R. Korostyshevskiy, Ph.D. May 2005;
Alexandra L. Chaillou, Ph.D. August 2003; Padmanabhan Seshaiyer, Ph.D. May 1998.

Master's Students (Master's Theses)

Charan Duggirala, M.S. (Information Systems) May 2023, "Distributed GPU Computing for Deep Learning in Proton Beam Therapy for Cancer Treatment" [203], *committee co-chair and co-mentor* with Jianwu Wang (Information Systems) and *mentor* for and his RA in HPCF

Garima Kumari, M.S. (Information Systems) May 2023, "Distributed Deep Learning Techniques for Remote Sensing Applications" [204], *committee co-chair and co-mentor* with Jianwu Wang (Information Systems) and *mentor* for her RA in HPCF

Carlos A. Barajas, M.S. December 2019, "An Approach to Tuning Hyperparameters in Parallel: A Performance Study Using Climate Data" [209], *committee chair*

Ryan D. Day, M.S. May 2016, "Parallel Performance Studies for a Linear Parabolic Test Problem Using the Intel Xeon Phi" [211], *committee chair*

Samuel Khuvis, M.S. May 2013, "Efficiency Improvements in Numerical Methods for Studying Connectivity in a Model of a Pancreatic Islet of Heterogeneous Beta Cells" [217], *committee chair and research mentor* for publications [15, 18, 71, 72, 137]

Neeraj Sharma, M.S. August 2010, "A Comparative Study of Several Numerical Computational Packages" [221], *committee chair and research mentor* for publications [153, 164]

Alexander L. Hanhart, M.S. May 2002, "Coarse-Grained Parallel Solution of a Three-Dimensional Model for Calcium Concentration in Human Heart Cells" [228], *committee chair and research mentor* for [32, 179]

Committee member for Jinglong Sun (Computer Science), M.S. December 2021;
Mattie Whitmore, M.S. December 2011, *research mentor* for [74]; Marlene Roush, M.S. May 2007;
Yevgen Tymofyeyev, M.S. December 2002; Jennifer Deering, M.S. May 2002

Undergraduate Students (Senior Theses for graduation with departmental honors)

Michelle Ramsahoye, B.S. May 2022, *research mentor* for senior thesis "Exploring Deep Fully Connected Residual Neural Networks for Initial Energy Estimations of Compton Camera Based Prompt Gamma Imaging Data for Proton Radiotherapy" [205]

Gerson C. Kroiz, B.S. May 2022, Goldwater Scholarship for STEM Research 2021–2022, *research mentor* for CyberTraining REU Supplement, publications [6, 7, 47, 50, 55, 58, 105, 106, 186], and senior thesis "A Comparison of Stochastic Precipitation Generation Models for the Potomac River Basin" [207]

Jonathan N. Basalyga, B.S. May 2020, *research mentor* for CyberTraining REU Supplement, publications [4, 57, 102, 105, 106], and senior thesis "Parallel Hyperparameter Tuning of Accuracy for Deep Learning based Tornado Predictions" [208]

Jack Slettebak, B.S. December 2015, *research mentor* for publications [131, 188] and the senior thesis "The HPCG Benchmark for Cluster Computing" [213]

Matthew W. Brewster, B.A. May 2014, *co-mentor* with Ivan Erill (Biological Sciences) in the UBM@UMBC program, *research mentor* for [67, 141, 144, 148, 195, 197] and the senior thesis "The Influence of Stochastic Parameters on Calcium Waves in a Heart Cell" [216]

Randal Mckissack, B.S. (Computer Science) May 2014, *research mentor* for publication [146] and the senior thesis "Cluster computing using Intel Concurrent Collections" [218]

Ecaterina "Oana" Coman, B.S. May 2012, *research mentor* for publication [141] and the senior thesis "IDL: A Possible Alternative to Matlab?" [219]

Robert Forder, B.S. May 2012, *co-mentor* with Ivan Erill (Biological Sciences) in the UBM@UMBC program for publications [149, 199] and the senior thesis

"Simulating the Evolution of Transcriptional Regulatory Motifs" [220]

Peter Hinkey, B.S. December 2009, *co-mentor* with Erricos C. Pavlis (NASA/JCET) for Practicum (Summer 2008) and senior thesis "Improvement of numerically integrated satellite orbits by inclusion of temporal variations in Earth's gravitational field from GRACE" [222]

Michael J. Reid, B.S. December 2008, *research mentor* for [168, 200] and the senior thesis "Comparison of Parallel Performance between MVAPICH2 and OpenMPI Applied to a Hyperbolic Test Problem" [223]

Steven C. Foster, B.S. August 2003, *research mentor* for [180, 202] and the senior thesis "Application of the Boltzmann Equation to the Modeling of Atomic Layer Deposition with Performance Studies" [226]

Kevin P. Allen, B.S. May 2003, *research mentor* for the [84, 177, 201] and the senior thesis "A Parallel Matrix-Free Implementation of the Conjugate Gradient Method for the Poisson Equation" [227]

Additional Work with Students:

Ph.D. students: Reetam Majumder (Statistics), Ph.D. December 2021, CNMS Grad. Res. Award May 2021, *research mentor* for [54, 58, 100, 106, 109] and his RA in HPCF during Spring 2019–Fall 2021

Nadeesri Wijekoon (Statistics), *mentor* for her RA in HPCF during Fall 2017

Sai K. Popuri (Statistics), Ph.D. May 2018, *research mentor* for [12, 65, 118, 140, 141, 144] and for his RA in HPCF Fall 2016–Spring 2017

Kourosh M. Kalayeh (Mechanical Engineering), *research mentor* for [66, 126, 189, 191]

Andrew M. Raim (Statistics), Ph.D. May 2014, *research mentor* for [19, 139, 143, 146, 155–157] and his RA in HPCF from Fall 2009 to Spring 2014 and in the REU Site in Summers 2010–2013

Yushu Yang, Ph.D. August 2011, *research mentor* for [171] and for her RA in CIRC in Summer 2008

Alen Alexanderian, Ph.D. August 2010, *research mentor* for [21, 173] and for his RA in CIRC from Summer 2006 to Fall 2007

Noemi Petra, Ph.D. August 2010, *research mentor* for publications [78, 161]

Ana Maria Soane, Ph.D. May 2008, *research mentor* for publications [30, 176]

Master's students: Richard Ebadi, University of Kassel (Germany), *research mentor* for [112]

Kritesh Arora (Information Systems), M.S. May 2018, *research mentor* for publication [115] and for his RA in HPCF from Fall 2017 to Spring 2018

Sarah Swatski, M.S. (non-thesis) May 2015, *research mentor* for her RA in CIRC from Fall 2014 to Spring 2015 and for publications [132, 192]

Sven Wallbaum, University of Kassel (Germany), M.Sc. 2014, *research mentor* for [70]

David Stonko, M.S. August 2014, *research mentor* for publication [133]

Jonas Schäfer, University of Kassel (Germany), Dipl.-Math. 2013, *research mentor* for [17, 196]

Hafez Tari, M.S. Mechanical Engineering August 2011, *research mentor* for publication [154]

David W. Trott, M.S. (non-thesis) May 2011, *research mentor* for publications [20, 74–76, 150–152], his RA in HPCF from Fall 2010 to Summer 2011, and his TA in the REU Site in Summer 2011

Kyle Stern, M.S. (non-thesis) May 2010, *research mentor* for [150], for his TA in the REU Site in Summer 2010, and for his RA in CIRC from Fall 2009 to Spring 2011

Aaron Churchill, M.S. (non-thesis) May 2010, *research mentor* for [77, 158, 162] and for his RA in CIRC from Spring to Summer 2009

Amanda Gassman, M.S. (non-thesis) May 2009, *research mentor* for [163]

Shiming Yang, M.S. (non-thesis) December 2008, *research mentor* for [23, 79, 167, 174] and for his RA in CIRC in Spring 2008

Guan Wang, M.S. (non-thesis) December 2008, *research mentor* for [77, 160, 162] and for his RA in CIRC from Summer 2008 to Fall 2008

Aaptha Murthy, M.S. (non-thesis) May 2007, *mentor* for her RA in CIRC in Spring 2006

Mark L. Breitenbach, M.S. (non-thesis) December 2004, *research mentor* for publication [81]

Undergraduate students:

Ruth Obe, University of Houston—Clear Lake, Summer 2023–present, *research mentor* for [48, 97]

and for her REU Site team in Summer 2023 and her RA in the Big Data REU Site in Summer 2024
Nithya Navarathna (Biological Sciences), Summer 2022–Fall 2022,
research mentor for her REU Site team in Summer 2022 and for publications [49, 98, 185];
James Della-Guistina, Community College of Baltimore County,
research mentor for his REU Site team in Summer 2017 and for publications [10, 63, 116];
Hayley Richardson, Spring 2014–Spring 2016, *co-mentor* with Kevin Omland
(Biological Sciences) in the UBM@UMBC program;
Tylynn Pettrey, Spring 2013–Spring 2014, *co-mentor*
with Kevin Omland (Biological Sciences) in the UBM@UMBC program;
Andrew Li, B.S. December 2012, *co-mentor* with Kevin Omland (Biological Sciences) in UBM@UMBC;
Zana Coulibaly, B.S. May 2009, *research mentor* for [159];
Tomasz J. Macura, B.S. May 2004, *research mentor* for his Undergraduate Research Award.

Service to the community: Greg E. McGlynn, Catonsville High School, graduated Spring 2007,
research mentor for project on parallel programming during Winter 2006
Rachel E. Bauer, Villa Julie College, B.A. May 2006, *research mentor* for senior project during Fall 2005

Service to the University

Initiated the UMBC High Performance Computing Facility (HPCF) in 2008. HPCF is the community-based, interdisciplinary core facility for scientific computing and research on parallel algorithms. Since its inception by over 20 researchers from 10 academic departments and research centers, over 400 users generated over 400 publications, including over 150 papers in peer-reviewed journals, 50 refereed conference papers, and 50 theses. I led three successful MRI grants (2008, 2012, 2017) totaling over $1.5M (including cost-sharing) and led the user community as chair of the governance committee and supervisor of the RAs 2008–2024 (system setup, user support, tech. report server, webpage documentation, etc.). `hpcf.umbc.edu`

Co-created the REU Site: Online Interdisciplinary Big Data Analytics in Science and Engineering with Jianwu Wang (Information Systems). This eight-week summer program creates a novel and unique online team-based REU Site on Big Data and HPC applied to interdisciplinary projects. The program consists of two teams of 4 or 5 undergraduates supported by dedicated GRAs working on projects with outside collaborators like NASA or the University of Maryland School of Medicine. The completely online nature of the program makes it available to students across the nation and provides experience in improving student engagement in online learning. The program is funded by the National Science Foundation since 2021 and was just renewed until 2027. `bigdatareu.umbc.edu`

Facilitated university partnership with the University of Kassel, Germany, including an undergraduate exchange program; with UMBC partners Brigitte May (retired), Susanne Sutton, and many more. Institutional MOU signed in Spring 2015. From Fall 2015 to Fall 2019, typically three students studied at partner university every year for one semester. Kassel delegation visits in 2015 and 2016, visits to Kassel by UMBC leaders Antonio Moreira in March 2016 and Karl Steiner in April 2016. Faculty sabbaticals in 2011–12, 2013–14, Spring 2017, and Spring 2019.

Research Council, member 2013–2015 (Dec.) and 2016–2017, chair 2015 (Jan.–Dec.)

Academic Planning and Budget (APB) Committee, member 2014–2015

Provost Task Force on Interdisciplinary Activities, member 2013–2015

Faculty Senate Computer Policy Committee (CPC), member 1998–2004, 2005–2009, 2021–2025, chair 2001–2004, 2005–2007, 2021–2022

Provost Information Technology (IT) Steering Committee, member 2001–2004, 2005–2017, 2021–2022

Research Park Advisory Committee (RPAC), member 2014–2017, 2019–2026

Research Space Workgroup, member, 2015

HPCF User / Governance Committee, chair 2008–2024
RCA Computing Task Force, member, April–October 2023
Hrabowski Innovation Fund (HIF) Selection Committee, member, 2022–precent
URCAD Committee, member 2014–2015
Faculty Senate, Senator 2006–2010, 2016–2017
Faculty Senate Executive Committee, member 2006–2007, 2008–2011, 2015
Graduate School Emergency Fund (GSEF), evaluation panel, member 2021–present
Represented College in university IT Restructuring Work Group, Spring 2010
Special task force on advancing UMBC's international partnerships and global engagement, member, 2018–2019
International Partnerships & Global Engagement Subcommittee, 2018–2019
Served on a Committee of Inquiry, June 2005
Served on successful search committee for Director of the Albin O. Kuhn Library & Gallery, 2015
Served on Provost Office Search Committee, Spring 2005
Academic advisor during Summer and Winter orientation for incoming freshmen and transfer students (Summer 2003, Winter 2004, Summer 2004, Summer 2005, Winter 2008, Summer 2008, Winter 2009)
Faculty Development Center (FDC) Active Learning, Inquiry Teaching (ALIT) Certificate, 2021–2022
DoIT's Instructional Technology Blackboard Ultra Faculty Ambassador, 2019–2020
Faculty Development Center FLC AI Literacy Within and Across Disciplines, 2024–2025
Faculty Development Center FLC Re-engaging Students After the Pandemic, 2023–2024
Faculty Development Center FLC Flexible, Alternative, or "Un"grading Strategies, 2022–2023
Faculty Development Center FLC SoTL Writing Accountability, 2021–2022
Faculty Development Center FLC Flipping the Classroom, 2018–2019
Faculty Development Center FLC Interdisciplinary Teaching and Learning, 2016–2017
Faculty Development Center FLC Integration of Teaching and Research, 2015–2016
Faculty Development Center FLC iTEACH: Using Tablet Computers in the Classroom, 2014–2015
Participated in Hybrid Course Design Workshop in Spring 2006 for the redesign of Math 221 in Summer 2006
Participated in reading group on Learner-Centered Teaching and several workshops on teaching techniques offered by the Faculty Development Center at UMBC during 2000–2005

Service to the Department

Created the REU Site: Interdisciplinary Program in High Performance Computing with Nagaraj K. Neerchal, Kofi P. Adragni, and Bradford E. Peercy. This eight-week summer program includes instruction in scientific, statistical, and parallel computing and research training by projects on interdisciplinary applications, in teams of participants with support by graduate assistants and faculty mentors. Over the eight years 2010 to 2017, our REU Site involved 21 graduate assistants and trained 158 participants, including 42 African Americans, 23 Asians, 2 Native Americans, and 20 Hispanics, as well as 5 students with disabilities and 3 military veterans. The research by student teams led to 65 publications, including 18 papers in reviewed journals for the participants, 4 refereed conference papers, 3 senior theses, and 40 technical reports. Three students affiliated with the program have been awarded the prestigious NSF Graduate Research Fellowships. The direct grants for this program from the NSF, NSA, and DOD total to over $2.0M. `hpcreu.umbc.edu`.
Co-created the Center for Interdisciplinary Research and Consulting (CIRC) with Nagaraj K. Neerchal in 2003. CIRC is a consulting service for mathematics and statistics dedicated to supporting interdisciplinary research for both the UMBC campus community and the general public. `circ.umbc.edu`
Initiated graduate and research level MOU with the Institute of Mathematics at the University of Kassel, Germany, that has resulted in graduate students and post-docs from both sides visiting for long-term stays and the principal faculty spending sabbatical stays at the partner institution, 2011–2014.
The effort led to a university partnership and institutional MOU in Spring 2015.

Chaired the organizing committee for the conference "Advances in Control of Partial Differential Equations"
in honor of colleague Thomas I. Seidman, October 28–29, 2006, `www.umbc.edu/seidman`,
with Stuart S. Antman (University of Maryland, College Park) and Kathleen A. Hoffman (UMBC)
Initiated the semi-annual departmental newsletter *News@Math&Stat* and served as inaugural editor 2006–2009
Departmental Undergraduate Program Committee, member 1998–2001, 2008–2011, chair 2012–2016
Member of the departmental committee for the Academic Program Review, 2006–2007, 2013–2014
Departmental Advisory Committee, member 2007–2008, 2012–2015
Departmental Graduate Program Committee, member 2005–2006
Departmental Computer Committee, member 1999–2004, 2005–2006
Departmental Hiring Committee, member 1999–2000, 2012–2013
Departmental Administration Committee, member 1998–1999
Organizer of the Differential Equations Seminar, 2001–2003
Created and taught new courses (complete list at `www.umbc.edu/~gobbert/teaching`):
FYS 101A First-Year Seminar: Technological Disasters and Their Causes (Spring 2003),
Math 426 Introduction to Mathematical Software Packages: Matlab (8 times),
Math 447/627 Introduction to Parallel Computing (21 times)
Math 490/710 Introduction to Asymptotic Analysis (Fall 1999)
Math 750 Introduction to Interdisciplinary Consulting (Fall 2003 and Spring 2004 as regular class)
Other significant teaching (complete list at `www.umbc.edu/~gobbert/teaching`):
Math 221 Introduction to Linear Algebra redesigned in hybrid format (Summer 2006, Summer 2007)
Math 621 Numerical Methods for Partial Differential Equations (8 times)
Independent Studies on various topics (Math 699 15 times, Math 750 7 times)
Math 497 Senior Thesis for graduating with departmental honors (12 times)
Participated in comprehensive exams and recommendations to the Graduate Program Director:
Math 620 Numerical Analysis (28 times), Math 630 Matrix Analysis (22 times)
Member of the departmental Core Advising Team for undergraduate majors and minors, Fall 2007–Spring 2017
Served as academic advisor for several non-thesis M.S. students:
Sarah Swatski (May 2015), David W. Trott (May 2011), Kyle Stern (May 2010),
Aaptha Murthy (May 2007), Mark L. Breitenbach (December 2004), Samuel G. Webster (May 2001),
Jiaqiao Hu (May 2001), Michael Muscedere (May 2001), and Kevin Puckace (May 2000)

Service to the Profession

Organized minisymposia: (i) SIAM Annual Meeting 2004, July 12–16, 2004, Portland, OR,
MS48 "Parallel Computing on Beowulf Clusters: Performance and Applications;"
(ii) SIAM Annual Meeting 2006, July 10–14, 2006, Boston, MA, MS33 "Parallel Computing for the Numerical Solution of Partial Differential Equations on Extremely Fine Meshes;"
(iii) SIAM Annual Meeting 2010, July 12–16, 2010, Pittsburgh, PA, MS65 and MS77 "Educational Strategies for Training Students for Interdisciplinary Applications and Research;"
(iv) SIAM Conference on Computational Science & Engineering 2011, February 28–March 04, 2011, Reno, NV, MS137 "Training Students in Skills for CS&E;"
(v) SIAM Annual Meeting 2012, July 09-13, 2012, Minneapolis, MN,
MS98 and MS111 "Best Practices for Introducing Undergraduate Students to Computational and Interdisciplinary Research;"
(vi) SIAM Conference on Computational Science & Engineering 2013, February 25–March 01, 2013, Boston, MA, MS54 "Numerical Methods for Partial Differential Equations on Modern Parallel Computing Platforms" and MS129 "Techniques for Workforce Development in Applied Mathematics and Computational Science;"
(vii) AMS 2014 Spring Eastern Sectional Meeting, March 29–30, 2014, Baltimore, MD,

SS 12A: "Special Session on Undergraduate Research and its Impact on Students and Faculty;"
(viii) SIAM Conference on Computational Science & Engineering 2015, March 14–18, 2015,
Salt Lake City, UT, MS197 and MS221 "Parallel Computing for Partial Differential Equations
on CPUs, GPUs, and Intel Phi;"
(ix) SIAM Annual Meeting 2016, July 11–15, 2016, Boston, MA,
MS30 "Parallel Computing on Hybrid Nodes with Multiple CPUs, GPUs, and Intel Xeon Phi;"
(x) SIAM Conference on Applied Mathematics Education 2016, September 30–October 02, 2016,
Philadelphia, PA, MS13 "Experience of REU Site Directors in Applied Mathematics;"
(xi) SIAM Conference on Computational Science & Engineering 2017, February 27–March 03, 2017,
Atlanta, GA, PP105 Minisymposterium: "Parallel Computing for Models
using Partial Differential Equations."

Program chair, National Symposium for NSF REU Research in Data Science, Systems, and Security (REU Symposium), `https://bigdatareu.umbc.edu/reu-symposium`;
in 2023 collocated at the 22nd IEEE International Conference on Machine Learning and Applications (ICMLA 2023), Jacksonville, FL, December 15–17, 2023,
in 2022 collocated at the 9th IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT 2022), Porland, OR, December 06–09, 2022
in 2021 collocated at the IEEE BigData 2021 Conference, Orlando, FL, December 15–18, 2021,

SIAM Web Advisory Committee, member 2011–2018, chair 2014–2018

Local organizer for the DelMar Numerics Day 2014 at UMBC, May 10, 2014, `delmar.math.umd.edu`

Local host for the 2014 Spring Eastern Sectional Meeting of the American Mathematical Society (AMS) at UMBC March 29–30, 2014, `circ.umbc.edu/hosting/AMS_Eastern_Spring_2014_UMBC`

Hosted the Finite Element Circus in Spring 2006 at UMBC, `www.umbc.edu/~gobbert/fecircus`, (semi-annual regional conference series with 30+ years' tradition)

Panel member for the program review of the Department of Mathematics at Arizona State University in 2001

National Science Foundation, panels and mail reviews in 2009–2015, 2020–2024, HPC workshops in 2009–2010

External evaluator for promotion to Professor at Temple University, 2023

External evaluator for tenure at Middlebury College, 2023

External evaluator for tenure at Temple University, 2020

External evaluator for promotion to (Full) Professor at Salisbury University, Salisbury, MD, 2017

External assessor for promotion to Associate Professor of Universiti Sains Malaysia, Malaysia, 2014

Outside reviewer for promotion to Associate Professor of Hashemite University, Jordan, 2012

Evaluation of the research outputs on behalf of the National Research Foundation of South Africa, 2007

Review of research proposal to the Technology Foundation STW, The Netherlands, 2007

Review of research proposal to the Austrian Science Fund (FWF), Austria, 2005 and 2006

Referee for various journals and conferences

Reviewer of various book proposals for the purpose of publication decisions

Reviewer for *Mathematical Reviews*, 2001–2004

Memberships: SIAM, AMS, MAA, ACM, AAUP, Phi Kappa Phi

PUBLICATIONS

Links to reprints/preprints of many of the following publications are available at my homepage at `http://www.umbc.edu/~gobbert`. If any of these links do not work for you, do not hesitate to contact me. In the following list, student co-authors are indicated by superscripts, with ^{U} for an undergraduate and ^{G} for a graduate student.

Articles in Peer-Reviewed Journals

[1] Zhuoran Jiang^G, Jerimy C. Polf, Carlos A. Barajas, Matthias K. Gobbert, and Lei Ren. A Feasibility Study of Enhanced Prompt Gamma Imaging for Range Verification in Proton Therapy using Deep Learning. *Physics in Medicine and Biology*, vol. 68, no. 7, article 075001, 2023.

[2] Carlos A. Barajas^G, Matthias K. Gobbert, and Jerimy C. Polf. Deep Residual Fully Connected Neural Network Classification of Compton Camera Based Prompt Gamma Imaging for Proton Radiotherapy. *Frontiers in Physics*, vol. 11, article 903929, 2023.

[3] Jerimy C. Polf, Carlos A. Barajas^G, Stephen W. Peterson, Dennis S. Mackin, Sam Beddar, Lei Ren, and Matthias K. Gobbert. Applications of Machine Learning to Improve the Clinical Viability of Compton Camera Based in vivo Range Verification in Proton Radiotherapy. *Frontiers in Physics*, vol. 10, article 838273, 2022.

[4] Jonathan N. Basalyga^U, Carlos A. Barajas^G, Matthias K. Gobbert, and Jianwu Wang. Performance Benchmarking of Parallel Hyperparameter Tuning for Deep Learning based Tornado Predictions. *Big Data Research*, vol. 25, no. 100212, 2021.

[5] Lai Wang^G, Matthias K. Gobbert, and Meilin Yu. A Dynamically Load-Balanced Parallel p-Adaptive Implicit High-Order Flux Reconstruction Method for Under-Resolved Turbulence Simulation. *Journal of Computational Physics*, vol. 417, no. 109581, 2020.

[6] Gerson C. Kroiz^U, Carlos Barajas^G, Matthias K. Gobbert, and Bradford E. Peercy. Linkages of Calcium Induced Calcium Release in a Cardiomyocyte Simulated by a System of Seven Coupled Partial Differential Equations. *Involve: A Journal of Mathematics*, vol. 13, no. 3, pp. 399–424, 2020.

[7] Carlos Barajas^G, Matthias K. Gobbert, Gerson C. Kroiz^U, and Bradford E. Peercy. Challenges and Opportunities for the Simulation of Calcium Waves on Modern Multi-Core and Many-Core Parallel Computing Platforms. *International Journal for Numerical Methods in Biomedical Engineering*, 2019;e3244.

[8] F. Avraham Dilmanian, Sunil Krishnan, William E. McLaughlin, Brendan Lukaniec, Jameson T. Baker, Sandeep Ailawadi, Kara N. Hirsch, Renee F. Cattell, Rahul Roy, Joel Helfer, Kurt Kruger, Karl Spuhler, Yulun He, Ramesh Tailor, April Vassantachart, Dakota C. Heaney, Pat Zanzonico, Matthias K. Gobbert, Jonathan S. Graf^G, Jessica R. Nassimi, Nasrin N. Fatemi, Mark E. Schweitzer, Lev Bangiyev, and John G. Eley. Merging Orthovoltage X-Ray Minibeams Spare the Proximal Tissues While Producing a Solid Beam at the Target. *Scientific Reports*, vol. 9, article number 1198, 2019.

[9] Anna M. Kearns, John F. Malloy, Matthias K. Gobbert, Aude Thierry, Walter Boles, Leo Joseph, Amy C. Driskell, and Kevin E. Omland. Nuclear Introns Help Unravel the Diversification History of the Australo-Pacific *Petroica* Robins. *Molecular Phylogenetics and Evolution*, vol. 131, pp. 48–54, 2019.

[10] James Della-Giustina[U], Johnlemuel Casilag[U], Elizabeth Gregorio[U], Aniebet Jacob[U], Carlos Barajas[G], Matthias K. Gobbert, Dennis S. Mackin, and Jerimy Polf. Speedup Potential for Reconstruction Techniques for Prompt Gamma Imaging During Proton Radiotherapy. *American Journal on Undergraduate Research*, vol. 14, iss. 4, pp. 23–37, 2018.

[11] Jonathan S. Graf[G], Matthias K. Gobbert, and Samuel Khuvis. Long-Time Simulations with Complex Code using Multiple Nodes of Intel Xeon Phi Knights Landing. *Journal of Computational and Applied Mathematics*, vol. 337, pp. 18–36, 2018.

[12] Sai K. Popuri, Andrew M. Raim, Nagaraj K. Neerchal, and Matthias K. Gobbert. Parallelizing Computation of Expected Values in Recombinant Binomial Trees. *Journal of Statistical Computation and Simulation*, vol. 88, iss. 4, pp. 657–674, 2018.

[13] Kristen Deetz[U], Nygel Foster[U], Darius Leftwich[U], Chad Meyer[U], Shalin Patel[U], Carlos Barajas[G], Matthias K. Gobbert, and Zana Coulibaly. Examining the Electrical Excitation, Calcium Signaling, and Mechanical Contraction Cycle in a Heart Cell. *Spora: A Journal of Biomathematics*, vol. 3, pp. 66–85, 2017.

[14] Kallista Angeloff[U], Carlos Barajas[U], Alexander D. Middleton[U], Uchenna Osia[U], Jonathan S. Graf[G], Matthias K. Gobbert, and Zana Coulibaly. Examining the Effect of Introducing a Link from Electrical Excitation to Calcium Dynamics in a Cardiomyocyte. *Spora: A Journal of Biomathematics*, vol. 2, pp. 49–73, 2016.

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[16] Zana A. Coulibaly[G], Bradford E. Peercy, and Matthias K. Gobbert. Insight into Spontaneous Recurrent Calcium Waves in a 3-D Cardiac Cell Based on Analysis of a 1-D Deterministic Model. *International Journal of Computer Mathematics*, vol. 92, no. 3, pp. 591–607, 2015.

[17] Jonas Schäfer[G], Xuan Huang[G], Stefan Kopecz, Philipp Birken, Matthias K. Gobbert, and Andreas Meister. A Memory-Efficient Finite Volume Method for Advection-Diffusion-Reaction Systems with Non-Smooth Sources. *Numerical Methods for Partial Differential Equations*, vol. 31, no. 1, pp. 143–167, 2015.

[18] Gemma Gearhart[U], Shuai Jiang[U], Thomas J. May[U], Jane Pan[U], Samuel Khuvis[G], Matthias K. Gobbert, Bradford E. Peercy, and Arthur Sherman. Dynamics of Computational Islet Simulations: Islets with Majority Mutated Open K_{ATP} Channels Retain Bursting. *Letters in Biomathematics*, vol. 1, no. 1, 13 pages, 2014. [Invited paper for the inaugural issue of this journal, published originally in the Proceedings of the Sixth Symposium on BEER 2013 [71].]

[19] Andrew M. Raim[G], Matthias K. Gobbert, Nagaraj K. Neerchal, and Jorge G. Morel. Maximum Likelihood Estimation of the Random-Clumped Multinomial Model as Prototype Problem for Large-Scale Statistical Computing. *Journal of Statistical Computation and Simulation*, vol. 83, no. 12, pp. 2178–2194, 2013.

[20] Thomas I. Seidman, Matthias K. Gobbert, David W. Trott[G], and Martin Kružík. Finite Element Approximation for Time-Dependent Diffusion with Measure-Valued Source. *Numerische Mathematik*, vol. 122, no. 4, pp. 709–723, 2012.

[21] Alen Alexanderian[G], Matthias K. Gobbert, K. Renee Fister, Holly Gaff, Suzanne Lenhart, and Elsa Schaefer. An Age-Structured Model for the Spread of Epidemic Cholera: Analysis

and Simulation. *Nonlinear Analysis: Real World Applications*, vol. 12, no. 6, pp. 3483–3498, 2011.

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[23] Shiming Yang[G] and Matthias K. Gobbert. The Optimal Relaxation Parameter for the SOR Method Applied to the Poisson Equation in Any Space Dimensions. *Applied Mathematics Letters*, vol. 22, pp. 325–331, 2009.

[24] Matthias K. Gobbert. Long-Time Simulations on High Resolution Meshes to Model Calcium Waves in a Heart Cell. *SIAM Journal on Scientific Computing*, vol. 30, no. 6, pp. 2922–2947, 2008.

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[35] Matthias K. Gobbert, Vinay Prasad, and Timothy S. Cale. Modeling and Simulation of Atomic Layer Deposition at the Feature Scale. *Journal of Vacuum Science & Technology B*, vol. 20, no. 3, pp. 1031–1043, 2002.

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[38] Matthias K. Gobbert and Andreas Prohl. A Comparison of Classical and New Finite Element Methods for the Computation of Laminate Microstructure. *Applied Numerical Mathematics*, vol. 36, pp. 155–178, 2001.

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[40] Matthias K. Gobbert and Andreas Prohl. A Discontinuous Finite Element Method for Solving a Multiwell Problem. *SIAM Journal on Numerical Analysis*, vol. 37, no. 1, pp. 246–268, 1999.

[41] Matthias K. Gobbert, Timothy S. Cale, and Christian A. Ringhofer. The Combination of Equipment Scale and Feature Scale Models for Chemical Vapor Deposition Via a Homogenization Technique. *VLSI Design*, vol. 6, nos. 1–4, pp. 399–403, 1998.

[42] Matthias K. Gobbert and Christian A. Ringhofer. An Asymptotic Analysis for a Model of Chemical Vapor Deposition on a Microstructured Surface. *SIAM Journal on Applied Mathematics*, vol. 58, no. 3, pp. 737–752, 1998.

[43] Matthias K. Gobbert, Tushar P. Merchant, Leonard J. Borucki, and Timothy S. Cale. A Multiscale Simulator for Low Pressure Chemical Vapor Deposition. *Journal of The Electrochemical Society*, vol. 144, no. 11, pp. 3945–3951, 1997.

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Articles in Refereed Proceedings

[45] Matthias K. Gobbert and Jianwu Wang. Team-Based Online Learning in Multidisciplinary Research and Instruction. In: *The 18th International Conference on Frontiers in Education: Computer Science and Computer Engineering (FECS'22)*, in press (2022).

[46] Matthias K. Gobbert and Jianwu Wang. Lessons from an Online Multidisciplinary Undergraduate Summer Research Program. In: *The 17th International Conference on Frontiers in Education: Computer Science and Computer Engineering (FECS'21)*, in press (2021).

[47] Gerson C. Kroiz^U, Carlos A. Barajas^G, Matthias K. Gobbert, and Jerimy C. Polf. Exploring Deep Learning to Improve Compton Camera Based Prompt Gamma Image Reconstruction for Proton Radiotherapy. In: *The 17th International Conference on Data Science (ICDATA'21)*, in press (2021).

[48] Ruth Obe[U], Brandt Kaufmann[U], Kaelen Baird[U], Sam Kadel[U], Yasmin Soltani[U], Mostafa Cham[G], Matthias K. Gobbert, Carlos A. Barajas, Zhuoran Jiang[G], Vijay R. Sharma, Lei Ren, Stephen W. Peterson, and Jerimy C. Polf. Accelerating Real-Time Imaging for Radiotherapy: Leveraging Multi-GPU Training with PyTorch. In: *2023 International Conference on Machine Learning and Applications (ICMLA 2023)*, pages 1727–1734, 2023.

[49] Joseph Clark[U], Anaise Gaillard[U], Justin Koe[U], Nithya Navarathna[U], Daniel J. Kelly[G], Matthias K. Gobbert, Carlos A. Barajas, and Jerimy C. Polf. Multi-Layer Recurrent Neural Networks for the Classification of Compton Camera Based Imaging Data for Proton Beam Cancer Treatment. In: *9th IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT 2022)*, pages 213–222, 2022.

[50] Carlos A. Barajas[G], Gerson C. Kroiz[U], Matthias K. Gobbert, and Jerimy C. Polf. Classification of Compton Camera Based Prompt Gamma Imaging for Proton Radiotherapy by Random Forests. In: *2021 International Conference on Computational Science and Computational Intelligence (CSCI 2021)*, pages 308–311, 2021.

[51] Sokhna A. York[U], Alina M. Ali[U], David C. Lashbrooke Jr.[U], Rodrigo Yepez-Lopez[U], Carlos A. Barajas[G], Matthias K. Gobbert, and Jerimy C. Polf. Promising Hyperparameter Configurations for Deep Fully Connected Neural Networks to Improve Image Reconstruction in Proton Radiotherapy. In: *2021 IEEE International Conference on Big Data (Big Data 2021)*, pages 5648–5657, 2021.

[52] Jianwu Wang, Matthias K. Gobbert, Zhibo Zhang, and Aryya Gangopadhyay. Team-Based Online Multidisciplinary Education on Big Data + High-Performance Computing + Atmospheric Sciences. In: Hamid R. Arabnia, Leonidas Deligiannidis, Fernando G. Tinetti, and Quoc-Nam Tran, editors, *Advances in Software Engineering, Education, and e-Learning*, Transactions on Computational Science and Computational Intelligence, Springer, pp. 43–54, 2021.

[53] Carlos A. Barajas[G], Matthias K. Gobbert, and Jianwu Wang. Tornado Storm Data Synthesization Using Deep Convolutional Generative Adversarial Network (DCGAN). In: R. Stahlbock, G. M. Weiss, M. Abou-Nasr, C. Y. Yang, H. .R. Arabnia, L. Deligiannidis, editors, *Advances in Data Science and Information Engineering*, Transactions on Computational Science and Computational Intelligence, Springer, pp. 383–388, 2021.

[54] Reetam Majumder[G], Matthias K. Gobbert, and Nagaraj K. Neerchal. A Modified Minibatch Sampling Method for Parameter Estimation in Hidden Markov Models using Stochastic Variational Bayes. In: *Proceedings in Applied Mathematics and Mechanics (PAMM)*, vol. 21, no. 1, 2 pages, 2021.

[55] Carlos A. Barajas[G], Gerson C. Kroiz[U], Matthias K. Gobbert, and Jerimy C. Polf. Using Deep Learning to Enhance Compton Camera Based Prompt Gamma Image Reconstruction Data for Proton Radiotherapy. In: *Proceedings in Applied Mathematics and Mechanics (PAMM)*, vol. 21, no. 1, 2 pages, 2021.

[56] Brice Coffer, Michaela Kubacki, Yixin Wen, Ting Zhang, Carlos A. Barajas[G], and Matthias K. Gobbert. Machine Learning with Feature Importance Analysis for Tornado Prediction from Environmental Sounding Data. *Proceedings in Applied Mathematics and Mechanics (PAMM)*, vol. 20, no. 1, 2 pages, 2020.

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of Proton Beams in Cancer Treatment. *Proceedings in Applied Mathematics and Mechanics (PAMM)*, vol. 20, no. 1, 2 pages, 2020.

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[62] Stefan Kopecz, Andreas Meister, Bradford E. Peercy, and Matthias K. Gobbert. Parameter Identification for Calcium Release in a Heart Cell with Modified Patankar-Runge-Kutta Schemes. *Proceedings in Applied Mathematics and Mechanics (PAMM)*, vol. 18, 2 pages, 2018.

[63] James Della-Giustina^{U}, Carlos Barajas^{G}, Matthias K. Gobbert, Dennis S. Mackin, and Jerimy Polf. Hybrid MPI+OpenMP Parallelization of Image Reconstruction in Proton Beam Therapy on Multi-Core and Many-Core Processors. In: *Proceedings of the High Performance Computing Symposium (HPC '18)*, Society for Computer Simulation International (SCS), article 11, pages 1–11, 2018.

[64] Jianwu Wang, Matthias K. Gobbert, Zhibo Zhang, Aryya Gangopadhyay, and Glenn G. Page. Multidisciplinary Education on Big Data + HPC + Atmospheric Sciences. In: *Proceedings of the Workshop on Education for High-Performance Computing (EduHPC-17)*, 8 pages, 2017.

[65] Sai K. Popuri, Ross Flieger-Allison, Lois Miller, Danielle Sykes, Pablo Valle, Nagaraj K. Neerchal, Kofi P. Adragni, Amita Mehta, and Matthias K. Gobbert. Spatio-Temporal Analysis of Precipitation Data via a Sufficient Dimension Reduction in Parallel. In: *JSM Proceedings, Section on Statistics and the Environment*, American Statistical Association, pp. 3805–3815, 2016.

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Student Theses Supervised

[203] Charan Duggirala^{G}. *Distributed GPU Computing for Deep Learning in Proton Beam Therapy for Cancer Treatment*. M.S. Thesis, Department of Information Systems, University of Maryland, Baltimore County, 2023.

[204] Garima Kumari^{G}. *Distributed Deep Learning Techniques for Remote Sensing Applications*. M.S. Thesis, Department of Information Systems, University of Maryland, Baltimore County, 2023.

[205] Michelle Ramsahoye^{U}. Exploring Deep Fully Connected Residual Neural Networks for Initial Energy Estimations of Compton Camera Based Prompt Gamma Imaging Data for Proton Radiotherapy. Senior Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2022.

[206] Carlos A. Barajas^{G}. *Neural Networks for the Sanitization of Compton Camera Based Prompt Gamma Imaging Data for Proton Radiotherapy*. Ph.D. Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2022.

[207] Gerson C. Kroiz^{U}. *A Comparison of Stochastic Precipitation Generation Models for the Potomac River Basin*. Senior Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2020.

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[209] Carlos A. Barajas^{G}. *An Approach to Tuning Hyperparameters in Parallel: A Performance Study Using Climate Data*. M.S. Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2019.

[210] Jonathan S. Graf^{G}. *Parallel Performance of Numerical Simulations for Applied Partial Differential Equation Models on the Intel Xeon Phi Knights Landing Processor*. Ph.D. Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2017.

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[212] Samuel Khuvis^{G}. *Porting and Tuning Numerical Kernels in Real-World Applications to Many-Core Intel Xeon Phi Accelerators*. Ph.D. Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2016.

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[215] Jonathan McHenry^{G}. *Parallel Regularized Maximum Likelihood Estimation for Proportional Odds Models*. Ph.D. Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2014.

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[218] Randal Mckissack[U]. *Cluster Computing using Intel Concurrent Collections*. Senior Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2012.

[219] Ecaterina Coman[U]. *IDL: A Possible Alternative to Matlab?* Senior Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2012.

[220] Robert Forder[U]. *Simulating the Evolution of Transcriptional Regulatory Motifs*. Senior Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2012.

[221] Neeraj Sharma[G]. *A Comparative Study of Several Numerical Computational Packages*. M.S. Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2010.

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[224] Zhibin Sun[G]. *Geomagnetic Data Assimilation Using Ensemble Methods to Estimate Forecast Error Covariance*. Ph.D. Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2007.

[225] Samuel G. Webster[G]. *Stability and Convergence of a Spectral Galerkin Method for the Linear Boltzmann Equation*. Ph.D. Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2004.

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[227] Kevin P. Allen[U]. *A Parallel Matrix-Free Implementation of the Conjugate Gradient Method for the Poisson Equation*. Senior Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2003.

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LECTURES AND PRESENTATIONS

Conference Presentations

1. *Poster presentation.* Matthias K. Gobbert. Improvement of Student Learning by Automatic Grading Systems. *Seventh Annual Provost's Teaching & Learning Symposium*, Chesapeake Employers Insurance Arena, University of Maryland, Baltimore County (UMBC), April 21, 2023.
2. *Contributed talk.* Matthias K. Gobbert and Jianwu Wang. Team-Based Online Learning in Multidisciplinary Research and Instruction. *The 18th International Conference on Frontiers in Education: Computer Science and Computer Engineering (FECS'22)*, Las Vegas, NV, July 25–28, 2022.
3. *Poster presentation.* Michelle Ramsahoye[U], Daniel J. Kelly[G], David H. Alexander[G], Carlos A. Barajas, Matthias K. Gobbert, Jianwu Wang, Jerimy C. Polf. Team-Based Online Instruction and Research in Machine Learning for Proton Beam Radiotherapy. *RetriEVER Empowered: Student Success + Research + Community*, Chesapeake Employers Insurance Arena, University of Maryland, Baltimore County (UMBC), April 27, 2022
4. *Contributed talk.* Matthias K. Gobbert and Jianwu Wang. Lessons from an Online Multidisciplinary Undergraduate Summer Research Program. *The 17th International Conference on Frontiers in Education: Computer Science and Computer Engineering (FECS'21)*, Las Vegas, NV, July 26–29, 2021.
5. *Contributed talk.* Gerson C. Kroiz[U], Carlos A. Barajas[G], Matthias K. Gobbert, and Jerimy C. Polf. Exploring Deep Learning to Improve Compton Camera Based Prompt Gamma Image Reconstruction for Proton Radiotherapy. *The 17th International Conference on Data Science (ICDATA'21)*, Las Vegas, NV, July 26–29, 2021.
6. *Poster presentation.* Matthias K. Gobbert, Jianwu Wang, Aryya Gangopadhyay, and Zhibo Zhang. Online Training in Team-Based Multidisciplinary Research on Big Data + High-Performance Computing + Atmospheric Sciences under the CyberTraining Initiative. *SIAM Conference on Computational Science & Engineering*, online, March 01–05, 2021.
7. *Contributed talk.* Jianwu Wang, Matthias K. Gobbert, Zhibo Zhang, and Aryya Gangopadhyay. Team-Based Online Multidisciplinary Education on Big Data + High-Performance Computing + Atmospheric Sciences. *The 16th International Conference on Frontiers in Education: Computer Science and Computer Engineering (FECS'20)*, Las Vegas, NV, July 27–30, 2020.
8. *Invited talk.* Reetam Majumder[G], Redwan Walid[G], Jianyu Zheng[G], Carlos Barajas[G], Pei Guo[G], Chamara Rajapakshe[G], Aryya Gangopadhyay, Matthias K. Gobbert, Jianwu Wang, Zhibo Zhang, Kel Markert, Amita Mehta, and Nagaraj K. Neerchal. High-Performance Computing for Analysis and Simulation of Rainfall in the Potomac River Basin. *6th African International Conference on Statistics*, Adama, Ethiopia, May 27–30, 2019.
9. *Poster presentation.* Carlos Barajas[G], Reetam Majumder[G], and Matthias K. Gobbert. The UMBC High Performance Computing Facility. *NIMBioS Investigative Workshop Scientific Collaboration Enabled by High Performance Computing*, National Institute for Mathematical and Biological Synthesis (NIMBioS), University of Tennessee, Knoxville, TN, May 13–15, 2019.
10. *Contributed talk.* Carlos Barajas[G], Stefan Kopecz, Andreas Meister, Bradford E. Peercy, and Matthias K. Gobbert. Simulation of Calcium Waves in a Heart Cell on Modern Multi-Core Parallel Computing Platforms. *90th Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM)*, Vienna, Austria, February 18–22, 2019.

11. *Contributed talk.* Carlos Barajas[G], Matthias K. Gobbert, and Samuel Khuvis. Challenges and Opportunities for the Simulations of Calcium Waves on Modern Multi-Core and Many-Core Parallel Computing Platforms. *INdAM Workshop "Mathematical and Numerical Modeling of the Cardiovascular System" at the Istituto Nazionale di Alta Matematica (INdAM)*, Rome, Italy, April 16–19, 2018,

12. *Contributed talk.* Jianwu Wang, Matthias K. Gobbert, Zhibo Zhang, Aryya Gangopadhyay, and Glenn G. Page. Multidisciplinary Education on Big Data + HPC + Atmospheric Sciences. *EduHPC-17: Workshop on Education for High-Performance Computing*, Supercomputing 2017, Denver, CO, November 13, 2017.

13. *Invited talk.* Matthias K. Gobbert. Challenges and Opportunities in Real-World Simulations on Modern Parallel Computing Platforms. *5th Regional Undergraduate Mathematics Research Conference*, Towson University, Towson, MD, April 08, 2017.

14. *Minisymposterium poster.* Ishmail Jabbie[U], George Owen[U], Benjamin Whiteley[U], Jonathan Graf[G], Xuan Huang, Matthias K. Gobbert, and Samuel Khuvis. Performance Comparisons of Application Codes on Modern Computer Architectures. *SIAM Conference on Computational Science & Engineering, PP105 Minisymposterium: Parallel Computing for Models using Partial Differential Equations*, Atlanta, GA, February 27–March 03, 2017.

15. *Minisymposium talk.* Matthias Gobbert, Nagaraj Neerchal, Bradford Peercy, Kofi Adragni. REU Site: Interdisciplinary Program in High Performance Computing. *SIAM Conference on Applied Mathematics Education, MS13 Experience of REU Site Directors in Applied Mathematics*, Philadelphia, PA, September 30–October 02, 2016.

16. *Minisymposium talk.* Matthias K. Gobbert, Jonathan S. Graf[G], Ryan D. Day[G], Xuan Huang[G], and Samuel Khuvis[G]. Overview and Contrast of Modern Computer Architectures including the Intel Phi. *SIAM Annual Meeting, MS30 Parallel Computing on Hybrid Nodes with Multiple CPUs, GPUs, and Intel Xeon Phi*, Boston, MA, July 11–15, 2016.

17. *Invited talk.* Matthias K. Gobbert. Challenges and Opportunities in Long-Time Simulations of PDEs on Modern Parallel Computing Platforms. *Workshop on Recent Developments in the Numerics of Nonlinear Hyperbolic Conservation Laws*, Mathematical Research Institute Oberwolfach, Germany, September 14–18, 2015.

18. *Invited talk.* Matthias K. Gobbert. The UMBC High Performance Computing Facility. *Spring 2015 Research Forum: High-Performance Computing*, University of Maryland, Baltimore County, May 01, 2015.

19. *Contributed talk.* Matthias K. Gobbert, Raji Baradwaj, Elizabeth Stanwyck, and Nagaraj K. Neerchal. Course Redesign as Strategic Tool to Consolidate Foundation Courses. *Spring 2014 Meeting of the MD–DC–VA Section of the MAA*, James Madison University, April 26, 2014.

20. *Invited special session talk.* Matthias K. Gobbert and Nagaraj K. Neerchal. Undergraduate Research on the Fast Track: From Nothing to Publication in Eight Weeks. *AMS Spring Eastern Eastern Sectional Meeting, SS 12A: Special Session on Undergraduate Research and its Impact on Students and Faculty*, University of Maryland, Baltimore County, March 29–30, 2014.

21. *Invited special session talk.* Matthias K. Gobbert. Numerical Methods for Long-Time Simulations of Partial Differential Equations on Modern Parallel Computing Platforms. *AMS Southeastern Sectional Meeting, SS 17A: Special Session on Scientific Computing, Numerical Analysis, and Mathematical Modeling*, University of Tennessee, Knoxville, March 21–23, 2014.

22. *Conference presentation.* Xuan Huang[G], Samuel Khuvis[G], Matthias K. Gobbert. Finite Element and Finite Volume Methods for Problems with Advection and Non-Smooth Source.

Finite Element Circus, University of Delaware, October 18–19, 2013.

23. *Invited talk and panel discussion.* Matthias K. Gobbert. Medium-Size Campus Clusters in Research and Education. *Enabling Discovery and Product Innovation with Dell HPC Solutions*, Philadelphia, PA, April 02, 2013.

24. *Minisymposium talk.* Matthias K. Gobbert, Xuan Huang, Stefan Kopecz, Philipp Birken, and Andreas Meister. Parallel Computing for Long-Time Simulations of Calcium Waves in a Heart Cell. *SIAM Conference on Computational Science & Engineering, MS54 Numerical Methods for Partial Differential Equations on Modern Parallel Computing Platforms*, Boston, MA, February 25–March 01, 2013.

25. *Minisymposium talk.* Matthias K. Gobbert and Nagaraj K. Neerchal. Undergraduate Research on the Fast Track: From Nothing to Publication in Eight Weeks. *SIAM Conference on Computational Science & Engineering, MS129 Techniques for Workforce Development in Applied Mathematics and Computational Science*, Boston, MA, February 25–March 01, 2013.

26. *Minisymposium talk.* Matthias K. Gobbert and Nagaraj K. Neerchal. Undergraduate Research on the Fast Track: From Nothing to Publication in Eight Weeks. *SIAM Annual Meeting, MS98 Best Practices for Introducing Undergraduate Students to Computational and Interdisciplinary Research*, Minneapolis, MN, July 09–13, 2012.

27. *Contributed talk.* Yu Wang^G, Marc Olano, Matthias K. Gobbert, and Wesley Griffin^G. Parallel Computing for Long-Time Simulations of Calcium Waves in a Heart Cell. *83rd Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM)*, Darmstadt, Germany, March 26–30, 2012.

28. *Minisymposium talk.* Matthias K. Gobbert and Nagaraj K. Neerchal. Career Preparation of Undergraduate and Graduate Students through an Interdisciplinary Consulting Approach. *SIAM Conference on Computational Science & Engineering, MS137 Training Students in Skills for CS&E*, Reno, NV, February 28–March 04, 2011.

29. *Conference presentation.* David W. Trott^G and Matthias K. Gobbert. Conducting Finite Element Convergence Studies using COMSOL 4.0. *COMSOL Conference 2010*, Boston, MA, October 07–09, 2010.

30. *Minisymposium talk.* Matthias K. Gobbert and Nagaraj K. Neerchal. Career Preparation of Undergraduate and Graduate Students through an Interdisciplinary Consulting Approach. *SIAM Annual Meeting, MS65 Educational Strategies for Training Students for Interdisciplinary Applications and Research*, Pittsburgh, PA, July 12–16, 2010.

31. *Contributed talk.* Matthias K. Gobbert. Efficient and Accurate Long-Time Simulations of Calcium Waves in a Cardiac Cell. *SIAM Annual Meeting*, Denver, CO, July 06–10, 2009.

32. *Conference presentation.* Aaron Churchill^G, Guan Wang^G, Matthias K. Gobbert, and Thomas I. Seidman. Efficient Simulations for a Reaction-Diffusion System with a Fast Reaction in the Asymptotic Limit. *Finite Element Circus*, University of Delaware, April 24–25, 2009.

33. *Contributed talk.* Matthias K. Gobbert. Parallel Computing for Long-Time Simulations of Calcium Waves in a Heart Cell. *SIAM Conference on Computational Science & Engineering*, Miami, FL, March 02–06, 2009.

34. *Minisymposium talk.* Matthias K. Gobbert and Nagaraj K. Neerchal. Career Preparation of Mathematics and Statistics Students through Interdisciplinary Research and Consulting. *Joint Mathematics Meetings*, Washington, D.C., January 05–08, 2009.

35. *Conference presentation.* Matthias K. Gobbert, Guan Wang^G, and Thomas I. Seidman. Equivalent Smooth Model for a Reaction-Diffusion System with a Fast Reaction. *Finite Element Circus*, Rensselaer Polytechnic Institute, October 24–25, 2008.

36. *Conference presentation.* Matthias K. Gobbert and Shiming Yang^G. Finite Element Convergence in COMSOL Multiphysics for Smooth and Non-Smooth Elliptic Test Problems. *COMSOL Conference 2008*, Boston, MA, October 09–11, 2008.

37. *Minisymposium talk.* Matthias K. Gobbert. Numerical Methods for a Model of Calcium Waves in a Human Heart Cell. *SIAM Annual Meeting, MS56 Electrical and Reaction-Diffusion Modeling of Biological Cells*, San Diego, CA, July 07–11, 2008.

38. *Invited talk.* Matthias K. Gobbert and Michael Muscedere^G. Efficient and Physically Accurate Numerical Methods for a Model of Calcium Waves in a Human Heart Cell. *6th International Conference on Differential Equations and Dynamical Systems*, Morgan State University, Baltimore, MD, May 22–26, 2008.

39. *Poster presentation.* Matthias K. Gobbert. Scientific Computing for Large-Scale Time-Dependent Models. *Undergraduate Years and Beyond 2007*, UMBC, October 20, 2007.

40. *Conference presentation.* Matthias K. Gobbert. A Technique for the Quantitative Assessment of the Solution Quality on Particular Finite Elements in COMSOL Multiphysics. *COMSOL Conference 2007*, Boston, MA, October 04–06, 2007.

41. *Conference presentation.* Matthias K. Gobbert. Screen Capture of Mathematics Examples with Voice Over using a Tablet Laptop. *Maryland Blackboard Users Group (MDBUG) Conference*, UMBC Technology Center, October 02, 2007.

42. *Invited plenary talk.* Matthias K. Gobbert and Timothy S. Cale. Modeling Multi Scale Effects on Transients During Chemical Vapor Deposition. *EuroCVD-16: Sixteenth European Conference on Chemical Vapor Deposition*, Den Haag (Scheveningen), The Netherlands, September 16–21, 2007.

43. *Conference presentation.* Matthias K. Gobbert. Efficient Cluster Computing for a Model of Calcium Flow in Heart Cells. *Finite Element Circus*, University of Maryland, College Park, April 20–21, 2007.

44. *Conference presentation.* Matthias K. Gobbert, Thomas I. Seidman, and Raymond J. Spiteri. A Non-Negativity Preserving Newton Method for High-Order Implicit Time-Stepping. *Finite Element Circus*, Pennsylvania State University, State College, PA, November 03–04, 2006.

45. *Minisymposium talk.* Matthias K. Gobbert. Efficient Cluster Computing for Time-Dependent Reaction-Diffusion Equations on High Resolution Meshes. *SIAM Annual Meeting, MS33 Parallel Computing for the Numerical Solution of Partial Differential Equations on Extremely Fine Meshes*, Boston, MA, July 10–14, 2006.

46. *Minisymposium talk.* Matthias K. Gobbert, Thomas I. Seidman, and Raymond J. Spiteri. Maintaining the Non-Negativity of Numerical Solutions of Time-Dependent Reaction-Diffusion Problems. *SIAM Annual Meeting, MS14 Numerical Techniques and Software for the Efficient Solution of Partial Differential Equations*, Boston, MA, July 10–14, 2006.

47. *Minisymposium talk.* Matthias K. Gobbert. A Kinetic Transport and Reaction Model for Process Models in Microelectronics Manufacturing. *SIAM Conference on Analysis of Partial Differential Equations, MS6 Quantum and Kinetic Transport Phenomena*, Boston, MA, July 10–12, 2006.

48. *Minisymposium talk.* Matthias K. Gobbert. Cluster Computing for a System of Time-Dependent Reaction-Diffusion Equations on a Three-Dimensional Domain with High Resolution. *12th SIAM Conference on Parallel Processing for Scientific Computing, MS Tools for High-Performance Scientific Computation in Cluster Environments*, San Francisco, CA, February 22–24, 2006.

49. *Conference presentation.* Matthias K. Gobbert. Towards a Non-Negativity Preserving Method for Systems of Reaction-Diffusion Equations. *Finite Element Circus*, Rutgers University, Piscataway, NJ, October 21–22, 2005.

50. *Contributed talk.* Matthias K. Gobbert, Mark L. Breitenbach^{G}, and Timothy S. Cale. Cluster Computing for Transient Simulations of the Linear Boltzmann Equation on Irregular Three-Dimensional Domains. *International Conference on Computational Science (ICCS 2005)*, Atlanta, GA, May 22–25, 2005.

51. *Minisymposium talk.* Matthias K. Gobbert. Examples of Student Research Projects in CSE. *SIAM Conference on Computational Science & Engineering, MS20 CSE Undergraduate Programs*, Orlando, FL, February 12–15, 2005.

52. *Contributed talk.* Matthias K. Gobbert, Samuel G. Webster^{G}, and Timothy S. Cale. Parallel Deterministic Numerical Simulations of the Linear Boltzmann Equation on Irregular Domains. *SIAM Conference on Computational Science & Engineering*, Orlando, FL, February 12–15, 2005.

53. *Contributed poster.* Matthias K. Gobbert, Ana Maria Soane^{G}, and Leighton T. Izu. Parallel Simulations of a System of Reaction-Diffusion Equations Modeling Calcium Waves in a Human Heart Cell. *16th International Conference on Domain Decomposition Methods*, New York University, New York, NY, January 12–15, 2005.

54. *Contributed poster.* Matthias K. Gobbert. Multiscale Models for Production Processes in Microelectronics Manufacturing. *IMA Workshop: Future Challenges in Multiscale Modeling and Simulation*, Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis, MN, November 18–20, 2004.

55. *Minisymposium talk.* Matthias K. Gobbert. Configuration and Performance of a Beowulf Cluster with High-Performance Interconnect. *SIAM Annual Meeting, MS48 Parallel Computing on Beowulf Clusters: Performance and Applications*, Portland, OR, July 12–16, 2004.

56. *Contributed talk.* Matthias K. Gobbert, Kevin P. Allen^{U}, Ana Maria Soane^{G}, and Leighton T. Izu. Numerical Modeling of Cellular Calcium Flow Involving Highly Non-Smooth Forcing Terms. *SIAM Conference on the Life Sciences*, Portland, OR, July 11–14, 2004.

57. *Conference presentation.* Ana Maria Soane^{G}, Matthias K. Gobbert, and Thomas I. Seidman. Numerical Studies of a Reaction-Diffusion System with a Fast Reaction. *Finite Element Circus*, University of Pittsburgh, Pittsburgh, PA, April 16–17, 2004.

58. *Conference presentation.* Matthias K. Gobbert. Numerical Simulations of the Boltzmann Equation for Applications in Microelectronics Manufacturing. *Finite Element Circus*, Cornell University, Ithaca, NY, November 07–08, 2003.

59. *Contributed talk.* Matthias K. Gobbert, Samuel G. Webster^{G}, and Timothy S. Cale. Numerical Simulations of the Boltzmann Transport Equation for Applications in Microelectronics Manufacturing. *SIAM Annual Meeting*, Montreal, Canada, June 16–20, 2003.

60. *Invited talk.* Matthias K. Gobbert. Numerical Simulations of the Boltzmann Transport Equation for Applications in Microelectronics Manufacturing. *Analysis and Numerics for Modeling Semiconductor Devices and Biological Channels*, Center for Scientific Computation and Mathematical Modeling (CSCAMM), University of Maryland, College Park, MD, May 19–23, 2003.

61. *Contributed talk.* Kevin P. Allen^{U} and Matthias K. Gobbert. Coarse-Grained Parallel Matrix-Free Solution of a Three-Dimensional Elliptic Prototype Problem. *2003 International Conference on Computational Science and its Applications (ICCSA 2003)*, Montreal, Canada, May 18–21, 2003.

62. *Conference presentation.* Matthias K. Gobbert. Parallel Numerical Simulations of the Linear Boltzmann Equation on Irregular Three-Dimensional Domains. *Finite Element Circus*, Pennsylvania State University, State College, PA, October 25–26, 2002.

63. *Contributed talk.* Matthias K. Gobbert, Alexander L. Hanhart^{G}, Kevin P. Allen^{U}, and Leighton Izu. Parallel Computation for a Three-Dimensional Model of Calcium Waves. *SIAM Symposium on Computational Models and Simulation for Intra-Cellular Processes*, Washington, D.C., October 04, 2002.

64. *Contributed talk.* Samuel G. Webster^{G}, Matthias K. Gobbert, Jean-François Remacle, and Timothy S. Cale. Parallel Numerical Solution of the Boltzmann Equation for Atomic Layer Deposition. *Euro-Par 2002*, Paderborn, Germany, August 29, 2002.

65. *Minisymposium talk.* Matthias K. Gobbert. A Transport and Reaction Model for Semiconductor Manufacturing Processes. *SIAM Annual Meeting, MS34 Non Classical Applications of Kinetic Theory*, Philadelphia, PA, July 09, 2002.

66. *Conference presentation.* Matthias K. Gobbert. Parallel Numerical Solution of the Boltzmann Equation for Atomic Layer Deposition. *Finite Element Circus*, University of Maryland, College Park, MD, March 09, 2002.

67. *Conference presentation.* Matthias K. Gobbert. A Feature Scale Transport and Reaction Model for Atomic Layer Deposition. *Finite Element Circus*, University of Delaware, Newark, DE, March 30, 2001.

68. *Contributed talk.* Matthias K. Gobbert and Timothy S. Cale. A Feature Scale Transport and Reaction Model for Atomic Layer Deposition. *199th Meeting of The Electrochemical Society*, Washington, D.C., March 28, 2001.

69. *Contributed talk.* Matthias K. Gobbert and Christian Ringhofer. A Homogenization Technique for the Boltzmann Equation for Low Pressure Chemical Vapor Deposition. *SIAM Annual Meeting*, Puerto Rico, July 2000.

70. *Invited talk.* Matthias K. Gobbert and Christian Ringhofer. A Homogenization Technique for the Boltzmann Equation for Low Pressure Chemical Vapor Deposition. *IMA Workshop: Multiscale Models for Surface Evolution and Reacting Flows*, Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis, MN, June 2000.

71. *Contributed talk.* Matthias K. Gobbert and Andreas Prohl. A Comparison of Classical and Discontinuous Finite Element Methods for the Computation of Laminate Microstructure. *Third SIAM Conference on Mathematical Aspects of Materials Science*, Philadelphia, PA, May 2000.

72. *Conference presentation.* Matthias K. Gobbert. Models for the interaction of reactor and feature scale phenomena in CVD processes. *Finite Element Circus*, Cornell University, Ithaca, NY, October 1999.

73. *Minisymposium talk.* Matthias K. Gobbert and Christian Ringhofer. A Homogenization Technique for a Kinetic Model of Chemical Vapor Deposition. *The Fourth International Congress on Industrial and Applied Mathematics*, Edinburgh, Scotland, July 1999.

74. *Invited talk.* Matthias K. Gobbert and Andreas Prohl. A Survey of Finite Elements for the Computation of Crystalline Microstructure. *Workshop on Numerics for Microstructures*, Mathematical Research Institute Oberwolfach, Germany, April 1999.

75. *Conference presentation.* Matthias K. Gobbert and Andreas Prohl. A New Finite Element Method for the Computation of Crystalline Microstructure. *Finite Element Circus*, University of Maryland, College Park, MD, November 1998.

76. *Contributed poster.* Matthias K. Gobbert, Tushar P. Merchant, Timothy S. Cale, and Leonard J. Borucki. Microloading in LPCVD: An integrated simulation approach. *Advanced Metalization and Interconnect Systems for ULSI Applications*, Boston, MA, October 1996.

77. *Conference presentation.* Matthias K. Gobbert. Robertson's example for stiff differential equations. *Volterra Centennial*, Tempe, AZ, May 1996.

78. *Conference presentation.* Matthias K. Gobbert, Timothy S. Cale, and Christian A. Ringhofer. Models for the interaction of reactor and feature scale phenomena in CVD processes. *Fourth International Workshop on Computational Electronics*, Tempe, AZ, November 1995.

79. *Contributed talk.* Matthias K. Gobbert, Timothy S. Cale, and Christian A. Ringhofer. One approach to combining equipment scale and feature scale models. *187th Meeting of The Electrochemical Society*, Reno, NV, May 1995.

Seminar and Colloquium Talks

80. *Oral presentation.* Matthias K. Gobbert. Potential of Automated Grading to Improve Student Learning. Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), March 08, 2023.

81. *Seminar talk.* Gerson C. Kroiz, Carlos A. Barajas, Matthias K. Gobbert, and Bradford E. Peercy. Long-Time Simulation of Calcium Waves in a Heart Cell on Modern Multi-Core Parallel Computing Platforms. Applied Mathematics and Scientific Computing Seminar, Department of Mathematics, Temple University, January 15, 2020.

82. *Seminar talk.* Matthias K. Gobbert. Challenges and Opportunities in Real-World Simulations on Modern Parallel Computing Platforms. Differential Equations Seminar, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), April 24, 2017.

83. *Colloquium talk.* Matthias K. Gobbert. Challenges and Opportunities in Real-World Simulations on Modern Parallel Computing Platforms. Department of Mathematics, Morehouse College, March 02, 2017.

84. *Colloquium talk.* Matthias K. Gobbert. REU Site: Interdisciplinary Program in High Performance Computing. Salisbury University and University of Maryland Eastern Shore, February 06, 2017.

85. *Colloquium talk.* Matthias K. Gobbert. Challenges and Opportunities in Real-World Simulations on Modern Parallel Computing Platforms. Salisbury University and University of Maryland Eastern Shore, January 28, 2016.

86. *Seminar talk.* Matthias K. Gobbert. Numerical Methods for Long-Time Simulations of Parabolic PDEs on Modern Parallel Computing Platforms. Oberseminar Analysis und Angewandte Mathematik, Institut für Mathematik, Universität Kassel, Kassel, Germany, July 14, 2015.

87. *Colloquium talk.* Matthias K. Gobbert. Long-Time Simulations of Partial Differential Equations on Modern Parallel Computing Platforms. Departmental Colloquium, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), April 04, 2014.

88. *Seminar talk.* Matthias K. Gobbert. Career Preparation of Students and Positive Recognition of a Mathematics Program through an Interdisciplinary Consulting Approach. Oberseminar Analysis und Angewandte Mathematik, Institut für Mathematik, Universität Kassel, Kassel, Germany, May 21, 2012.

89. *Colloquium talk.* Matthias K. Gobbert. Parallel Computing on Distributed-Memory Clusters for Long-Time Simulations of Calcium Waves in a Heart Cell. Lehrstuhl für Simulation and Zentralinstitut für Scientific Computing, University Erlangen-Nürnberg, Erlangen, Germany, May 18, 2012.

90. *Colloquium talk.* Matthias K. Gobbert. Modeling and Simulations of Calcium Waves in a Heart Cell. Institutskolloquium, Institut für Mathematik, Universität Kassel, Kassel, Germany, April 23, 2012.

91. *Colloquium talk.* Matthias K. Gobbert. Parallel Computing on Distributed-Memory Clusters for Long-Time Simulations of Calcium Waves in a Heart Cell. Kolloquium of the SFB Scientific Computing in strömungstechnischen Anwendungen, Universität Kassel, Kassel, Germany, December 08, 2011.

92. *Seminar talk.* Matthias K. Gobbert. Scientific and Parallel Computing for Problems in Science and Engineering. Differential Equations Seminar, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), October 24, 2011.

93. *Colloquium talk.* Matthias K. Gobbert. Efficient Parallel Computing of Finite Element Methods for Long-Time Simulations of Calcium Waves in a Heart Cell. Departmental Colloquium, Department of Mathematics, Towson University, October 19, 2011.

94. *Seminar talk.* Matthias K. Gobbert. Training Students for Skills in CS&E. Differential Equations Seminar, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), April 04, 2011.

95. *Colloquium talk.* Matthias K. Gobbert. Parallel Computing on Distributed-Memory Clusters for Long-Time Simulations of Calcium Waves in a Heart Cell. Colloquium of the Computational Materials Science Center, George Mason University, Fairfax, VA, March 21, 2011.

96. *Colloquium talk.* Matthias K. Gobbert. Parallel Computing for Long-Time Simulations of Calcium Waves in a Heart Cell. Departmental Colloquium, Department of Physics, University of Maryland, Baltimore County, October 20, 2010.

97. *Colloquium talk.* Matthias K. Gobbert. Parallel Computing for Long-Time Simulations of Calcium Waves in a Heart Cell. Departmental Colloquium, Department of Mathematics, Howard University, Washington, D.C., September 24, 2010.

98. *Seminar talk.* Matthias K. Gobbert. Parallel Computing for a Model of Calcium Waves in a Human Heart Cell. Oberseminar Analysis und Angewandte Mathematik, Institut für Mathematik, Universität Kassel, Kassel, Germany, May 31, 2010.

99. *Seminar talk.* Matthias K. Gobbert. COMSOL Multiphysics Features in Scripting and Batch Processing. Differential Equations Seminar, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), April 06, 2009.

100. *Seminar talk.* Matthias K. Gobbert. Parallel Computing for Long-Time Simulations of Calcium Waves in a Heart Cell. Numerical Analysis Seminar, Department of Mathematics, University of Maryland, College Park, March 03, 2009.

101. *Seminar talk.* Matthias K. Gobbert. Parallel Computing on the Distributed-Memory Cluster hpc for Large-Scale Simulations of Transient Partial Differential Equations. Research seminar, Department of Biological Sciences, University of Maryland, Baltimore County, September 10, 2008.

102. *Colloquium talk.* Matthias K. Gobbert. Parallel Computing for Long-Time Simulations of a Model for Calcium Waves in a Heart Cell. Departmental Colloquium, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), September 05, 2008.

103. *Seminar talk.* Matthias K. Gobbert. Parallel Computing for a Model of Calcium Waves in a Human Heart Cell. Research group seminar, National Institutes of Health, March 11, 2008.

104. *Colloquium talk.* Matthias K. Gobbert. Parallel Computing on Distributed-Memory Clusters for Large-Scale Simulations of Transient Partial Differential Equations. Departmental Colloquium, Department of Physics, University of Maryland, Baltimore County, March 05, 2008.

105. *Seminar talk.* Matthias K. Gobbert and Shiming Yang[G]. A Tutorial Introduction to COMSOL Multiphysics. Departmental seminar, Department of Mathematics, U.S. Naval Academy, January 31, 2008.

106. *Colloquium talk.* Matthias K. Gobbert. Efficient Non-Negativity Preserving High-Order Implicit Time-Stepping for Reaction-Diffusion Equations. Departmental Colloquium, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), September 28, 2007.

107. *Seminar talk.* Matthias K. Gobbert. Efficient Cluster Computing for Reaction-Diffusion Equations on High Resolution Meshes. Analysis and PDE Seminar, Department of Mathematical Sciences, University of Delaware, April 13, 2006.

108. *Seminar talk.* Matthias K. Gobbert. MATLAB's `ode15s` Function and the Efficient and Effective Solution of Time-Dependent Reaction-Diffusion Equations Using It. Differential Equations Seminar, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), December 05, 2005.

109. *Seminar talk.* Matthias K. Gobbert. Configuration and Performance of a Beowulf Cluster with High-Performance Interconnect. Department of Statistics, Iowa State University, Ames, IA, December 03, 2004.

110. *Seminar talk.* Matthias K. Gobbert. Parallel Simulations of the Linear Boltzmann Equation for Models in Microelectronics Manufacturing. Applied Mathematics and Numerical Analysis Seminar, School of Mathematics, University of Minnesota, Minneapolis, MN, December 02, 2004.

111. *Colloquium talk.* Matthias K. Gobbert. Numerical Simulations of Process Models in Microelectronics Manufacturing on Beowulf Clusters with High-Performance Networks. Departmental Colloquium, Department of Mathematics, Boise State University, Boise, ID, October 15, 2004

112. *Seminar talk.* Matthias K. Gobbert. Configuration and Performance of the Math Department's SCREMS Cluster. Differential Equations Seminar, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), October 13, 2003.

113. *Invited panel participant.* Matthias Gobbert, Sue Dwyer, Tim Brennan, and Philip Rous. Panel Discussion: Teaching First Year Seminars: Experiences from the Program's First Year. TLT Brownbag Workshop, University of Maryland, Baltimore County, September 29, 2003.

114. *Seminar talk.* Matthias K. Gobbert. Parallel Numerical Simulation of Calcium Waves in Human Heart Cells. Computational and Applied Mathematics Proseminar, Department of Mathematics and Statistics, Arizona State University, Tempe, AZ, January 23, 2003.

115. *Seminar talk.* Matthias K. Gobbert. A Taste of MPI and Some General Lessons for Parallel Computing. Differential Equations Seminar, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), October 14, 2002.

116. *Colloquium talk.* Matthias K. Gobbert. Parallel Numerical Simulations of the Linear Boltzmann Equation. Departmental Colloquium, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), September 27, 2002.

117. *Colloquium talk.* Matthias K. Gobbert. Mathematical Modeling of Deposition Processes in Semiconductor Manufacturing. Departmental Colloquium, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), October 12, 2001.

118. *Seminar talk.* Matthias K. Gobbert. Mathematical Modeling of Deposition Processes in Semiconductor Manufacturing. Numerical Analysis Seminar, Department of Mathematics, University of Maryland, College Park, May 03, 2001.

119. *Seminar talk.* Matthias K. Gobbert. Some Show-and-Tell on FEMLAB. Differential Equations Seminar, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), May 01, 2001.

120. *Seminar talk.* Matthias K. Gobbert. Mathematical Modeling of Deposition Processes in Semiconductor Manufacturing. Numerical and Applied Mathematics Seminar, Department of Mathematics, University of Tennessee, Knoxville, TN, April 30, 2001.

121. *Seminar talk.* Matthias K. Gobbert. A Feature Scale Transport and Reaction Model for Atomic Layer Deposition. Differential Equations Seminar, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), March 27, 2001.

122. *Colloquium talk.* Matthias K. Gobbert. Mesoscopic Scale Modeling for Chemical Vapor Deposition. Departmental Colloquium, Department of Mathematics and Computer Science, Clarkson University, Potsdam, NY, November 2000.

123. *Seminar talk.* Matthias K. Gobbert. A Numerical Solution of the 2-D/2-D Linear Boltzmann Equation, a series of three talks. Differential Equations Seminar, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), April 2000.

124. *Invited lecture.* Matthias K. Gobbert. Homogenization Techniques for the Development of Mesoscopic Scale Models for Chemical Vapor Deposition. Bell Laboratories, Lucent Technologies, Morristown, NJ, December 03, 1999.

125. *Colloquium talk.* Matthias K. Gobbert and Andreas Prohl. Discontinuous Finite Element Methods for Martensitic Phase Transformations. Departmental Colloquium, Department of Mathematics and Computer Science, Clarkson University, Potsdam, NY, September 1999.

126. *Seminar talk.* Matthias K. Gobbert. A Homogenization Technique for the Derivation of Mesoscopic Scale Models for Chemical Vapor Deposition. Numerical Analysis Seminar, Department of Mathematics, University of Kiel, Germany, January 1998.

127. *Seminar talk.* Matthias K. Gobbert. A Homogenization Technique for the Development of Mesoscopic Scale Models for Chemical Vapor Deposition. Graduate Seminar, Department of Computer Science and Electrical Engineering, University of Maryland, Baltimore County, December 1997.

128. *Seminar talk.* Matthias K. Gobbert. A New Finite Element Method for Computing Crystalline Microstructure. Numerical Analysis Seminar, Department of Mathematics, University of Maryland, College Park, October 1997.

129. *Colloquium talk.* Matthias K. Gobbert. A New Finite Element Method for Computing Crystalline Microstructure. Departmental Colloquium, Department of Mathematics and Statistics, University of Maryland, Baltimore County (UMBC), September 1997.

130. *Colloquium talk.* Matthias K. Gobbert. A New Finite Element Method for Computing Crystalline Microstructure. Departmental Colloquium, Department of Mathematical Sciences, George Mason University, Fairfax, VA, September 1997.

131. *Seminar talk.* Matthias K. Gobbert. An Integrated Simulation Procedure for Chemical Vapor Deposition in Semiconductor Manufacturing. Numerical Analysis Seminar, School of Mathematics, University of Minnesota, Minneapolis, MN, October 1996.

132. *Seminar talk.* Matthias K. Gobbert. A Homogenization Technique for the Derivation of Mesoscopic Scale Models for Chemical Vapor Deposition. Applied Math Modelling Seminar, Department of Mathematics, University of Arizona, Tucson, AZ, April 1996.

133. *Invited lecture.* Matthias K. Gobbert. A Homogenization Technique for the Derivation of Mesoscopic Scale Models for Chemical Vapor Deposition. SGS-Thomson Microelectronics Research Center and Department of Mathematics, Università dì Catania, Catania, Italy, January 1996.

134. *Seminar talk.* Matthias K. Gobbert. A Homogenization Technique for the Derivation of Mesoscopic Scale Models for Chemical Vapor Deposition. Department of Mathematics, Technische Universität Berlin, Berlin, Germany, December 1995.

135. *Seminar talk.* Matthias K. Gobbert. A Homogenization Technique for the Derivation of Mesoscopic Scale Models for Chemical Vapor Deposition. Advanced Modeling Group, Motorola, Mesa, AZ, December 1995.

LIST OF COURSES TAUGHT

Spring 2025:	Math 341 Computational Methods Math 430 Matrix Analysis
Winter 2025:	Math 426 Introduction to Mathematical Software Packages: Matlab
Fall 2024:	Math 221 Introduction to Linear Algebra Math 447/627 Introduction to Parallel Computing
Summer 2024:	Math 426 Introduction to Mathematical Software Packages: Matlab
Spring 2024:	Math 221 Introduction to Linear Algebra Math 630 Numerical Linear Algebra
Winter 2024:	Math 426 Introduction to Mathematical Software Packages: Matlab
Fall 2023:	Math 447/627 Introduction to Parallel Computing Math 620 Numerical Analysis
Summer 2023:	Math 225 Introduction to Differential Equations Math 426 Introduction to Mathematical Software Packages: Matlab
Spring 2023:	Math 221 Introduction to Linear Algebra Math 341 Computational Methods
Winter 2023:	Math 426 Introduction to Mathematical Software Packages: Matlab
Fall 2022:	Math 225 Introduction to Differential Equations Math 447/627 Introduction to Parallel Computing
Summer 2022:	Math 225 Introduction to Differential Equations Math 426 Introduction to Mathematical Software Packages: Matlab
Spring 2022:	Math 225 Introduction to Differential Equations Math 341 Computational Methods
Fall 2021:	Math 441 Introduction to Numerical Analysis Math 447/627 Introduction to Parallel Computing
Summer 2021:	Math 341 Computational Methods
Spring 2021:	Math 225 Introduction to Differential Equations Math 630 Numerical Linear Algebra
Winter 2021:	Math 447 Introduction to Parallel Computing
Fall 2020:	Math 620 Numerical Analysis Math 447/627 Introduction to Parallel Computing

Summer 2020: Math 341 Computational Methods

Spring 2020: Math 225 Introduction to Differential Equations
Math 341 Computational Methods
Math 700 / IS 698 / PHYS 650 CyberTraining: Big Data + HPC + Atmospheric Physics, team-taught with Jianwu Wang, Zhibo Zhang, and Aryya Gangopadhyay

Fall 2019: Math 441 Introduction to Numerical Analysis
Math 627 Introduction to Parallel Computing

Spring 2019: *Sabbatical leave*
Math 700 / IS 698 / PHYS 650 CyberTraining: Big Data + HPC + Atmospheric Physics, team-taught with Jianwu Wang, Zhibo Zhang, and Aryya Gangopadhyay

Fall 2018: Math 620 Numerical Analysis
Math 447/627 Introduction to Parallel Computing

Spring 2018: *Rotator at the National Science Foundation*
Math 700 / IS 698 / PHYS 650 CyberTraining: Big Data + HPC + Atmospheric Physics, team-taught with Jianwu Wang, Zhibo Zhang, and Aryya Gangopadhyay

Fall 2017: *Rotator at the National Science Foundation*

Spring 2017: Math 341 Computational Methods
Math 621 Numerical Methods for Partial Differential Equations

Fall 2016: Math 441 Introduction to Numerical Analysis
Math 447/627 Introduction to Parallel Computing

Spring 2016: Introduction to Parallel Computing, at the Universität Kassel, Germany

Fall 2015: Math 225 Introduction to Differential Equations
Math 441 Introduction to Numerical Analysis
Math 627 Introduction to Parallel Computing

Spring 2015: Math 621 Numerical Methods for Partial Differential Equations

Fall 2014: Math 627 Introduction to Parallel Computing

Summer 2014: Math 447 Introduction to Parallel Computing (REU Site)

Spring 2014: Math 630 Numerical Linear Algebra

Fall 2013: Math 620 Numerical Analysis, team-taught with Andreas Meister
Math 627 Introduction to Parallel Computing

Summer 2013: Math 447 Introduction to Parallel Computing (REU Site)

Spring 2013: Math 621 Numerical Methods for Partial Differential Equations

Fall 2012: Math 627 Introduction to Parallel Computing

Summer 2012: Math 447 Introduction to Parallel Computing (REU Site)

Spring 2012: *Sabbatical leave*
Parallel Computing for Partial Differential Equations, at the Universität Kassel, Germany
Seminar: Applications of Parallel Computing, at the Universität Kassel, Germany

Fall 2011: *Sabbatical leave*
Introduction to Parallel Computing, at the Universität Kassel, Germany

Summer 2011: Math 447 Introduction to Parallel Computing (REU Site)

Spring 2011: Math 225 Introduction to Differential Equations
Math 627 Introduction to Parallel Computing

Fall 2010: Math 621 Numerical Methods for Partial Differential Equations

Summer 2010: Math 447 Introduction to Parallel Computing (REU Site)

Spring 2010: Math 225 Introduction to Differential Equations
Math 627 Introduction to Parallel Computing

Fall 2009: Math 225 Introduction to Differential Equations
Math 441 Introduction to Numerical Analysis

Spring 2009: Math 627 Introduction to Parallel Computing

Fall 2008: Math 225 Introduction to Differential Equations
Math 620 Numerical Analysis I

Spring 2008: Math 221 Introduction to Linear Algebra
Math 627 Introduction to Parallel Computing

Fall 2007: Math 441 Introduction to Numerical Analysis
Math 621 Numerical Analysis II:
Numerical Methods for Partial Differential Equations

Summer 2007: Math 221 Introduction to Linear Algebra

Spring 2007: Math 630 Matrix Analysis

Fall 2006: Math 221 Introduction to Linear Algebra
Math 627 Introduction to Parallel Computing

Summer 2006: Math 221 Introduction to Linear Algebra

Spring 2006: Math 621 Numerical Analysis II:
Numerical Methods for Partial Differential Equations

Fall 2005: Math 221 Introduction to Linear Algebra
Math 441 Introduction to Numerical Analysis
Math 620 Numerical Analysis I

Summer 2005: Math 426 Introduction to Mathematical Software Packages: Matlab

Spring 2005: *Sabbatical leave*

Fall 2004: *Sabbatical leave*

Spring 2004: Math 627 Introduction to Parallel Computing
Math/Stat 750 Introduction to Interdisciplinary Consulting,
team-taught with Nagaraj K. Neerchal

Fall 2003: Math 621 Numerical Analysis II:
Numerical Methods for Partial Differential Equations
Math/Stat 750 Introduction to Interdisciplinary Consulting,
team-taught with Nagaraj K. Neerchal
Math 441/620 Introduction to Numerical Analysis

Spring 2003: FYS 101A First-Year Seminar: Technological Disasters and Their Causes,
team-taught with Ted M. Foster

Fall 2002: Math 426 Introduction to Mathematical Software Packages: Matlab
Math 430/630 Matrix Analysis
Math 627 Introduction to Parallel Computing,
team-taught with Madhu Nayakkankuppam

Spring 2002: Math 426 Introduction to Mathematical Software Packages: Matlab
Math 441/620 Introduction to Numerical Analysis

Winter 2002: Math 426 Introduction to Mathematical Software Packages: Matlab

Fall 2001: Math 426 Introduction to Mathematical Software Packages: Matlab
Math 430/630 Matrix Analysis
Math 700 Special Topics in Numerical Analysis:
Introduction to Parallel Computing using MPI,
team-taught with Susan E. Minkoff and Madhu Nayakkankuppam

Spring 2001: Math 441/620 Introduction to Numerical Analysis
Math 621 Numerical Analysis II:
Numerical Methods for Partial Differential Equations

Winter 2001: Math 426 Introduction to Mathematical Software Packages: Matlab

Fall 2000: Math 426 Introduction to Mathematical Software Packages: Matlab

Spring 2000: Math 441/620 Introduction to Numerical Analysis
Math 490 Special Topics in Mathematics:
Mathematical Computer Packages: Matlab

Fall 1999: Math 341 Computational Methods
Math 430/630 Matrix Analysis, team-taught with Weijia Kuang
Math 490/710 Special Topics in Applied Mathematics:
Introduction to Asymptotic Analysis and Singular Perturbations,
team-taught with Thomas I. Seidman and Weijia Kuang

Spring 1999: Math 225 Introduction to Differential Equations
Math 441/620 Introduction to Numerical Analysis

Fall 1998: Math 251 Multivariable Calculus
Math 341 Computational Methods
Introduction to Matlab, taught for Northrop Grumman
through the Office of Continuing Education

Spring 1998: Math 152 Calculus and Analytic Geometry II
Math 441/620 Introduction to Numerical Analysis

Fall 1997: Math 151 Calculus and Analytic Geometry I
Math 341 Computational Methods