

## Jason M Larkin

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4763 Sherwood Dr  
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### EDUCATION

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#### **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.

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### EXPERIENCE

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#### **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.

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### 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

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### PROJECTS

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#### **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

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- Northrop-Grumman Fellow, Carnegie Institute for Complex Engineered Systems (ICES) **2011**
  - NSF Graduate Student Research Grant, University of Pittsburgh Dept. of Physics **2007-2009**
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#### MEMBERSHIPS

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