

CAROLINE S. GORHAM, PH.D.

caroling@alumni.cmu.edu ~ topologylab.com

Higher Education

Carnegie Mellon University **Pittsburgh, PA**

Ph.D., Materials Science and Engineering August 2018

Thesis Work: “On the formation of crystalline and non-crystalline solid states and their thermal transport properties: A topological perspective via a quaternion orientational order parameter”

Supervised by: David E. Laughlin

Carnegie Mellon University **Pittsburgh, PA**

M.Sc., Materials Science and Engineering January 2017

Supervised by: David E. Laughlin

Carnegie Mellon University **Pittsburgh, PA**

M.Sc., Mechanical Engineering May 2015

Supervised by: Alan J. H. McGaughey

King’s College London **London, UK**

BEng Mechanical Engineering – 1st Classification Honors 2007 – 2010

Awards and Honors

NASA Space Technology Research Fellowship 2013 – 2017

NSF Graduate Research Fellowship, Honorable Mention 2013

Certifications

Engineer in Training, FE Mechanical 2011

Professional Experience

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

Skills

- Programming: python, MATLAB modeling

Selected Publications

1. **C. S. Gorham** and D. E. Laughlin, “SU(2) orientational ordering in restricted dimensions: Evidence for a Berezinskii-Kosterlitz-Thouless transition of topological point defects in four dimensions,” J. Phys. Comm., 2,7, 2018. DOI: <https://doi.org/10.1088/2399-6528/aace2a>
2. 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, 2015. DOI: <https://doi.org/10.1557/jmr.2015.11>
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,” PRB, 90, 024301, 2014. DOI: <https://doi.org/10.1103/PhysRevB.90.024301>

4. **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. DOI: <https://doi.org/10.1063/1.4885415>
5. B. M. Foley, **C. S. Gorham**, J. C. Duda, R. Cheaito, C. J. Szwejkowski, C. Constantin, B. Kaehr, and P. E. Hopkins, "Protein thermal conductivity measured in the solid state reveals anharmonic interactions of vibrations in a fractal structure," J. Phys. Chem. Lett., 5(7), pp. 1077-1082, 2014. DOI: <https://doi.org/10.1021/jz500174x>

Technical Presentations

1. **C. S. Gorham**, "Energy density and thermal diffusivity of Ioffe-Regel confined vibrations," Materials Research Society, 03 December 2015, Boston, MA.
2. **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.

Poster Presentations

1. **C.S. Gorham** and D. E. Laughlin, "Optimizing materials for energy harvesting on interplanetary return missions: What makes glass interesting," Carnegie Mellon Univ., 18 March 2016, Pittsburgh, PA.
2. **C.S. Gorham** and A. J. H. McGaughey, "Thermal transport in buckminsterfullerene molecular solids at and above room temperature," Carnegie Mellon Univ., 22 March 2015, Pittsburgh, PA.
3. **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.
4. **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.