

Jason M Larkin
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Pittsburgh, PA 15236

EDUCATION

Carnegie Mellon University, Pittsburgh, PA

Ph.D. Mechanical Engineering GPA: 3.9

2009-2013

Thesis: Thermal Modeling of Disordered Materials

Advisor: Alan J.H. McGaughey

Coursework: molecular and electron structure simulation, nanoscale transport phenomena.

University of Pittsburgh, Pittsburgh, PA

M.S. Mechanical Engineering GPA: 3.7

2007-2009

Thesis: Statistics of Particle Concentrations in Free-Surface Turbulence

Advisor: Walter I. Goldburg

Coursework: quantum and statistical physics, chaos and nonlinear phenomena.

B.S. Mechanical Engineering GPA: 3.2

2007-2009

Research: finite element analysis of novel flow chamber to study development of aneurysms.

EXPERIENCE

Carnegie Mellon University

Teaching Assistant - 24-322: Heat Transfer

2010-2012

- Topics in conduction, convection, and radiation. Supervised recitations and substituted for lectures.

University of Pittsburgh

Teaching Assistant - Advanced Fluid Mechanics

2008

- Topics in fluid mechanics including viscous flow, boundary layer theory, and scale similarity.

Lecturer - Physics

2007-2009

- Lectured to undergraduate students, graduate students, and faculty on mathematics, turbulence, bio-physics, statistical physics, and nonlinear phenomena.

Precision Therapeutics

Intern - Technology Development

2006-2007

- Worked with a team of software developers, information technology specialists, and laboratory equipment specialists.

- Used computer-aided drafting and design (**CADD**) to design components of optical microscopes and their automation controls.

- Assisted in fabrication of microscope components and laboratory equipment.

SKILLS

Computing Languages: Matlab, Python, Latex, Shell, Fortran, C/C++, Java, Perl, Markdown, HTML

High-Performance Computing: linux/unix cluster administration/computing, parallel computation (MPI, OpenMP), mixed-language development, open-source development

General Computing: linux/unix, Windows, Microsoft Office, Mac OS

Modeling: atomistic/molecular simulation, quantum chemistry, nanoscale transport, statistical and non-linear systems, turbulent flow

Hardware: general computing hardware, linear optics, visible lasers, DI/DO AI/AO interfaces, simple automation, high-speed video capture, simple machining, simple circuitry

PROJECTS

Quantum Mechanics-Driven Prediction of Nanostructure Thermal Conductivity

2011-2013

- Served as an investigator for this project under the Air Force Office of Scientific Research (**AFOSR**) with collaborators at Carnegie Mellon and the University of Pittsburgh, performing calculations on the Department of Defense's (**DOD's**) High Performance Computing (**HPC**) system as part of the High Performance Computing Modernization Program (**HPCMP**).

ntpy

2012-Present

- Created this open-source, collaborative effort between members of the Nanoscale Transport Phenomena Laboratory (**NTPL**) and the University of Toronto hosted on Github.

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- Used the code to perform nanoscale transport modeling for the project **disorder** and others.

disorder

2012-2013

- A comprehensive repository of code and data from my PhD thesis, hosted on Github.

GULP: General Utility Lattice Program

2012-2013

- Worked with Julian D. Gale at the Nanochemistry Research Institute at Curtin University, Perth Australia to contribute several subroutines for predicting thermal transport properties.
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PUBLICATIONS

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- **J.M. Larkin**, A.J.H. McGaughey, "Origin of the Exceptionally Low Thermal Conductivity of Fullerene Derivative PCBM Films", *Phys. Rev. B* (in progress).
 - **J.M. Larkin**, A.J.H. McGaughey, "Vibrational Mean Free Paths in Amorphous Systems", *Phys. Rev. B* (in progress).
 - S.C. Huberman, **J.M. Larkin**, A.J.H. McGaughey, C.H. Amon, "Disruption of Superlattice Phonons by Interfacial Mixing", *Phys. Rev. B* (submitted).
 - A.J.H. McGaughey and **J.M. Larkin**, "Predicting Phonon Properties from Equilibrium Molecular Dynamics Simulations", *Advances in Heat Transfer* Volume 17 (Academic Press, 2013).
 - **J.M. Larkin**, A.J.H. McGaughey, "Predicting Alloy Vibrational Mode Properties using Lattice Dynamics Calculations, Molecular Dynamics Simulations, and the Virtual Crystal Approximation", *J. of App. Phys.* (in press).
 - **J. M. Larkin**, A.D. Massicotte, J.E. Turney, C.H. Amon, A.J.H. McGaughey, "Comparison and Evaluation of Spectral Energy Methods for Predicting Phonon Properties", to appear in *J. Comp. and Theo. Nano.*
 - S. Stefanus, **J. Larkin**, W. Goldburg, "A Search for Conformal Invariance in Compressible Two Dimensional Turbulence", *Phys. Fluids* **23** (2011) 105101 (appeared on cover).
 - **J. Larkin**, W. Goldburg, M.M. Bandi, "Time-Evolution of a fractal distribution: Particle concentrations in free-surface turbulence", *Physica D* **239** 14 (2010) 1264-1268.
 - **J. Larkin**, W. Goldburg, "Decorrelating a Compressible Turbulent Flow: an Experiment", *Phys. Rev. E* **82**, 016301 (2010).
 - **J. Larkin**, M.M. Bandi, A. Pumir, W. Goldburg, "Power-law distributions of particle concentration in free-surface flows", *Phys. Rev. E* **80**, 066301 (2009).
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PRESENTATIONS (15 TOTAL)

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- "Evaluation of the Virtual Crystal Approximation for Predicting Thermal Conductivity", **J.M. Larkin (speaker)**, A.J.H. McGaughey, presented at 2013 MRS Spring Meeting San Francisco, CA.
 - "Ordered and Disordered Contributions to Lattice Thermal Conductivity", **J.M. Larkin (speaker)**, A.J.H. McGaughey, presented at 2012 PHONONS Conference Ann Arbor, MI.
 - "Comparison of Spectral Energy Methods for Predicting Phonon Properties", **J.M. Larkin**, A.D. Massicotte, J.E. Turney, C.H. Amon, A.J.H. McGaughey (speaker), presented at 2012 ASME Micro/Nanoscale Heat & Mass Transfer International Conference Atlanta, GA (top 5 technical paper).
 - "Predicting Thermal Conductivity of Defected Systems using the Spectral Energy Density", **J. Larkin (speaker)**, A.J.H. McGaughey, 2011 MRS Fall Meeting Boston, MA.
 - "Predicting Thermal Conductivity of Defected Systems using the Spectral Energy Density", **J. Larkin (speaker)** 2011 Bennett Presentation (Award for Best Presentation).
 - "Statistics of Preferential Particle Concentration in Free-Surface Turbulence", **J. Larkin (speaker)**, M.M. Bandi, W. Goldburg, 2009 American Physical Society March Meeting Pittsburgh, PA.
 - "Turbulent Dynamics of a Hydraulic Jump in two dimensions: Soap Film Flow" **J. Larkin (speaker)**, W. Goldburg, T. Tran, P. Chakraborty, G. Goia, 2008 Meeting of the APS Division of Fluid Dynamics San Antonio, TX.
 - "The Generalized Fractal Dimensions of a 2-D Compressible Turbulence", **J. Larkin (speaker)**, M.M. Bandi, W. Goldburg, 2008 American Physical Society March Meeting New Orleans, LA.
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AWARDS

Northrop-Grumman Fellow, Carnegie Institute for Complex Engineered Systems (ICES)

2011

NSF Graduate Student Research Grant, University of Pittsburgh Dept. of Physics

2007-2009

MEMBERSHIPS

American Physical Society, American Society of Mechanical Engineers, Materials Research Society, Society of Industrial and Applied Mathematics, DOD High Performance Computing Modernization Program.
