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Positions held:

- 1999-present Associate Professor (fall 03 – present)
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
Weinan E, Program in Applied and Computational Mathematics, Princeton
Shaun Hendy, Industrial Research Limited/Victoria University, Wellington NZ
Peter Smereka, Mathematics, University of Michigan
Grae Worster, DAMTP, Cambridge, UK

Publications:

T.P. Schulze and P. Smereka, "An Energy Localization Principle and its Application to Fast Kinetic Monte Carlo Simulation of Heteroepitaxial Growth," submitted to *Journal of the Mechanics and Physics of Solids*.

T.P. Schulze, "Simulation of Dendritic Growth using Kinetic Monte Carlo," *Physical Review E* **78** (2008) : Art. No. 020601(R) .

M. Saum, T.P. Schulze and C. Ratsch, "Kinetic Monte Carlo Simulation of Directed Self-Assembly During Epitaxial Growth," submitted to *Communications in Computational Physics*.

M. Saum and T.P. Schulze, "The Role of Processing Speed in Determining Step Patterns during Directional Epitaxy," submitted to *Discrete and Continuous Dynamical Systems B*.

T.P. Schulze, "Efficient Kinetic Monte Carlo Simulation," *Journal of Computational Physics* **227** (2008) 2455-2462.

P. Zoontjens, 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. 3rd 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:

- 2008 SUBMITTED: NSF DIVISION OF MATHEMATICAL SCIENCES with P. Smereka (Michigan) and V. Shenoy (Brown), Applied Mathematics, \$1,006,764 (3 years)
"FRG: Collaborative Research: 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)

Current PhD students:

Holly Clark
Nick Gewecke

Recent presentations:

- 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
- 1/02 SIAM Minisymposium on Modeling and Simulation for Thin Films, San Diego
- 8/01 13th American Conference on Crystal Growth and Epitaxy, Burlington, Vermont
Invited talk: *Modeling and Simulation of Epitaxial Film Growth*
- 6/01 Steve Davis, G.I. Taylor SES Medallist Symposium, San Diego

Miscellaneous, recent service activities:

2007-2008 Coedited Barrett Lectures proceedings as a special issue of the *J. of Scientific Computing*

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*