

CAROLINE S. GORHAM, EIT

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Education

Carnegie Mellon University **Pittsburgh, PA**

Ph.D. Candidate, Materials Science and Engineering (D. E. Laughlin) May 2015 – Present

Thesis Work: “The liquid to structural glass transition: a discussion of relevant phenomena”

Carnegie Mellon University, (GPA 3.8/4.0, 8 engineering courses) **Pittsburgh, PA**

M.S., Materials Science (D. E. Laughlin) Jan 2017

Thesis Work: “Thermal properties of dielectric materials”

Carnegie Mellon University, (GPA 4.0/4.0, 4 engineering courses) **Pittsburgh, PA**

M.S., Mechanical Engineering (A. J. H. McGaughey) May 2015

Thesis Work: “Thermal properties of buckminsterfullerene molecular solids at and above room temperature”

University of Virginia, (GPA 3.9/4.0, 9 engineering courses) **Charlottesville, VA**

Ph.D. Candidate, Mechanical Engineering (P. E. Hopkins) 04/12 – 12/13

King’s College London, (GPA 3.9/4.0, 24 engineering courses) **London, UK**

BEng Mechanical Engineering – 1st Classification Honors 2007 – 2010

Thesis Work: “Optimal polymerization of silica nanoparticles minimizing size and size dispersion”

Awards and Honors

NASA Space Technology Research Fellowship 2013 – 2017

NSF Graduate Research Fellowship, Honorable Mention 2013

Professional and Research Experience

National Renewable Energy Laboratory: Computational Division **Golden, CO** Summer 2015

- Characterize structural relaxations and electronic transport in polymers for improved photovoltaic material

NASA Glenn: Photovoltaic and Power Technologies Division **Cleveland, OH** Summer 2014

- Interrogated mode-level vibrational properties of bulk C60 for improved photovoltaic material

Raytheon Company (IIS): System Engineer and Integrator **Aurora, CO** 2010 – 2011

- Integrated three system level components for the net-centric ground control system for GPS OCX
- Developed test procedures to ensure high-value functionality of the ground control system

LBNL: DOE Science Internship: Superconducting Magnet Group **Berkeley, CA** Summer 2010

- Conducted experiments, at 77 K and with a high-intensity applied magnetic field, to characterize current entrance length in superconducting wires to ultimately minimize material usage in high-throughput studies
- Co-authored the paper “Novel methods for the measurement of critical current of superconducting wires,” AIP Conference Proceedings, vol. 1435, pp. 209-216, 2012.

NASA Langley: Mechanical Systems Engineering Internship **Hampton, VA** Summer 2008

- Fabricated and tested a minimal risk method for finding the moment of inertia of the Orion crew module
- Presented the project to executives at NASA headquarters in Washington D.C., in a National broadcast

Skills

- Computational management: linux, PBS-job-queuing, github, vi, LaTeX
 - Programming: MATLAB, python, FORTRAN, bash
 - Simulations: LAMMPS (molecular dynamics), GULP (harmonic lattice dynamics)
 - Advanced level MATLAB modeling and GUI development
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Selected Publications

4. R. Cheaito and **C. S. Gorham**, A. Misra, K. Hattar and P. E. Hopkins, "Thermal conductivity measurements via time-domain thermoreflectance for the characterization of radiation induced damage," *Journal of Materials Research*, 30, 1403-1412, 10.1557/jmr.2015.11, 2015.
3. **C. S. Gorham**, K. Hattar, R. Cheaito, J. C. Duda, J. T. Gaskins, T. E. Beechem, J. F. Ihlefeld, L. B. Biedermann, E. S. Piekos, D. L. Medlin and P. E. Hopkins, "Ion irradiation of the native oxide/silicon surface increases the thermal boundary conductance across aluminum/silicon interfaces," *Physical Review B*, 90, 024301, 2014.
2. **C. S. Gorham**, J. T. Gaskins, G. N. Parsons, M. D. Losego and P. E. Hopkins, "Density dependence of the room temperature thermal conductivity of atomic layer deposition-grown amorphous alumina (Al_2O_3)," *Applied Physics Letters*, 104, 253107, 2014.
1. B. M. Foley, **C. S. Gorham**, J. C. Duda, R. Cheaito, C. J. Szwejkowski, C. Constantin, B. Kaehr, and P. E. Hopkins, "Thermal conductivity of water insoluble protein films: anharmonic interactions of vibrations in a fractal structure," *Journal of Physical Chemistry Letters*, 5(7), pp. 1077-1082, 2014.

Technical and Poster (T/P) Presentations

- 2T. **C. S. Gorham**, "Energy density and thermal diffusivity of Ioffe-Regel confined vibrations," *Materials Research Society*, 03 December 2015, Boston, MA.
- 1T. **C.S. Gorham** and A. J. H. McGaughey, "Thermal transport in buckminsterfullerene molecular solids at and above room temperature," *American Physical Society*, 05 March 2015, San Antonio, TX.
- 4P. **C.S. Gorham** and D. E. Laughlin, "Optimizing materials for energy harvesting on interplanetary return missions: What makes glass interesting." *Carnegie Mellon Univ., Materials Science and Engineering Symposium*, 18 March 2016, Pittsburgh, PA.
- 3P. **C.S. Gorham** and A. J. H. McGaughey, "Thermal transport in buckminsterfullerene molecular solids at and above room temperature," *Carnegie Mellon Univ., Bennett Conference*, 22 March 2015, Pittsburgh, PA.
- 2P. **C.S. Gorham**, B.M. Foley, J.C. Duda, et al., "Thermal conductivity of water insoluble protein films: anharmonic coupling in a fractal structure," *American Society of Mechanical Engineers -IMECE*, 19 November 2013, San Diego, CA.
- 1P. **C.S. Gorham**, K. Hattar, R. Cheaito, et al., "Effects of surface treatments on thermal boundary conductance across Al/Si interfaces," *Materials Research Society*, 03 April 2013, San Francisco, CA.

Professional Associations

NSPE, SWE, MRS, APS, ACS and ASME.

Other Education

Central St. Martin's College of Art and Design

Developing Your Creativity

London, UK

Winter 2009

Stanford Graduate School of Business

Summer Institute for General Management

Stanford, CA

Summer 2009

References can be made available upon request.