# Corinne L. Carpenter, Ph.D.

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## EDUCATION

**Ph.D., Chemical Engineering** June 2017
University of California, Santa Barbara

**B.S, Chemical Engineering** May 2013
University of Massachusetts, Amherst *Honors:* Cum Laude
*Minor:* Applied Mathematics

## PUBLICATIONS

1. Carpenter, C. L., Nicaise, S., Theofanis, P. L., Shykind, D., Berggren, K. K., Delaney, K. T., Fredrickson, G. H., "Orientational preference in multilayer block copolymer nanomeshes with respect to layer-to-layer commensurability," Macromolecules 50, 20 (2017).

2. Farmer, T. C., Carpenter, C. L., Doherty, M. F., "Polymorph selection by continuous crystallization." AIChE Journal 62, 9 (2016).

3. Carpenter, C. L., Delaney, K. T., Fredrickson, G. H., "Suppression of thermal fluctuation placement errors in linear arrays of block copolymer cylinders." Proceedings of SPIE 10146 (2017).

4. Carpenter, C. L., Delaney, K. T., Fredrickson, G. H., "Directed self-assembly of diblock copolymers in multi-VIA configurations: effect of chemopatterned substrates on defectivity." Proceedings of SPIE 9779 (2016). **2016 Hiroshi Ito Memorial Award for the Best Student Paper**

5. Carpenter, C. L., Delaney, K. T., Laachi, N., Fredrickson, G. H., "Directed self-assembly of diblock copolymers in cylindrical confinement: effect of underfilling and air-polymer interactions on configurations." Proceedings of SPIE 9423 (2015).

6. Carpenter, C. L., Christmann, A. M., Hu, L., Fampiou, I., Muniz, A.R., Ramasubramaniam, A., and Maroudas, D.M., "Elastic properties of graphene nanomeshes." Applied Physics Letters 104, 141911 (2014).

7. Carpenter, C. L., Ramasubramaniam, A., Maroudas, D., "Mechanical properties of irradiated single-layer graphene." Applied Physics Letters 103, 013102 (2013).

8. Carpenter, C. L., Ramasubramaniam, A., Maroudas, D., "Analysis of vacancy-induced amorphization of single-layer graphene." Applied Physics Letters 100, 203105 (2012).

## ANALYTICAL SKILLS

**Simulation:** Self-consistent field theory, molecular dynamics, Monte Carlo
**Software:** MATLAB, LAMMPS, Microsoft Excel, Powerpoint, gnuplot, Ovito
**Languages:** C++, Python, LaTeX, Bash

## PROFESSIONAL EXPERIENCE

**Postdoctoral Associate** Aug. 2018-Present
Massachusetts Institute of Technology Cambridge, MA

- Determine crystallization kinetics of polymeric systems in the presence of nucleating agents using LAMMPS
- Develop new optimization techniques for application to highly stochastic, computationally extensive, high-dimensional systems
- Enable design and discovery of additives for controlling polymer morphology and performance through crystallization kinetics

**Engineering Consultant** June 2018-Aug. 2018
Independent Consultant Boston, MA

- Provided engineering advice and expertise to industrial steelmaking company in order to guide decision-making

- Designed and implemented model for evaluating and optimizing processing conditions to create desired product steel efficiently and cost-effectively
- Re-engineered C++ code of plant operation software for determining process input requirements under real-world, real-time conditions, including optimization based on fuel minimization and cost reduction

**Graduate Research Scientist** Sept. 2013-Aug. 2017
University of California, Santa Barbara Santa Barbara, CA

- Generated independent computational research that guided industrial research efforts through a 3+ year collaboration with Intel Corporation
- Analyzed large, complex data sets using C++, Python, and MATLAB to produce unbiased results and informative visualizations
- Presented technical research to both industry-specific (SPIE Advanced Lithography 2015 and 2016) and general audiences (APS March Meeting 2016)
- Developed new simulation and analysis tools and create added functionality for research group and collaborators

**Summer Graduate Research Intern** Jun. 2015-Sept. 2015
Intel Corporation Hillsboro, OR

- Worked on nondisclosure work to perform computational analysis and develop rigorous morphological theory
- Coordinated with both theoretical and experimental groups to inform simultaneous research projects
- Synthesized independent research in a collaborative industrial setting

**Undergraduate Research Scientist** Jun. 2011-Sept. 2013
University of Massachusetts, Amherst Amherst, MA

- Performed independent, self-guided research using molecular dynamics simulations in LAMMPS and analysis scripts in C++ to study the crystal structure and mechanical properties of defected graphene
- Generated three first-author peer-reviewed articles in Applied Physics Letters
- Presented results at research-level conference to general engineering audience (2012 AIChE Annual Meeting)

## LEADERSHIP EXPERIENCE

**Graduate Student Association** Mar. 2016-Jun. 2017
Departmental Representative for Chemical Engineering

- Represent departmental interests at the university-wide level
- Promote increased representation from the College of Engineering

**Chemical Engineering Graduate Student Symposium** May 2016-Sept. 2016
Co-Chair

- Led committee to promote graduate students to visitors from industry and national labs
- Organized team of graduate students and coordinated with department staff

**Graduate Recruitment** Jan. 2016-Mar. 2016
Co-organizer

- Planned recruitment weekends for prospective graduate students visiting from universities across the country
- Facilitated information sessions, tours, and meetings to ensure satisfactory answers to all visitors' questions