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**Positions held:**

- 1999-present Professor (fall 2010 – present)  
Associate Professor (fall 03 – spring 2010)  
Assistant Professor (fall 99 – spring 03)  
Department of Mathematics, University of Tennessee
- 1997-1999 Associate Research Scientist  
Courant Institute of Mathematical Sciences, New York University  
Scientific Advisors: Professor Robert V. Kohn and Professor Weinan E
- 1995-1997 NSF-NATO Postdoctoral Research Fellow (1996-1997, awarded 1995)  
Postdoctoral Research Associate (1995-1996)  
Department of Applied Mathematics and Theoretical Physics (DAMTP),  
University of Cambridge  
Scientific Advisor: Dr. M. Grae Worster

**Education:**

- 1991-1995 Ph.D. in Applied Mathematics, Northwestern University  
Thesis Title: *Shear stabilization of morphological instability during directional solidification*  
Thesis Advisor: Professor Stephen H. Davis
- 1987-1991 B.S.E. in Interdisciplinary Engineering, University of Washington, Seattle

**Extended visits to other institutions:**

- Spring 2006 Courant Institute of Mathematical Sciences, NYU  
(on leave) Program in Applied and Computational Mathematics, Princeton  
Industrial Research Limited/Victoria University, Wellington NZ  
Department of Mathematics, University of Michigan, Ann Arbor
- Fall 2005 Institute for Pure and Applied Mathematics (IPAM), UCLA  
(on leave)
- May 2005 Institute for Mathematics and its Applications (IMA), University of Minnesota
- Spring 2002 Program in Applied and Computational Mathematics, Princeton  
(on leave)

**Recent Collaborators:**

Dan Anderson, Mathematics, George Mason University  
Christian Ratsch, Institute for Pure and Applied Mathematics, UCLA  
Weinan E, Program in Applied and Computational Mathematics, Princeton  
Shaun Hendy, Industrial Research Limited/Victoria University, Wellington NZ  
Vivek Shenoy, Brown University, Providence  
Peter Smereka, Mathematics, University of Michigan  
Grae Worster, DAMTP, Cambridge, UK

## Publications:

- N.R. Gewecke and T.P. Schulze, "Solid-Mush Interface Conditions for Mushy Layers," accepted for publication in *Journal of Fluid Mechanics*.
- N.R. Gewecke and T.P. Schulze, "The Rapid Advance and Slow Retreat of a Mushy Zone," *Journal of Fluid Mechanics* **674** (2011) 227-243.
- T.P. Schulze and P. Smereka, "Simulation of Three-Dimensional Strained Heteroepitaxial Growth using Kinetic Monte Carlo," *Communications in Computational Physics* **10** (2011) 1089-1112.
- T.P. Schulze and P. Smereka, "An Energy Localization Principle and its Application to Fast Kinetic Monte Carlo Simulation of Heteroepitaxial Growth," *Journal of the Mechanics and Physics of Solids* **57** (2009) 521-538.
- M. Saum, T.P. Schulze and C. Ratsch, "Inverted List Kinetic Monte Carlo with Rejection Applied to Directed Self-Assembly During Epitaxial Growth," *Communications in Computational Physics* **6** (2009) 553-564.
- M. Saum and T.P. Schulze, "The Role of Processing Speed in Determining Step Patterns during Directional Epitaxy," *Discrete and Continuous Dynamical Systems B* **11** (2009) 443-457.
- T.P. Schulze, "Simulation of Dendritic Growth using Kinetic Monte Carlo," *Physical Review E* **78** (2008) : Art. No. 020601(R) .
- T.P. Schulze, "Efficient Kinetic Monte Carlo Simulation," *Journal of Computational Physics* **227** (2008) 2455-2462.
- P. Zootjens, T.P. Schulze and S. Hendy, "Hybrid Method for Modeling Epitaxial Growth: Kinetic Monte Carlo plus Molecular Dynamics," *Physical Review B* **76** (2007): Art. No. 245418.
- W. Guo, T.P. Schulze, and Weinan E, "Simulation of Impurity Diffusion in a Strained Nanowire Using Off-lattice KMC," *Communications in Computational Physics* **2** (2007) 164-176.
- T.P. Schulze, "Morphological Instability during Directional Epitaxy," *Journal of Crystal Growth* **296** (2006) 188-201.
- D.M. Anderson and T.P. Schulze, "Linear and Nonlinear Convection in Solidifying Ternary Alloys," *Journal of Fluid Mechanics* **545** (2005) 213-243.
- T.P. Schulze and M.G. Worster, "A Time-Dependent Formulation of the Mushy Zone Free Boundary Problem," *Journal of Fluid Mechanics* **541** (2005) 193-202.
- T.P. Schulze, "A Hybrid Method for Simulating Epitaxial Growth," *Journal of Crystal Growth* **263** (2004) 605-615.
- T.P. Schulze, P. Smereka and Weinan E, "Coupling Kinetic Monte-Carlo and Continuum Models with Application to Epitaxial Growth," *Journal of Computational Physics* **189** (2003) 197-211.
- T.P. Schulze, "Kinetic Monte-Carlo with Minimal Searching," *Phys. Rev. E* **65** (2002) Art. No. 036704.
- T.P. Schulze and M.G. Worster, "Mushy Zones with Fully Developed Chimneys," *Interactive Dynamics of Convection and Solidification*, edited by P. Ehrhard Kluwer Academic Publishers (2001) 71-80.
- T.P. Schulze and Weinan E, "A Continuum Model for Epitaxial Growth," *Journal of Crystal Growth* **222** (2001) 414-425.
- T.P. Schulze, "A Note on Subharmonic Instabilities," *Physics of Fluids* **11** no.12 (1999) 3573-3576.

T.P. Schulze and R.V. Kohn, "A Geometric Model for Coarsening During Spiral-Mode Growth of Thin Films," *Physica D* **132** (1999) 520-542.

T.P. Schulze and M.G. Worster, "Weak Convection, Liquid Inclusions and the Formation of Chimneys in Mushy Layers," *Journal of Fluid Mechanics* **388** (1999) 197-215.

T.P. Schulze and M.G. Worster, "A Numerical Investigation of Steady Convection in Mushy Layers During the Directional Solidification of Binary Alloys," *Journal of Fluid Mechanics* **356** (1998) 199-220.

T.P. Schulze and S.H. Davis, "Shear Stabilization of a Solidifying Front: Weakly Nonlinear Analysis in a Long-Wave Limit," *Physics of Fluids* **8** no. 9 (1996) 2319-2336.

S. H. Davis and T.P. Schulze, "Effects of Flow on Morphological Stability During Directional Solidification," *Metallurgical and Materials Trans. A---Physical Metallurgy and Material Science* **27** no. 3 (1996) 583-593.

S.H. Davis and T.P. Schulze, "Shear Stabilization of a Solidifying Front," *Proc. 3rd Microgravity Fluid Physics Conf.* (1996).

M.G. Worster, D.M. Anderson and T.P. Schulze, "Nonlinear Convection in Mushy Layers," *Proc. 3<sup>rd</sup> Microgravity Fluid Physics Conf.* (1996).

T.P. Schulze and S.H. Davis, "Shear Stabilization of Morphological Instability During Directional Solidification," *Journal of Crystal Growth* **149** (1995) 253-265.

T.P. Schulze and S.H. Davis, "The Influence of Oscillatory and Steady Shears on Interfacial Stability During Directional Solidification," *Journal of Crystal Growth* **143** (1994) 317-333.

S.H. Davis and T.P. Schulze, "Shear Stabilization of Solidification Fronts," *Proc. 2nd Microgravity Fluid Physics Conf.* (1994) 181-186.

#### **Volumes edited:**

T.P.Schulze, X. Feng, V. Alexiades and T. Tang, editors, "Multiscale Modeling and Simulation in Materials Science," *Proceedings of the 2007 John H. Barrett Memorial Lectures, Journal of Scientific Computing*, **37**, 2008.

Xiaobing Feng and Tim P. Schulze, editors, "Recent Advances in Numerical Methods for Partial Differential Equations and Applications," *Proceedings of the 2001 John H. Barrett Memorial Lectures, Trends in Computational Mathematics*, May 10-12, 2001, The University of Tennessee.

#### **Grants:**

- 2011 NSF DIVISION OF MATHEMATICAL SCIENCES, Applied Mathematics, recommended. \$217,390 (3 years)  
"Kinetic Monte Carlo Modeling and Simulation of Phase Boundaries and Polycrystals"
- 2009 UTK/ORNL Joint Institute for Advanced Materials (JIAM) Seed Project Proposal, with Z. Zhang (Physics), J. Shen (Physics) and W. Zhu (Physics), \$35,000  
"Development of Dynamic -Zone Monte Carlo (DZ-KMC) Simulations for Predictive Modeling of Interface Evolution During Nonequilibrium Growth"
- 2009 NSF DIVISION OF MATHEMATICAL SCIENCES, with P. Smereka (Michigan) and V. Shenoy (Brown), Applied Mathematics, \$1,006,764 (3 years)  
"FRG: Modeling and Computation of Crystalline Nanostructures"
- 2007 NSF DIVISION OF MATHEMATICAL SCIENCES, Applied Mathematics, \$126,068 (3 years)  
"Fast Kinetic Monte Carlo Simulation of Crystal Growth and Evolution"
- 2007 NSF Conference Proposal with Alexiades and Feng, Computational Mathematics, \$15,000  
"Conference proposal: Multi-Scale Modeling and Simulation in Materials Science "

- 2004 NSF DIVISION OF MATHEMATICAL SCIENCES, Applied Mathematics, \$115,352 (3 years)  
"The mushy-zone free-boundary problem"
- 2003 DEPARTMENT OF ENERGY, \$400,000 (5 years)  
"Integrated multiscale modeling of molecular computing devices"
- 2001 NSF DIVISION OF MATHEMATICAL SCIENCES, Applied Mathematics, \$76,000 (3 years)  
"Modeling, simulation and analysis of epitaxial film growth"

**Post docs:**

Weidong Guo (spring 04 – spring 05); Mike Saum (fall 06 – spring 08), Henry Boateng (fall 2010-)

**Current PhD students:**

Holly Clark ; Nick Gewecke ; Wei Chen (Physics, joint with Zhenyu Zhang)

**Current Honors Thesis students:**

Yiyang Sun

**Recent presentations:**

- 7/11 7th International Congress on Industrial and Applied Mathematics, Vancouver, Canada (mini-symposium)
- 6/11 Coarse-Graining of Many-Body Systems: Analysis, Computations and Applications, Heraklion Crete, Greece  
Invited Talk: *Simulation of three-dimensional strained heteroepitaxial growth using kinetic Monte Carlo*
- 3/11 Junior Colloquium, University of Tennessee
- 1/11 Multiscale Simulation of Heterogeneous Materials & Coupling of Thermodynamic Models, Leuven, Belgium  
Invited Talk: *Kinetic Monte Carlo simulation of heterostructured nanocrystalline growth*
- 7/10 9th World Congress on Computational Mechanics, Sydney (minisymposium)
- 5/10 SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia (minisymposium)
- 3/10 AMS Spring Southeastern Sectional Meeting, Lexington, KY
- 11/09 6th Annual Clusters and Nanoparticles Meeting, Lake Tekapo, New Zealand  
Invited Talk: *Kinetic Monte Carlo Simulation of Quantum Dots*
- 10/09 Dept. of Chemical and Biomolecular Engineering Graduate Seminar, UTK
- 10/09 2nd US-China Workshop on Nanostructured Materials for Global Energy & Environmental Challenges  
Changzhou, China
- 8/09 The 17th American Conference on Crystal Growth and Epitaxy, Lake Geneva, WI  
Invited talk: *Using Kinetic Monte Carlo to Simulate Dendritic Growth*
- 5/09 Eurotherm Seminar 84: Thermodynamics of Phase Change, Namur, Belgium.
- 7/08 Applied Mathematics Colloquium, Northwestern University
- 7/08 8th World Congress on Computational Mechanics, Venice
- 6/08 Bridging Time & Length Scales in Materials Science & Bio-Physics Reunion Conf., IPAM  
Invited talk: *Simulation of Dendritic Growth using Kinetic Monte Carlo*
- 5/08 SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia
- 3/08 Applied Mathematics & Computation Seminar, University of Massachusetts, Amherst
- 12/07 Mathematical & Computational Nanoscience Workshop, Victoria Univ., Wellington, New Zealand  
Invited Talk: *Extending the Capabilities of Kinetic Monte Carlo*
- 11/07 AMS Regional Meeting, Middle Tennessee State University, Murfreesboro, TN.
- 7/07 6th International Congress on Industrial & Applied Mathematics, Zurich (minisymposium)
- 6/07 Bridging Time & Length Scales in Materials Science & Bio-Physics Reunion Conf., IPAM  
Invited talk: *Efficient Kinetic Monte Carlo*
- 11/06 Differential Equations and Computational Math Seminar, University of Tennessee
- 11/06 Junior Colloquium, University of Tennessee
- 10/06 Meeting on Kinetic Monte Carlo and Micro Fluidics, Princeton  
Invited talk: *KMC with  $O(1)$  Event Selection*
- 05/06 Applied Mathematics Seminar, Courant Institute, New York University
- 04/06 Mechanical and Aerospace Engineering Seminar, Princeton
- 04/06 Applied Math Colloquium, New Jersey Institute of Technology

- 02/06 Nanotechnology Seminar, Industrial Research Limited, Wellington, New Zealand
- 01/06 Applied and Interdisciplinary Mathematics Seminar, University of Michigan
- 11/05 IPAM Multiscale Analysis and Computation Workshop, IPAM, University of California, Los Angeles  
Invited talk: *Kinetic Monte Carlo: Building a Bridge to Larger Length Scales*
- 10/05 IPAM Applicable Mathematics Seminar, IPAM, University of California, Los Angeles
- 5/05 Materials Science Seminar, IMA, University of Minnesota
- 11/04 Workshop on Nanoscale Material Interfaces: Experiment, Theory & Simulation, Nat. Univ of Singapore  
Invited talk: *Off-Lattice Kinetic Monte Carlo Simulation*
- 5/04 SIAM Meeting on Material Science, Los Angeles (minisymposium)
- 5/04 Applied Math & Computational Science Seminar, NIST, Gaithersburg, Maryland
- 10/03 Bio-math Seminar, Vanderbilt University
- 9/03 Applied Mathematics Colloquium, Northwestern University
- 8/03 Workshop on Continuum Models for Epitaxial Growth, CEASAR research institute , Bonn  
Invited talk: *Coupling Kinetic Monte Carlo and Continuum Models with Applications to Epitaxial Growth*
- 7/03 5th International Congress on Industrial & Applied Mathematics, Sydney (minisymposium)
- 5/03 SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah (minisymposium)
- 3/03 Materials Science and Engineering Seminar, University of Tennessee
- 11/02 Mathematics Seminar, University of Tennessee
- 5/02 Fronts, Fluctuations and Growth Conference, University of Michigan  
Invited talk: *Simulating Epitaxial Growth*
- 2/02 Applied Mathematics Seminar, Courant Institute, New York University

**Miscellaneous, recent service activities:**

- 2011 Co-chair of organizing committee for IPAM long program “Materials Defects: Mathematics, Computation, and Engineering”
- 2010 Co-organized mini-symposium at 2010 SIAM meeting in Philadelphia
- 2009 2nd US-China Workshop on Nanostructured Materials for Global Energy and Environmental Challenges, NSF sponsored workshop in Suzhou, October 17-18, 2009.
- 2009 Co-organizing mini-symposium at 2010 SIAM materials meeting in Philadelphia
- 2008 Supervised Fulbright New Zealand student Dmitri Schebarchov
- 2007-2008 Coedited 2007 Barrett Lectures proceedings
- 2009, 2007, 2005, 2003 Served on NSF review panels
- 2007 co-organized (with S Hendy) nanotechnology meeting in Wellington, NZ for Dec 2007
- 2007 Co-organized mini-symposium at 2007 ICIAM meeting in Zurich
- 2007 Barrett Lectures (conference held at UT, Knoxville) organizing committee chair
- 2006 Joined editorial board of *Discrete and Continuous Dynamical Systems B*
- Review of 5-10 manuscripts per year for various journals (e.g. *Journal of Fluid Mechanics*, *Journal of Computational Physics*, *Journal of Crystal Growth*, ...)