Steven M. Wise

Curriculum Vitae

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stevenmwise@gmail.com ★ https://scholar.google.com/citations?user=dGv7Ou8AAAAJ
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Current Appointment

Mathematics Department, University of Tennessee

Professor, August 2017 – present

Interim Department Head, January 2020

Associate Professor, August 2012 – July 2017

Assistant Professor, August 2007 – July 2012

Research Impact

Web of Science Highly Cited Researcher: Mathematics, 2020, 2022
https://recognition.webofscience.com/awards/highly-cited/2020/
https://recognition.webofscience.com/awards/highly-cited/2022/

Google Scholar Citation Metrics: over 10000 citations, h-index 51, as of August, 2024

Research Interests

Computational Mathematics and Numerical Analysis: Approximation methods for nonlinear parabolic/hyperbolic PDE; convex-concave decomposition methods for bistable gradient equations. Multilevel pre-conditioners. Fast nonlinear solvers. Efficient adaptive multigrid methods for interface problems; methods for moving boundary problems, especially phase-field and diffuse interface methods. Rigorous stability and convergence of finite difference, finite element, pseudo-spectral and discontinuous galerkin methods for nonlinear and nonlocal, elliptic and parabolic PDE.

Optimization: Preconditioned Nesterov and multilevel methods for constrained and unconstrained optimization problems, especially those related to the discretization of nonlinear PDE and Calculus of Variations problems.

Mathematical Biology: Modeling tissue growth and remodeling – including cancerous tumor growth – angiogenesis, and cancer treatment; spatiotemporal pattern formation in biological systems, morphogenesis. Deformation, decomposition, and motion of biological membranes

in viscous flows.

Computational Materials Science: Growth and coarsening dynamics of heteroepitaxial thin films, long-time and large-scale coarsening of material microstructures, quantum dot formation, phase field crystal models, nonlocal models of phase transformation, crystal growth with strong interfacial anisotropy, elastically mediated phase transformations. Soft materials.

Computational Fluid Dynamics: Phase field methods for two-phase flows with large density difference and heat transport. Two-phase flows in porous media. Microstructural evolution of multiphase polymer systems, especially for organic photovoltaic (OPV) devices. Transport of ions in solution. Multi-species gas dynamics and the multi-species Boltzmann equations.

Nonlinear PDE: Existence, uniqueness, and regularity of solutions for nonlinear parabolic-hyperbolic PDE and related integro-partial differential equations (IPDE), especially for models related to phenomena described above.

Nonlinear Analysis: Γ convergence and asymptotic analysis for diffuse interface problems.

University Education

Ph.D., University of Virginia, Engineering Physics[1]; May 2003.

Advisor: W.C. Johnson

Dissertation: "Diffuse Interface Model for Microstructural Evolution of Stressed, Binary Thin Films on Patterned Substrates."

Graduate Studies, Virginia Tech and Penn State, Mathematics; August 1996–December 1998.

Coursework: Analysis (Real, Complex, Functional, and Numerical), Applied Mathematics.

B.S., Clarion University of Pennsylvania, Mathematics; May 1996.

Minor (Coursework Equivalent): Physics

Current Funding

NSF Grant, DMS-2309547: PI, *Collaborative Research: Accurate and Structure- Preserving Numerical Schemes for Variable Temperature Phase Field Models and Efficient Solvers,* \$213,743, 8/23 – 7/26.

ORNL-DOE-UT-Battelle CW24420: PI, *BGK Kinetic Equations,* \$606,000, 8/24 – 7/27. ORNL Technical Point of Contact: Ryan Glasby, `glasbyrs@ornl.gov`.

Previous Funding, Support, and Awards

NSF Grant, DMS-2012634: PI, *Collaborative Research: Efficient, Accurate, and Structure-Preserving Numerical Methods for Phase Field-Type Models with Applications,* \$200,000, 8/20 – 7/24.

ORNL-DOE-UT-Battelle CW24420: PI, *BGK Kinetic Equations,* \$250,200, 1/22 – 7/24.

[1]What is *Engineering Physics*? It's a weird name, that probably should have been changed to *Applied Physics*. At UVA this was an interdisciplinary degree that allowed the student to study any kind of applied science problem. I studied the theory and simulation of certain phase transformations.

ORNL Technical Point of Contact: Ryan Glasby, glasbyrs@ornl.gov.

LANL-ORNL-DOE-UT-Battelle RFP584197: co-PI, *Developing a better understanding of adaptive velocity grids for kinetic equations,* approx. $60,000, 2/20 – 5/21. DOE-LANL Technical Point of Contact: Jeff Haack. (Originally funded at about $640K, before budget cuts.)

ORNL-DOE-UT-Battelle 3400267345: PI, *Quadratic Unconstrained Binary Optimization and Regularized Problems Expressed via Steady States of Dynamical Systems,* $40,506, 6/18 – 8/18. ORNL Technical Point of Contact: Ryan Bennink.

ORNL-DOE-UT-Battelle 3400253096: PI, *Physics-Based, Self-Consistent Simulation of Neutron Reflectivity for Thin Films of Block Copolymers with Incorporated Nanoparticles,* $138,834, 7/17 – 9/18. ORNL Technical Points of Contact: Rajeev Kumar, Valeria Lauter, Bobby Sumpter.

Dresden Fellowship: Technische Universität Dresden, Germany, €10,500, 9/1/17 – 11/30/17.

ORNL-DOE-UT-Battelle 3400252731: PI, *Modeling and Simulation of Ion Transport in Polymer Systems and Novel Discrete Ordinate Methods for Modeling Radiation Transport via Kinetic Equations,* $60,285, 6/17 – 5/18. ORNL Technical Point of Contact: Cory Hauck.

IMA Conference Grant: co-PI, *The 2017 Barrett Lectures: the Mathematical Foundations of Data Science,* $5,000, 4/17 – 3/18.

NSF Grant, DMS-1719854: PI, *Efficient, Adaptive, and Convergent Numerical Methods for Phase Field Equations with Applications,* $200,000, 8/17 – 11/21.

NSF Grant, DMS-1700494: co-PI, *The 2017 Barrett Lectures: the Mathematical Foundations of Data Science,* $16,000, 4/17 – 3/18.

NSF Grant, DMS-1418692: PI, *Efficient, Adaptive, and Convergent Numerical Methods for Phase Field and Phase Field Crystal Equations with Applications,* $105,000, 9/14 – 8/18.

NSF Grant, DMS-1338314: co-PI, *Southeastern-Atlantic Regional Conference on Differential Equations 2013,* $21,938.00, 8/13 – 4/14.

NSF Grant, DMS-1115390: Lead PI, *Collaborative Research: Stable and Efficient Convexity-Splitting Schemes for Bistable Gradient PDEs,* $160,000, 7/11 – 6/14.

NSF Grant, DMS-0818030: PI, *Collaborative Research: Multiscale Modeling of Solid Tumor Growth,* $70,000, 9/08 – 8/11.

Workshop Support: Lead Organizer, *Investigative Workshop: Solid Tumor Modeling*, National Institute for Mathematical and Biological Synthesis (NIMBioS), approx. 40 participants, 1/19/11 – 1/21/11. ' in the category of Natural Sciences from the College of Arts and Sciences.

Senior Research and Creative Achievement Award: College of Arts and Sciences, Natural Sciences Category, University of Tennessee, Fall/Winter Convocation 2022.

Mid-Career Faculty Research Achievement Award: College of Arts and Sciences, University of Tennessee, Fall/Winter Convocation 2014, $500.

Junior Faculty Research Achievement Award: College of Arts and Sciences, University of Tennessee, Fall/Winter Convocation 2010, $1000.

Best Graduate Teaching Award: Mathematics Department, University of Tennessee, 2012-13,

and 2013-14.

Best Graduate Advising Award: Mathematics Department, University of Tennessee, 2016-17.

Supplementary Support for PhD Students[2]

Kylie Berry, United States Department of Energy Office of Science Graduate Student Research (SCGSR) Program Award/Fellowship, $18,000 (approx.) plus tuition, 1/19 – 6/19. PhD 2019. Topic: "Energy-based blending for local-nonlocal coupling in linear elasticity." Advisors P. Seleson (ORNL), Tadele Mengesha (UTK), and **S.M. Wise** (UTK).

John Cummings, United States Department of Energy Office of Science Graduate Student Research (SCGSR) Program Award/Fellowship, $36,000 (approx.) plus tuition, 1/15 – 1/16. PhD 2017. Topic: "Simulating Polymer-Solvent Mixtures for Organic-Photovoltaic Devices." Co-advisors R. Kumar (ORNL), **S.M. Wise** (UTK).

Charlotte Beckford, University of Tennessee-Oak Ridge Innovation Institute's (UTORII's) Science Alliance Graduate Advancement, Training and Education (GATE) Fellowship, $34,000 (approx.) plus tuition, 8/2024 – 7/2025. Topic: "Thermodynamically Consistent Models of Polymeric Battery Systems." Advisors R. Kumar (ORNL) and **S.M. Wise**.

Professional Membership

Society for Industrial and Applied Mathematics (SIAM)

Activity Group: Mathematical Aspects of Materials Science

Prior and Visiting Appointments

Dresden Senior Fellow, Technische Universität Dresden, September 2017 – November 2017.

Visiting Associate Researcher, University of California, Irvine, Mathematics Department, March 2015 – June 2015.

Visiting Assistant Professor, University of California, Irvine, Mathematics Department, July 2006 – July 2007.

Post-Doctoral Researcher, University of California, Irvine, Mathematics Department, July 2004 – June 2006.

Advisor: John S. Lowengrub

Post-Doctoral Researcher, University of California, Irvine, Biomedical Engineering and Mathematics Departments, March 2003 – June 2004.

Advisors: John S. Lowengrub and Vittorio Cristini

Research Assistant, University of Virginia, Engineering Physics Program, August 1999 – March 2003.

Scientist, United States Navy, NSWC-Dahlgren (Dahlgren,Virginia), January 1999 – August 1999.

[2]These awards are listed because the PI helped in the preparation of the application proposals and supervised the work. The awards went directly to the students, not to the PI, just to be clear.

Teaching Assistant–Primary Instructor, Penn State, Mathematics Department, August 1998 – December 1998.

Research Assistant, Virginia Tech, Mathematics Department, May 1997 – August 1998.

Teaching Assistant, Virginia Tech, Mathematics Department, August 1996 – April 1997.

Textbooks and Research Monographs

1. A.J. Salgado and **S.M. Wise**, *Classical Numerical Analysis: A Comprehensive Course*, Cambridge University Press, September 2022, 937 pages.
   https://www.cambridge.org/9781108837705
   https://doi.org/10.1017/9781108942607
2. A.J. Salgado and **S.M. Wise**, *An Introduction to Multigrid Methods: A Mostly Matrix-Based Approach*, De Gruyter (under contract), approx. 300 pages.
3. T. Mengesha and **S.M. Wise**, *Essential Asymptotic Analysis and Perturbation Theory*, (in preparation), approx. 400 pages.

Journal Publications

1. D. Schaal and **S.M. Wise**, *Rado Numbers for Some Inequalities and an Arbitrary Number of Colors*, Congr. Numer. 121 (1996), 147-153.
2. **S.M. Wise**, A.J. Sommese, and L.T. Watson, *Algorithm 801: POLSYS_PLP: A Partitioned Linear Product Homotopy Code for Solving Polynomial Systems of Equations*, ACM TOMS 26 (2000) 176-200.
   https://doi.org/10.1145/347837.347885
3. W.C. Johnson, P.H. Leo, Y. Zhen, and **S.M. Wise**, *Spinodal Decomposition in Thin Plates Subjected to a Temperature Gradient*, Modeling the Performance of Engineering Structural Materials II (TMS Fall 2001 Meeting), (2001).
4. **S.M. Wise** and W.C. Johnson, *Competitive Phase Growth in Stressed Thin Films*, Modeling the Performance of Engineering Structural Materials II (TMS Fall 2001 Meeting), (2001).
5. W.C. Johnson and **S.M. Wise**, *Phase Decomposition of a Binary Thin Film on a Patterned Substrate*, Appl. Phys. Lettr. 81 (2002), 919-921.
   https://doi.org/10.1063/1.1497193
6. W.C. Johnson, **S.M. Wise**, J.Y. Huh, and J. Favergeon, *Effect of Interfacial Segregation on Phase Decomposition of a Thin Film on a Patterned Substrate*, Met. Mater. Int. 9 (2003) 1-8.
   https://doi.org/10.1007/BF03027222
7. **S.M. Wise** and W.C. Johnson, *Numerical Simulations of Pattern-Directed Phase Decomposition in a Stressed, Binary Thin Film*, J. Appl. Phys. 94 (2003) 889-898.
   https://doi.org/10.1063/1.1577230
8. **S.M. Wise**, J.S. Kim, and W.C. Johnson, *Surface-Directed Spinodal Decomposition in a Stressed Two-Dimensional Thin Film*, Thin Solid Films 473 (2004) 151-163.
   https://doi.org/10.1016/j.tsf.2004.07.075
9. **S.M. Wise**, J.S. Lowengrub, J.S. Kim, and W.C. Johnson, *Efficient Phase-Field Simulation*

of Quantum Dot Formation in a Strained Heteroepitaxial Film, Superlattices and Microstructures 36 (2004) 293-304.
https://doi.org/10.1016/j.spmi.2004.08.029

10. J.S. Lowengrub, Z. Hu, **S.M. Wise**, J.S. Kim, and A. Voigt, *Phase-Field Modeling of Step Dynamics*, MRS Proceedings, 859E (2005) JJ8.6.1-JJ8.6.6.
11. X. Zheng, **S.M. Wise**, and V. Cristini, *Nonlinear Simulation of Tumor Necrosis, Neo-Vascularization and Tissue Invasion via an Adaptive Finite-Element/Level-Set Method*, Bull. Math. Biol. 67 (2005) 211-259.
https://doi.org/10.1016/j.bulm.2004.08.001
12. **S.M. Wise**, J.S. Lowengrub, J.S. Kim, K. Thornton, P. Voorhees, and W.C. Johnson, *Quantum Dot Formation on a Strain-Patterned Epitaxial Thin Film*, Appl. Phys. Lettr. 87 (2005) 133102.
https://doi.org/10.1063/1.2061852
13. J. Favergeon, J.Y. Huh, W.C. Johnson, and **S.M. Wise**, *Wetting Transitions in a Binary Thin Film*, Met. Mater. Int. 11 (2005) 487-497.
https://doi.org/10.1007/BF03027499
14. H.B. Frieboes, J.S. Lowengrub, **S.M. Wise**, X. Zheng, P. Macklin, E.L. Bearer, and V. Cristini, *Computer Simulation of Glioma Growth and Morphology*, NeuroImage 37 (2007) S59-S70.
https://doi.org/10.1016/j.neuroimage.2007.03.008
15. **S.M. Wise**, J.S. Kim, and J.S. Lowengrub, *Solving the Regularized, Strongly Anisotropic Cahn-Hilliard Equation by an Adaptive Nonlinear Multigrid Method*, J. Comput. Phys. 226 (2007) 414-446.
https://doi.org/10.1016/j.jcp.2007.04.020
16. S. Torabi, **S.M. Wise**, J.S. Lowengrub, A. Ratz, and A. Voigt, *A New Method for Simulating Strongly Anisotropic Cahn-Hilliard Equations*, MS&T 2007 Conference Proceedings (2007) 1432-1444.
17. Z. Hu, S. Li, J.S. Lowengrub, **S.M. Wise**, and A. Voigt, *Phase Field Modeling of Nanoscale Island Dynamics*, TMS 2008 (137th annual meeting) Supplemental Proceedings: Materials Processing and Properties (2008) 111-116.
18. V. Cristini, H.B. Frieboes, X. Li, J.S. Lowengrub, P. Macklin, S. Sanga, **S.M. Wise**, and X. Zheng, *Nonlinear Modeling and Simulation of Tumor Growth, in N. Bellomo, M. Chaplain, and E. De Angelis (Editors), "Selected Topics in Cancer Modeling: Genesis, Evolution, Immune Competition, and Therapy,"* Birkhauser (2008) 1-69.
https://doi.org/10.1007/978-0-8176-4713-1_6
19. S. Torabi, **S.M. Wise**, S. Li, A. Voigt, J.S. Lowengrub, and P. Zhou, *Simulations of Nonlinear Strongly Anisotropic, Misfitting Crystals and Thin Films*, MRS Proceedings 1087 (2008) 1087-V02-01.
https://doi.org/10.1557/PROC-1087-V02-01
20. **S.M. Wise**, J.S. Lowengrub, H.B. Frieboes, and V. Cristini, *Three-Dimensional Multispecies Nonlinear Tumor Growth–I: Model and Numerical Method*, J. Theor. Biol. 253 (2008) 524-543.
https://doi.org/10.1016/j.jtbi.2008.03.027
21. V. Cristini, X. Li, J.S. Lowengrub, and **S.M. Wise**, *Nonlinear Simulations of Solid Tumor*

Growth using a Mixture Model: Invasion and Branching, J. Math. Biol. 58 (2009) 723-763. https://doi.org/10.1007/s00285-008-0215-x

22. S. Torabi, J.S. Lowengrub, A. Voigt, and **S.M. Wise**, *A New Phase-Field Model for Strongly Anisotropic Systems*, Proc. R. Soc. A 465 (2009) 1337-1359. https://doi.org/10.1098/rspa.2008.0385
23. E.L. Bearer, J.S. Lowengrub, H.B. Frieboes, Y.L. Chuang, F. Jin, **S.M. Wise**, M. Ferrari, D.B. Agus, and V. Cristini, *Multiparameter Computational Modeling of Tumor Invasion*, Cancer Res. 69 (2009) 4493-4501. https://doi.org/10.1158/0008-5472.CAN-08-3834
24. J.S. Lowengrub, V. Cristini, H.B. Frieboes, X. Li, P. Macklin, S. Sanga, **S.M. Wise**, and X. Zheng, *Lecture Notes on Nonlinear Tumor Growth: Modeling and Simulation, in B.C. Khoo, Z. Li, and P. Lin (Editors) "Interface Problems and Methods in Biological and Physical Flows,"* World Scientific (2009) 69-133. https://doi.org/10.1142/9789812837851_0002
25. **S.M. Wise**, C. Wang, and J.S. Lowengrub, *An Energy Stable and Convergent Finite Difference Scheme for the Phase Field Crystal Equation*, SINUM (SIAM J. Numer. Anal.) 47 (2009) 2269-2288. https://doi.org/10.1137/080738143
26. Z. Hu, **S.M. Wise**, C. Wang, and J.S. Lowengrub, *Stable Finite Difference, Nonlinear Multigrid Simulation of the Phase Field Crystal Equation*, J. Comput. Phys. 228 (2009) 5323-5339. https://doi.org/10.1016/j.jcp.2009.04.020
27. P. Zhou, J.S. Lowengrub, and **S.M. Wise**, *Coarsening of 3D Thin Films Under the Influence of Strong Surface Anisotropy and Elastic Stresses*, TMS 2009 (138th annual meeting), Supplemental Proceedings: Materials Characterization, Computation and Modeling (2009) 39-46. https://apps.dtic.mil/dtic/tr/fulltext/u2/a538820.pdf
28. J.S. Lowengrub, H.B. Frieboes, F. Jin, Y.L. Chuang, X. Li, P. Macklin, **S.M. Wise**, and V. Cristini, *Nonlinear Modeling of Cancer: Bridging the Gap Between Cells and Tumors*, Nonlinearity 23 (2010) R1-R91. https://doi.org/10.1088/0951-7715/23/1/R01
29. C. Wang, X. Wang, and **S.M. Wise**, *Unconditionally Stable Schemes for Equations of Thin Film Epitaxy*, Discrete Contin. Dyn. Syst. Ser. A 28 (2010) 405-423. https://doi.org/10.3934/dcds.2010.28.405
30. **S.M. Wise**, *Unconditionally Stable Finite Difference, Nonlinear Multigrid Simulation of the Cahn-Hilliard-Hele-Shaw System of Equations*, J. Sci. Comput. 44 (2010) 38-68. https://doi.org/10.1007/s10915-010-9363-4
31. H.B. Frieboes, F. Jin, Y.L. Chuang, **S.M. Wise**, J.S. Lowengrub, and V. Cristini, *Three-Dimensional Multispecies Nonlinear Tumor Growth–II: Angiogenesis and Tissue Invasion*, J. Theor. Biol. 264 (2010) 1254-1278. https://doi.org/10.1016/j.jtbi.2010.02.036
32. Y.L. Chuang, F. Jin, and **S.M. Wise**, *Numerical Schemes, in V. Cristini and J.S. Lowengrub (Authors), "Multiscale Modeling of Cancer: An Integrated Experimental and Mathematical*

Modeling Approach," Cambridge University Press (2010) 153-182.
https://doi.org/10.1017/CBO9780511781452.009

33. C. Wang and **S.M. Wise**, *Global Smooth Solutions of the Three-Dimensional Modified Phase Field Crystal Equation*, Methods Appl. Anal. 17 (2010) 191-212.
https://doi.org/10.4310/MAA.2010.v17.n2.a4

34. **S.M. Wise**, J.S. Lowengrub, and V. Cristini, *An Adaptive Algorithm for Simulating Solid Tumor Growth using Mixture Models*, Math. Comput. Model. 53 (2011) 1-20.
https://doi.org/10.1016/j.mcm.2010.07.007

35. C. Wang and **S.M. Wise**, *An Energy Stable and Convergent Finite Difference Scheme for the Modified Phase Field Crystal Equation*, SINUM (SIAM J. Numer. Anal.) 49 (2011) 945-969.
https://doi.org/10.1137/090752675

36. Z. Hu, J.S. Lowengrub, **S.M. Wise**, and A. Voigt, *Phase-Field Modeling of Epitaxial Growth: Applications to Step Trains and Island Dynamics*, Physica D 241 (2012) 77-94.
https://doi.org/10.1016/j.physd.2011.09.004

37. J. Shen, C. Wang, X. Wang, and **S.M. Wise**, *Second-Order Convex Splitting Schemes for Gradient Flows with Ehrlich-Schwoebel Type Energy: Application to Thin Film Epitaxy*, SINUM (SIAM J. Numer. Anal.) 50 (2012) 105-125.
https://doi.org/10.1137/110822839

38. X. Feng and **S.M. Wise**, *Analysis of a Darcy-Cahn-Hilliard Diffuse Interface Model for the Hele-Shaw Flow and its Fully Discrete Finite Element Approximation*, SINUM (SIAM J. Numer. Anal.) 50 (2012) 1320-1343.
https://doi.org/10.1137/110827119

39. P. Zhou, **S.M. Wise**, X. Li, and J.S. Lowengrub, *Coarsening of Elastically Stressed, Strongly Anisotropic Driven Thin Films*, Phys. Rev. E 85 (2012) 061605.
https://doi.org/10.1103/PhysRevE.85.061605

40. W. Chen, S. Conde, C. Wang, X. Wang, and **S.M. Wise**, *A Linear Energy Stable Scheme for a Thin Film Model without Slope Selection*, J. Sci. Comput. 52 (2012) 546-562.
https://doi.org/10.1007/s10915-011-9559-2

41. C. Collins, J. Shen, and **S.M. Wise**, *An Efficient, Energy Stable Scheme for the Cahn-Hilliard-Brinkman System*, Commun. Comput. Phys. 13 (2013) 929-957.
https://doi.org/10.4208/cicp.171211.130412a

42. A. Baskaran, Z. Hu, J.S. Lowengrub, C. Wang, **S.M. Wise**, and P. Zhou, *Energy Stable and Efficient Finite-Difference Nonlinear-Multigrid Schemes for the Modified Phase Field Crystal Equation*, J. Comput. Phys. 250 (2013) 270-292.
https://doi.org/10.1016/j.jcp.2013.04.024

43. A. Aristotelous, O. Karakashian, **S.M. Wise**, *A Mixed Discontinuous Galerkin, Convex Splitting Scheme for a Modified Cahn-Hilliard Equation and an Efficient Nonlinear Multigrid Solver*, Discrete Cont. Dyn. Syst. B 18 (2013) 2211-2238.
https://doi.org/10.3934/dcdsb.2013.18.2211

44. A. Baskaran, J.S. Lowengrub, C. Wang, and **S.M. Wise**, *Convergence of a Second Order Convex Splitting Scheme for the Modified Phase Field Crystal Equation*, SINUM (SIAM J. Numer. Anal.) 51 (2013) 2851-2873.

https://doi.org/10.1137/120880677

45. W. Chen, C. Wang, X. Wang, and **S.M. Wise**, *A Linear Iteration Algorithm for an Energy Stable Second Order Scheme for a Thin Film Model Without Slope Selection*, J. Sci. Comput. 59 (2014) 574-601.
https://doi.org/10.1007/s10915-013-9774-0

46. Y. Chen, **S.M. Wise**, V.B. Shenoy, and J.S. Lowengrub, *A Stable Scheme for a Nonlinear, Multispecies Tumor Growth Model with an Elastic Membrane*, Int. J. Numer. Meth. Biomed. Engng. 30 (2014) 726-754.
https://doi.org/10.1002/cnm.2624

47. Z. Guan, J.S. Lowengrub, C. Wang, and **S.M. Wise**, *Second-Order Convex Splitting Schemes for Non-local Cahn-Hilliard and Allen-Cahn Equations*, J. Comput. Phys. 277 (2014) 48-71.
https://doi.org/10.1016/j.jcp.2014.08.001

48. Z. Guan, C. Wang, and **S.M. Wise**, *A Convergent Convex Splitting Scheme for the Periodic Nonlocal Cahn-Hilliard Equation*, Numer. Math. 128 (2014) 377-406.
https://doi.org/10.1007/s00211-014-0608-2

49. A. Diegel, X. Feng, and **S.M. Wise**, *Analysis of a Mixed Finite Element Method for a Cahn-Hilliard-Darcy-Stokes System*, SINUM (SIAM J. Numer. Anal.) 53 (2015) 127-152.
https://doi.org/10.1137/130950628

50. A. Aristotelous, O. Karakashian, and **S.M. Wise**, *Second-Order in Time, Primitive-Variable Discontinuous Galerkin Schemes for a Cahn-Hilliard Equation with a Mass Source Term*, IMA J. Numer. Anal. 35 (2015) 1167-1198.
https://doi.org/10.1093/imanum/dru035

51. W. Feng, T. Lewis, and **S.M. Wise**, *Discontinuous Galerkin Derivative Operators with Applications to Second Order Elliptic Problems and Stability*, Math. Methods Appl. Sci. 38 (2015) 5160-5182.
https://doi.org/10.1002/mma.3440

52. J. Guo, C. Wang, **S.M. Wise**, and X. Yue, *An H^2 Convergence of a Second-Order Convex-Splitting, Finite Difference Scheme for the Three-Dimensional Cahn-Hilliard Equation*, Commun. Math. Sci. 14 (2016) 489-515.
https://doi.org/10.4310/CMS.2016.v14.n2.a8

53. Tri Sri Noor Asih, Suzanne Lenhart, **S.M. Wise**, Lina Aryati, F. Adi-Kusumo, Mardiah S. Hardianti, and Jonathan Forde, *The Dynamics of HPV Infection and Cervical Cancer Cells*, Bull. Math. Biol. 78 (2016) 4-20.
https://doi.org/10.1007/s11538-015-0124-2

54. W. Chen, Y. Liu, C. Wang, and **S.M. Wise**, *An Optimal-Rate Convergence Analysis of a Fully Discrete Finite Difference Scheme for the Cahn-Hilliard-Hele-Shaw Equation*, Math. Comp. 85 (2016) 2231-2257.
https://doi.org/10.1090/mcom3052

55. N. Chen, C. Wang, and **S.M. Wise**, *Global-in-time Gevrey Regularity Solution for a Class of Bistable Gradient Flows*, Discrete Cont. Dyn. Syst. Ser. B 21 (2016) 1689-1711.
https://doi.org/10.3934/dcdsb.2016018

56. Z. Guan, V. Heinonen, J.S. Lowengrub, C. Wang, and **S.M. Wise**, *An Energy Stable, Hexagonal Finite Difference Scheme for the 2D Phase Field Crystal Amplitude Equations*,

J. Comput. Phys. 321 (2016) 1026-1054.
https://doi.org/10.1016/j.jcp.2016.06.007

57. A. Diegel, C. Wang, and **S.M. Wise**, *Stability and Convergence of a Second Order Mixed Finite Element Method for the Cahn-Hilliard Equation*, IMA J. Numer. Anal. 36 (2016) 1867-1897.
https://doi.org/10.1093/imanum/drv065

58. K. Cheng, C. Wang, **S.M. Wise**, and Y. Yue, *A Second-Order, Weakly Energy-Stable Pseudo-Spectral Scheme for the Cahn-Hilliard Equation and its Solution by the Homogeneous Linear Iteration Method*, J. Sci. Comput. 69 (2016) 1083-1114.
https://doi.org/10.1007/s10915-016-0228-3

59. W. Feng, A.J. Salgado, C. Wang, **S.M. Wise**, *Preconditioned Steepest Descent Methods for some Nonlinear Elliptic Equations Involving p-Laplacian Terms*, J. Comput. Phys. 334 (2017) 45-67.
https://doi.org/10.1016/j.jcp.2016.12.046

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Preprint at https://arxiv.org/abs/2412.07007

121. Y. Guo, C. Wang, **S.M. Wise**, and Z. Zhang, *A Uniquely Solvable and Positivity-Preserving Finite Difference Scheme for the Flory-Huggins-Cahn-Hilliard Equation with Dynamical Boundary Condition* (in review).
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Invited Research Presentations

1. Fourth SIAM Conference on Mathematical Aspects of Materials Science, Los Angeles, CA (May 2004). Research talk entitled *Phase Field Simulation of Quantum Dot Formation in a Thin Film*.
2. University of Virginia MRSEC/Lund University meeting, Lund, Sweden (July 2004). Research talk entitled *Phase Field Simulation of Quantum Dot Formation in a Thin Film*.
3. TMS Annual Meeting, The Armen G. Khachaturyan Symposium on Phase Transformation and Microstructural Evolution in Crystalline Solids, San Francisco, CA (February 2005). Research talk entitled *3D Phase Field Simulation of Q-Dot Formation (in a Strained Het-*

eroepitaxial Film).

4. University of Buffalo, Mathematics Department, Buffalo, NY (January 2006). Colloquium talk entitled *Diffuse-Interface/Adaptive-Multigrid Calculations of Crystal Growth with Strong Interfacial Anisotropy*.
5. Research Center Caesar, Crystal Growth Group, Bonn, Germany (August 2006). Seminar talk entitled *Diffuse-Interface/Adaptive-Multigrid Calculations of Crystal Growth with Strong Interfacial Anisotropy*.
6. SIAM Conference on Nonlinear Waves and Coherent Structures (NW06), Seattle WA (September 2006). Research talk entitled *Continuum Models of Tumor Growth and Angiogenesis*.
7. University of Akron, Department of Theoretical and Applied Mathematics, Akron, OH (December 2006). Colloquium talk entitled *Modeling Solid Tumor Growth: Role of the Microstructure*.
8. Purdue University, Mathematics Department, West Lafayette, IN (January 2007). Colloquium talk entitled *Modeling Solid Tumor Growth: Role of the Microstructure*.
9. University of Louisville, Mathematics Department, Louisville, KY (January 2007). Colloquium talk entitled *Modeling Solid Tumor Growth: Role of the Microstructure*.
10. Ohio State University, Mathematics Department and Mathematical Biosciences Institute, Columbus, OH (February 2007). Colloquium talk entitled *Modeling Solid Tumor Growth: Role of the Microstructure*.
11. University of Tennessee, Mathematics Department, Knoxville, TN (February 2007). Colloquium talk entitled *Modeling Solid Tumor Growth: Role of the Microstructure*.
12. British Applied Mathematics Colloquium, Bristol, UK (April 2007). Research talk entitled *Computational Results for a Class of Regularized, Strongly Anisotropic Cahn-Hilliard Equations*.
13. Florida State University, Mathematics Department, Tallahassee, FL (September 2007). Colloquium talk entitled *The Diffuse Interface Method: Applications in Tumor Growth and Phase Transformations*.
14. SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA (May 2008). Research talk entitled *Large-Scale Coarsening Dynamics of Four-Fold Anisotropic Thin Films*.
15. Pennsylvania State University, Mathematics Department, University Park, PA (March 2009). Seminar talk entitled *Energy Stable and Convergent Schemes for the Phase Field Crystal (PFC) and Modified Phase Field Crystal (MPFC) Equations*.
16. 33rd SIAM Southeastern-Atlantic Section Conference, University of South Carolina, Columbia, SC (April 2009). Research talk entitled *Energy Stable and Convergent Schemes for the Phase Field Crystal (PFC) and Modified Phase Field Crystal (MPFC) Equations*.
17. 24th Annual Shanks Lecture and Conference, Vanderbilt University, Nashville, TN (May 2009). Plenary talk entitled *Multiscale Modeling of Solid Tumor Growth and Angiogenesis: The Effect of the Microenvironment*.
18. SIAM Conference on Mathematics for Industry: Challenges and Frontiers, San Francisco, CA (October 2009). Research talk entitled *Energy Stable and Convergent Schemes for the Phase Field Crystal (PFC) and Modified Phase Field Crystal (MPFC) Equations*.

19. University of Massachusetts, Mathematics Department, North Dartmouth, MA (November 2009). Seminar talk entitled *Energy Stable and Convergent Schemes for Bistable Gradient Equations*.
20. University of Pittsburgh, Mathematics Department, Pittsburgh, PA (January 2010). Colloquium talk entitled *Convex Splitting Schemes for Conserved Bistable Gradient Equations: Applications in Grain Boundary Motion, Solidification, and Tumor Growth*.
21. Purdue University, Mathematics Department, West Lafayette, IN (March 2010). Seminar talk entitled *Convex Splitting Schemes for Conserved Bistable Gradient Equations: Applications in Grain Boundary Motion, Solidification, and Tumor Growth*.
22. AMS Southeastern Section Meeting, University of Kentucky, Lexington, KY (March 2010). Research talk entitled *Energy Stable and Convergent Schemes for the Phase Field Crystal (PFC) and Modified Phase Field Crystal (MPFC) Equations*.
23. SIAM Annual Meeting, Pittsburgh, PA (July 2010). Research talk entitled *An Unconditionally Stable Second-Order Scheme for the Slope Selection Equation and Related Epitaxial Thin Film Models*.
24. SIAM Conference on the Life Sciences, Pittsburgh, PA (July 2010). Research talk entitled *Stable Finite Difference, Adaptive Nonlinear Multigrid Simulation of a Diffuse-Interface Model for Tumor Growth*.
25. University of South Carolina, Columbia SC (October 2010). Seminar talk entitled *Numerical and PDE Analyses of a Diffuse-Interface Model for Tumor Growth*.
26. Central Michigan University, Mount Pleasant, MI (March 2011). Seminar talk entitled *Numerical and PDE Analyses of a Diffuse-Interface Model for Tumor Growth*.
27. 35th SIAM Southeastern-Atlantic Section Conference, University of North Carolina, Charlotte, NC (March 2011). Research talk entitled *Second-Order Convex-Splitting Schemes*.
28. SIAM Conference on Applications of Dynamical Systems, Snowbird, UT (May 2010). (Declined invitation.)
29. 2011 International Conference on Applied Mathematics and Interdisciplinary Research, Nankai University, Tianjin, China and Beijing, China (June 2011). (Declined invitation.)
30. ICIAM, Vancouver, BC, Canada (July 2011). Research talk entitled *Second-Order Convex-Splitting Schemes*. (Declined invitation because of a scheduling conflict.)
31. University of South Carolina, Columbia, SC (January 2012). Research talk entitled *PDE/Numerical Analyses and Computations of some Diffuse Interface Models of Viscous Two-Phase Flows*.
32. Florida State University, Tallahassee, FL (February 2012). Research talk entitled *PDE/Numerical Analyses and Computations of some Diffuse Interface Models of Viscous Two-Phase Flows*.
33. Illinois Institute of Technology, Chicago, IL (March 2012). Research talk entitled *PDE/Numerical Analyses and Computations of some Diffuse Interface Models of Viscous Two-Phase Flows*.
34. ORNL/UTK Numerical Day 2012, Oak Ridge National Lab, Oak Ridge, TN (April 2012). Research talk entitled *A Mixed Discontinuous Galerkin, Convex Splitting Scheme for the Cahn-Hilliard Equation*.

35. University of California, Irvine, CA (May 2012). Research talk entitled *A Mixed Discontinuous Galerkin, Convex Splitting Scheme for a Modified Cahn-Hilliard Equation*.

36. Workshop on *Heterostructured Nanocrystalline Materials*, ICERM, Brown University, Providence, RI (May 2012). (Declined invitation because of a scheduling conflict.)

37. AIMS 9th International Conference On Dynamical Systems and Differential Equations, Orlando, FL (July 2012). Research talk entitled *A Mixed Discontinuous Galerkin, Convex Splitting Scheme for the Cahn-Hilliard Equation*.

38. George Mason University, Fairfax, VA (September 2012). Research talk entitled *A Mixed Discontinuous Galerkin, Convex Splitting Scheme for the Cahn-Hilliard Equation*.

39. Virginia Tech, Blacksburg, VA (September 2012). Research talk entitled *A Mixed Discontinuous Galerkin, Convex Splitting Scheme for the Cahn-Hilliard Equation*.

40. *Workshop II: Atomistic and Mesoscale Modeling of Materials Defects*, IPAM's Program on *Materials Defects: Mathematics, Computation, and Engineering*, University of California, Los Angeles, CA (October 2012). Research talk entitled *Some Numerical Methods for PFC and DDFT-Like Equations*.

41. *International Workshop on Acoustic Activation of Surface Processes*, Breckenridge, CO (January 2013). Sponsored by DARPA. (Unable to attend due to a late scheduling conflict.)

42. SIAM Conference on Computational Science and Engineering, Boston, MA (February 2013). Research talk entitled *A Mixed Discontinuous Galerkin, Convex Splitting Scheme for the Cahn-Hilliard Equation*.

43. 37th SIAM Southeastern-Atlantic Section Conference, University of Tennessee, Knoxville, TN (March 2013). Research talk entitled *Second-Order Convex-Splitting Linear Iteration Scheme for Thin Film Models*.

44. University of Virginia, Charlottesville, VA (June 2013). Research talk entitled *The Phase Field Crystal Model: A Continuum Framework for Studying Phase Transformations on Atomic Length and Diffusive Time Scales*.

45. Oak Ridge National Lab, Computational Mathematics Seminar, Oak Ridge, TN (March 2014). Research talk entitled *Convergence of a Mixed Finite Element Method for a Cahn-Hilliard-Stokes System*.

46. University of North Carolina, Greensboro, NC (March 2014). Research talk entitled *Convergence of a Mixed Finite Element Method for a Cahn-Hilliard-Stokes System*.

47. Soochow University, Suzhou, China (June 2014). Research talk entitled *Convergence of a Mixed Finite Element Method for a Cahn-Hilliard-Stokes System*.

48. Fudan University, Shanghai, China (June 2014). Research talk entitled *Convergence of a Mixed Finite Element Method for Some Cahn-Hilliard-Flow Models*.

49. Shanghai Jiao Tong University, Shanghai, China (June 2014). Research talk entitled *Convergence of a Mixed Finite Element Method for Some Cahn-Hilliard-Flow Models*.

50. SIAM Annual Meeting, Chicago, IL (July 2014). Research talk entitled *Optimal Energy Norm Error Estimates for a Mixed FEM for a Cahn-Hilliard-Stokes System*.

51. SIAM Annual Meeting, Chicago, IL (July 2014). Research talk entitled *Stable and Convergent Numerical Schemes for Phase Field Crystal Models*.

52. Virginia Tech, Blacksburg, VA (October 2014). Research talk entitled *The Phase Field Crystal Model: A Continuum Framework for Studying Phase Transformations on Atomic Length and Diffusive Time Scales*.
53. Penn State, State College, PA (October 2014). Research talk entitled *The Phase Field Crystal Model: A Continuum Framework for Studying Phase Transformations on Atomic Length and Diffusive Time Scales*.
54. AMS Southeastern Section Meeting, Memphis, TN (October 2015). Research talk entitled *Convergence of a Second-order-in-time Finite Element Scheme for the Cahn-Hilliard Equation*.
55. SIAM SEAS 2016, Athens, GA (March 2016). Research talk entitled *Stability and Convergence for some Numerical Approximations of Cahn-Hilliard-Navier-Stokes Systems*.
56. Florida State University, Tallahassee, FL (March 2016). Research talk entitled *A Convergent, Energy Stable, and Efficient Hexagonal Finite Difference Scheme for the Phase Field Crystal Amplitude Expansion Model*.
57. Michigan State University, East Lansing, MI (April 2016). Research talk entitled *Higher-Order Convex Splitting Schemes for Bi-Stable Gradient Equations: Analysis and Practical Implementation*.
58. AIMS 11th International Conference on Dynamical Systems and Differential Equations, Orlando, FL (July 2016). Research talk entitled *A Convergent, Energy Stable, and Efficient Hexagonal Finite Difference Scheme for the Phase Field Crystal Amplitude Expansion Model*.
59. AIMS 11th International Conference on Dynamical Systems and Differential Equations, Orlando, FL (July 2016). Research talk entitled *A Multiphase Thin Film Model for Polymer Organic Photovoltaic (OPV) Device Preparation*.
60. Penn State, State College, PA (August 2016). Research talk entitled *A Multi-Component Model for Solvent Evaporation in a Polymer Thin Film*.
61. Virginia Tech, Blacksburg, VA (November 2016). Research talk entitled *Preconditioned Steepest Descent Methods for some Nonlinear Elliptic Equations Involving p-Laplacian Terms*.
62. University of North Carolina, Chapel Hill, NC (March 2017). Research talk entitled *Diffuse Interface Models of Density Mismatched, Multi-Phase Flows and Their Approximation Using Adaptive Multigrid Methods*.
63. University of California, Irvine, CA (April 2017). Research talk entitled *Preconditioned Steepest Descent Methods for some Nonlinear Elliptic Equations Involving p-Laplacian Terms*.
64. Oak Ridge National Laboratory, Computational and Applied Mathematics Seminar, Oak Ridge, TN (June 2017). Research talk entitled *Diffuse Interface Models of Density Mismatched, Multi-Phase Flows and Their Approximation Using Adaptive Multigrid Methods*.
65. Technische Universität Dresden, The Dresden Fellow Lecture, Mathematics Department, Dresden, Germany (November 2017). Research talk entitled *Diffuse Interface Models of Density Mismatched, Multi-Phase Complex Fluids, Soft Matter, and Beer Bubbles*.
66. Tufts University, Medford, MA (March 2018). Research talk entitled *Preconditioned Gradient Descent Methods for some Nonlinear Elliptic Equations Involving p-Laplacian Terms*.
67. SIAM Conference on Nonlinear Waves, Anaheim, CA (June 2018). Research talk entitled *A Phase Field Crystal Model for Graphene and Some Benchmark Problems*.

68. Illinois Institute of Technology, Chicago, IL (October 2018). Research talk entitled *Convergence Analysis of a Generalized Full Approximation Storage Scheme for Convex Optimization Problems*.
69. University of Alabama, Tuscaloosa, AL (March 2019). Research talk entitled *Convergence Analysis of Fast Subspace Descent (FASD) Scheme for Convex Optimization Problems*.
70. University of California, Irvine, CA (April 2019). Research talk entitled *Convergence Analysis of Fast Subspace Descent (FASD) Scheme for Convex Optimization Problems*.
71. 2019 Midwest Numerical Analysis Day, Illinois Institute of Technology, Chicago, IL (April 2019). Research talk entitled *A New Thermodynamically Consistent Phase Field Crystal Model with Multiple Phases and Heat Transport*.
72. Missouri University of Science and Technology, Rolla, MO (May 2019). Research talk entitled *Convergence Analysis of Fast Subspace Descent (FASD) Scheme for Convex Optimization Problems*.
73. The Cahn-Hilliard Equation: Recent Advances and Applications, NSF/CBMS Conference (May 2019). Research talk entitled *Convergence Analysis of Fast Subspace Descent (FASD) Scheme for Convex Optimization Problems Especially for Cahn-Hilliard-Type Equations*.
74. CAIMS Annual Meeting, Whistler, BC, Canada (June 2019). Research talk entitled *Numerical Methods and Benchmark Computations for the Functionalized Cahn-Hilliard Equation*. (Unable to attend due to a late flight cancellation. Talk given by a co-author.)
75. The University of Pittsburgh, Pittsburgh, PA (September 2019). Research talk entitled *Convergence Analysis of Fast Subspace Descent (FASD) Scheme for Convex Optimization Problems*.
76. Illinois Institute of Technology, Chicago, IL (March 2023), Research talk entitled *A Doubly Degenerate Diffuse Interface Model of Surface Diffusion*.
77. SIAM Northern States Section Meeting, Logan, UT (April 2023), Plenary talk entitled *Doubly Degenerate Cahn-Hilliard Models of Surface Diffusion*.
78. ABPDE5 (Asymptotic Behaviors of Systems of PDEs Arising in Physics and Biology, 5th Edition), Lille, France (June 2023), Plenary talk entitled *Doubly Degenerate Cahn-Hilliard Models of Surface Diffusion*.
79. The University of Pittsburgh, Pittsburgh, PA (September 2023). Research talk entitled *Doubly Degenerate Cahn-Hilliard Equation: Asymptotic Analysis and Gamma Convergence*.
80. ORNL/UTK Phase Field Workshop, Oak Ridge National Laboratory, Oak Ridge, TN. (November 2023). Research talk entitled *Non-Isothermal Phase Field Crystal Model with Lattice Expansion*.
81. The University of California, Irvine, CA (December 2023). Research talk entitled *Non-Isothermal Phase Field Crystal Model with Lattice Expansion*.
82. The Ohio State University, Columbus, OH (January 2024). Research talk entitled *Non-Isothermal Phase Field Crystal Model with Lattice Expansion*.
83. SIAM Conference on Mathematics in Materials Science, Pittsburgh, PA (May 2024). Research talk entitled *Non-Isothermal Phase Field Crystal Model with Lattice Expansion*
84. International Workshop on Advancements in Mesoscale Materials Modeling: Cutting-Edge

Formulations, Simulations, and Applications, Technische Universität Dresden, Germany (December 2024). Research talk entitled *Non-Isothermal Phase Field Crystal Model with Lattice Expansion*.

General Audience Presentations

1. Tennessee Governor's School, October 2010. Gave presentation entitled *How to Become a Mathematician, and Maybe What to Do After That*.
2. University of Tennessee Pregame Faculty Showcase, November, 2013. Gave presentation entitled *Simulations for Solutions: Solving Problems Through Scientific Computing*.
3. University of Tennessee Governor's School for the Sciences and Engineering, June, 2016. Gave presentation entitled *Solving Problems with Scientific Computing, or Computing with Floating Point Numbers*.
4. University of Tennessee, High school teacher training event *Let's Get Physical! Teaching Mathematics through the Lens of Physics*, July, 2016. Gave presentation entitled *Modeling Soft Matter Materials*.

Recent Teaching

Math 673, Advanced Numerical PDE I (Multigrid Methods), Fall 2024.

Math 515, Perturbation Theory and Asymptotic Analysis, Spring 2024.

Math 572, Numerical Mathematics II, Spring 2024.

Math 571, Numerical Mathematics I, Fall 2023.

Math 572, Numerical Mathematics II, Spring 2023.

Math 547, Applied Linear Analysis, Spring 2023.

Math 571, Numerical Mathematics I, Fall 2022.

Service

University

Electrical Engineering and Computer Science (EECS) Department External Review Committee, Office of the Provost, UTK, Spring 2019.

College of Arts and Sciences

Connections and Global Challenges Curriculum Committee, UTK, 2016-17, 2017-18, 2018-19.

Department

Advisory Committee, UTK, academic years 2011-12, 2012-13, 2014-15, 2015-16, 2018-19 (elected member), 2019-20.

Assistantship Committee, UTK, academic years 2012-13, 2017-18.

Bylaws Committee, UTK, academic year 2013-14.

Colloquium Committee, UTK, academic years 2007-08, 2008-09 (chair), 2009-10 (chair).

Graduate Committee, UTK, academic years 2007-08, 2008-09, 2009-10, 2010-11 (chair), 2011-12 (chair), 2015-16, 2016-17, 2018-19 (chair, Spring 2019), 2020-21, 2022-23 (chair), 2023-24 (chair), 2024-25 (chair).

High School Math Contest, UTK, timer (2007, 08, 10, 11, 14), judge, (2009, 11, 12, 13, 15).

NIMBioS Mentor, UTK. REU: summers 2009 and 2010; Postdoc: Sharon Bewick, August 2009 - May 2011; GRA Advisor: Tri Sri Noor Asih, August 2013 - May 2014.

M.S. Examination Committees, UTK, Robert Burnham, Summer 2011; Aaron Craig, Fall 2014; Steve Fassino, Summer 2013; Stephen E. Galloway, Spring 2017 (primary advisor); Casey Hufford, Summer 2011; Dragos Ilas, Fall 2013; Kai Kang, Spring 2012 (primary advisor); Manda Saylor, Spring 2010; Jillian Trask, Summer 2014.

Ph.D. Examination Committees, UTK, Andreas Aristotelous, Summer 2011 (co-advisor with O. Karakashian); Yang Bai, Spring 2011 (Computer Science); Kylie Berry, Summer 2019 (co-advisor with T. Mengesha); Holly Clark, Spring 2014; Craig Collins, Summer 2015 (co-advisor with O. Karakashian); Nick Dexter, Summer 2018; Amanda Diegel, Spring 2015 (primary advisor); Khoa Dinh, Summer 2019; Stephen Galloway, Summer 2020 (primary advisor); Kyle Golenbiewski Spring 2016; Zhen Guan, Summer 2012 (primary advisor); Peter Jantsch, Summer 2017; Tim Krumwiede, Fall 2016; Alexandria Lacy, Spring 2023; Cody Lorton, Summer 2014; Hamza Ruzayqat, Spring 2019; Mikhail Sekachev, Summer 2013 (Mechanical Engineering); Tumin Wu, Fall 2024 (Computer Science); Miun Yoon, Fall 2010.

Search Committees, UTK, academic years 2008-09 (JICS), 2011-12 (PDE), 2012-2013 (Computational and Applied Mathematics), 2016-2017 (Math Biology), 2022-23 (Math Biology), 2023-24 (Computational and Applied Mathematics and Actuarial Mathematics).

Tenure and Promotion (T&P) and Promotion (P) Committees, UTK, academic year 2016-17 (A. Salgado, T&P), 2017-18 (T. Mengesha, T&P), 2020-21 (A. Salgado, P), 2021-22 (T. Mengesha, P), 2021-22 (O. Prosper, T&P).

Graduate Student Advising and Mentoring Committee, UTK, 2022-23 (chair), 2023-24 (chair), 2024-25 (chair).

Community

Associate Editor, Discrete and Continuous Dynamical Systems, Series S (DCDS-S), 2014-present.

Associate Editor, Advances in Applied Mathematics and Mechanics (AAMM), 2018 - present.

Associate Editor, Numerical Mathematics: Theory, Methods and Applications (NMTMA), 2017 - present.

Advisory Editor/Communicator, Mathematical Methods in the Applied Sciences (MMAS), 2014-2019.

Journal Reviewer, Acta Materialia, Applied Mathematics and Computation, Applied Numerical Mathematics, Communications in Computational Physics, Communications in Mathematical Sciences, Discrete and Continuous Dynamical Systems B, IMA Journal

of Applied Mathematics, Journal of Computational Physics, Journal of Crystal Growth, Mathematical Biosciences and Engineering, Mathematics of Computation, Physical Review E, Polymer Engineering and Science, SIAM Journal on Numerical Analysis, Science China Mathematics, Thin Solid Films.

Mini Symposium Organizer

Society for Industrial and Applied Mathematics (SIAM) Conference on Mathematical Aspects of Materials Science, May 2010: "The Ubiquitous Nature of Instabilities During Step-Flow Epitaxy."

Society for Industrial and Applied Mathematics (SIAM) Conference on Mathematical Aspects of Materials Science, May 2010: "Mathematical and Computational Advances in Phase Field Crystal Modeling."

International Congress of Industrial and Applied Mathematicians (ICIAM) 2011, July 2011: "Theoretical, Mathematical, and Computational Aspects of Crystal Dynamics."

American Institute of Mathematical Sciences (AIMS), 9th International Conference On Dynamical Systems and Differential Equations, July 2012: "Multiphase Flows in Porous Media and Related Systems."

Society for Industrial and Applied Mathematics (SIAM) Conference on Mathematical Aspects of Materials Science, June 2013: "Phase Field Methods in Materials Science."

American Mathematical Society (AMS), Southeastern Spring Sectional Meeting, March 2014: "Special Session on Scientific Computing, Numerical Analysis, and Mathematical Modeling."

American Institute of Mathematical Sciences (AIMS), 11th International Conference On Dynamical Systems and Differential Equations, July 2016: "Computational Methods for Phase Field Methods."

Society for Industrial and Applied Mathematics (SIAM) Conference on Mathematical Aspects of Materials Science, May 2021: "Bulk and Surface Diffusion in Structured Membranes."

NSF Panel Reviewer, Computing and Communication Foundations, Division of Materials Research, Division of Mathematical Sciences.

Workshop Organizer, National Institute for Mathematical and Biological Synthesis (NIMBioS) Investigative Workshop "Solid Tumor Modeling," Jan. 19-21, 2011.

Steering Committee Member, Southeastern-Atlantic Regional Conference on Differential Equations (SEARCDE), October 2010 - October 2014.

Conference Co-Organizer

Southeastern-Atlantic Regional Conference on Differential Equations (SEARCDE), with S. Lenhart (UTK, lead) and T. Phan (UTK), September 21, 22, 2013, Knoxville, TN.

2017 Barrett Lectures: Mathematical Foundations of Data Sciences, with V. Maroulas (UTK, lead), C. Webster (UTK), J. Rosinski (UTK), May 1, 2, 3, 2017, Knoxville, TN.

2019 SIAM-SEAS Conference, with C. Webster (UTK, Lead), G. Zhang (ORNL),

September 20, 21, 22, 2019, Knoxville, TN.

2024 SIAM-SEAS Conference, with V. Maroulas (UTK, Lead), G. Zhang (ORNL), March 2024, Knoxville, TN.

Graduate Students

Former

Andreas Aristotelous, Math UTK (primary advisor, O. Karakashian), PhD August 2011. Thesis: "Adaptive Discontinuous Galerkin Finite Element Methods for a Diffuse Interface Model of Biological Growth." First position: postdoc at Duke University and SAMSI.

Kylie Berry (co-advisor, Tadele Mengesha), Math UTK, PhD 2019. Topic: "Energy-Based Blending Models in Peri-dynamics." First position: Assistant Professor of Mathematics at Dalton State College, Dalton, GA.

Craig Collins (primary advisor, O. Karakashian), Math UTK, PhD 2015. Thesis: "Domain Decomposition Methods for Discontinuous Galerkin Approximations of Elliptic Problems." First position: Assistant Professor of Mathematics at Murray State University, Murray, KY.

John Cummings (co-advisor, Rajeev Kumar), Math UTK, PhD 2017. Topic: "Simulating Block Polymer-Solvent Mixtures for Organic-Photovoltaic Devices." First position: Visiting assistant professor, Berry College, Rome, GA.

Amanda Diegel, Math UTK, PhD May 2015. Thesis: "Numerical Analysis of Convex Splitting Schemes for Cahn-Hilliard and Coupled Cahn-Hilliard-Fluid-Flow Equations." First position: Postdoctoral researcher in Mathematics at Louisiana State University, Baton Rouge, LA.

Wenqiang Feng Math UTK, PhD 2017. Topic: "Linearly Preconditioned Nonlinear Solvers for Phase Field Equations Involving p-Laplacian Terms." First position: Data scientist, DST Systems Inc, Kansas City, MO.

Stephen Galloway, Math UTK, MS 2017. Project: "Numerical Simulation of Solidification with Strong Interface Anisotropy." Continued in PhD program at UTK.

Stephen Galloway, Math UTK, PhD 2020. Thesis: "Graphene Formation using the PFC Model with a Vapor Phase." First position: Assistant Professor of Mathematics at St. Andrews University, Laurinburg, NC.

Zhen Guan, Math UTK, PhD August 2012. Thesis: "Numerical Analysis of First and Second Order Unconditionally Energy Stable Schemes for Nonlocal Cahn-Hilliard and Allen-Cahn Equations." First position: Visiting Assistant Professor of Mathematics at the University of California, Irvine, CA.

Kai Kang, Math UTK, MS May 2012. Project: "A Second-Order Accurate Energy Stable Scheme for the Cahn-Hilliard-Hele-Shaw System of Equations: Application to Tumor Growth." Went on to complete PhD at UTK, 2017.

Jea-Hyun Park (co-advisor, Abner Salgado), Math UTK, PhD 2021. Thesis: "Preconditioned Nesterov's Accelerated Gradient Descent Method and its Applications for Nonlinear PDE." First position: Visiting Assistant Professor of Mathematics at the

University of California, Santa Barbara, CA.

Current

Charlotte Beckford, Math UTK, PhD 2026 (expected).

Daniel Bond (co-advisor, Cory Hauck), Math UTK, PhD 2027 (expected).

Sam Gruber, Math UTK, PhD 2027 (expected).

Jack Haight (co-advisor, Cory Hauck), Math UTK, PhD 2026 (expected).

Evan Habbershaw (co-advisor, Cory Hauck), Math UTK, PhD 2025 (expected).

Ben Plumridge (primary advisor, Cory Hauck), Math UTK, PhD 2025 (expected).

Suleman Shahid (co-advisor, Abner Salgado), Math UTK, PhD 2027 (expected).

Calvin Wong (primary advisor, Cory Hauck), Math UTK, PhD 2026 (expected).

References

1. **Wenbin Chen,** Professor
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   Shanghai, China
   wbchen@fudan.edu.cn
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   Columbia University
   New York, NY 10027
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3. **John S. Lowengrub,** Chancellor's Professor
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   University of California
   Irvine, CA 92697-3875
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   Technische Universität Dresden
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   Department of Mathematics and Statistics
   Missouri University of Science and Technology
   Rolla, MO 65409-0020
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   Mathematics Department
   University of British Columbia
   Vancouver, BC, Canada V6T 1Z2
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