

Cody Bezik

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Education

- 2015–present **PhD, Molecular Engineering**, *University of Chicago*, Chicago, IL.
advisor: Professor Juan de Pablo
gpa: 3.964/4.0
expected graduation: Fall 2020
- 2011–2015 **MS, Chemical Engineering**, *Case Western Reserve University*, Cleveland, OH.
advisor: Professor Ica Manas-Zloczower, Professor Donald Feke
gpa: 3.84/4.0
- 2011–2015 **BS, Chemical Engineering**, *Case Western Reserve University*, Cleveland, OH.
gpa: 3.80/4.0
honors: Magna Cum Laude

Experience

- 2015–present **Graduate Research Assistant**, *University of Chicago*, Chicago, IL.
• Utilized coarse-grained dynamics simulations to study fluctuation-stabilized block copolymer networks for use as thermoplastic elastomers. • Performed computational research focused on the directed self-assembly of block copolymers, especially in geometries and confinements relevant to semiconductor device fabrication. • Collaborated on development of a coarse-grained model implemented in a Monte Carlo simulator to study the assembly process in cylindrical geometries (the hole-shrink process) as well as for lamellae in thin film. • Implemented advanced free energy calculations to further understand these systems. • Collaborated on the development of the Software Suite for Advanced General Ensemble Simulations (SSAGES), an open source software package written in C++ designed to provide easy access to free energy calculations for research purposes.
- 2017–2018 **Teaching Assistant and Co-Instructor**, *University of Chicago*, Chicago, IL.
• Was a teaching assistant for an undergraduate and graduate course, both titled “Thermodynamics and Statistical Mechanics” in 2017, and a co-instructor for the 2018 undergraduate course of the same name. • Held weekly review sessions and office hours. • Gave lectures while the instructors are out of town. • Wrote and graded assignments. • Proctored and graded exams.
- 2016–present **Webmaster**, *MICCoM Codes*, Madison, WI.
• Developed a website (<http://www.miccomcodes.org>) using HTML and CSS to design a simple portal to access codes developed by the MICCoM research center.
- fall 2016 **Visiting Scholar**, *KU Leuven*, Leuven, Belgium.
• Worked closely with experimental researchers at KU Leuven and imec, as well as industry partners at Mentor Graphics, to design simulations of block copolymer self assembly to test hypotheses about experimentally observed assembly behavior.

- 2012–2015 **Research Assistant**, *Case Western Reserve University*, Cleveland, OH.
- Experimentally studied structure-property relationships in poly-(high internal phase emulsion) foam based systems.
 - Analyzed the effect that composition of the emulsion precursor had on resulting foam properties.
 - Collaborated on developing a patented method for production of poly-(HIPE) fibers with other researchers at CWRU and industrial partners at Procter & Gamble.
- fall 2014 **Teaching Assistant**, *Case Western Reserve University*, Cleveland, OH.
- Was a teaching assistant for an undergraduate laboratory course, titled “ Introduction to Chemical Engineering at Case”.
 - Supervised laboratory activities.
 - Graded assignments.
- spring 2012 **Research Assistant**, *Case Western Reserve University*, Cleveland, OH.
- Analyzed the thermal behavior of methylcellulose in aqueous solution, particularly focusing on quantifying the growth rate of solidifying material around a heated wire using a high-speed camera.

Publications

- in preparation **Bezik, C.**, Ramirez-Hernandez A., & de Pablo, J. Three-dimensional particle-based simulations of fluctuation-stabilized copolymer mesophases.
- in review **Bezik, C.**, & de Pablo, J. Formation, Stability, and Annihilation of the Stitched Morphology in Block Copolymer Thin Films.
- published Dolejsi, M., Moni, P., **Bezik, C. T.**, Zhou, C., de Pablo, J. J., Gleason, K. K., & Nealey, P. F. (2019). Ultrathin initiated chemical vapor deposition polymer interfacial energy control for directed self-assembly hole-shrink applications. *Journal of Vacuum Science & Technology B*, 37(6), 061804. <https://doi.org/10.1116/1.5121541>
- Doise, J., **Bezik, C.**, Hori, M., de Pablo, J., & Gronheid, R. (2019). Influence of Homopolymer Addition in Templated Assembly of Cylindrical Block Copolymers. *ACS Nano*, 13(4), 4073-4082. <https://doi.org/10.1021/acsnano.8b08382>
- Bezik, C. T.**, Garner, G. P., & de Pablo, J. J. (2018). Mechanisms of Directed Self-Assembly in Cylindrical Hole Confinements. *Macromolecules*, 51(7), 2418–2427. <https://doi.org/10.1021/acs.macromol.7b02639>
- Zhou, C., Kurosawa, T., Dazai, T., Doise, J., Ren, J., **Bezik, C.**, . . . Nealey, P. F. (2018). Studying the effects of chemistry and geometry on DSA hole-shrink process in three dimensions. In E. M. Panning & M. I. Sanchez (Eds.), *Emerging Patterning Technologies 2018* (p. 19). SPIE. <https://doi.org/10.1117/12.2297461>
- Sidky, H., Colón, Y. J., Helfferich, J., Sikora, B. J., **Bezik, C.**, Chu, W., . . . de Pablo, J. J. (2018). SSAGES: Software Suite for Advanced General Ensemble Simulations. *The Journal of Chemical Physics*, 148(4), 044104. <https://doi.org/10.1063/1.5008853>
- Foudazi, R., **Bezik, C.**, Feke, D. L., Manas-Zloczower, I., Merrigan, S. R., & Rowan, S. J. (2015). METHOD FOR THE PRODUCTION OF HIGH INTERNAL PHASE EMULSION FOAMS.

Technical Experience

- languages C, C++, Python, Matlab, Mathematica, HTML, CSS, JSON
- technologies MPI, Paraview, COMSOL, \LaTeX , Bash Scripting, Git, Vim, Windows, Ubuntu
- molecular simulations LAMMPS, Gromacs, HOOMD-blue
- experiments SEM, Optical Microscopy, ARES Rheometer, Thermogravimetric Analysis, MTS Universal Testing System, BET Analysis

Relevant Coursework

University of Chicago

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| chemical engineering | Thermodynamics and Statistical Mechanics, Advanced Statistical Mechanics, Molecular/Materials Modelling, Molecular Science and Engineering of Water |
| polymer science | Polymer Physics & Engineering, Soft Condensed Matter Physics |
| computation and mathematics | Mathematical Methods, Applied Numerical Methods, Applied Probability For Engineers, Machine Learning |

Case Western Reserve University

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| chemical engineering | Transport Phenomena for Chemical Systems, Process Control, Professional Communication for Engineers, Thermodynamics of Chemical Systems, Inorganic Chemistry, Quantum Mechanics, Separation Processes, Colloid Science, Chemical Engineering Applied to Micro-fabrication and Devices, Physical Chemistry |
| polymer science | Polymer Physical Chemistry |
| computation and mathematics | Statistics for Experimenters, Chemical Engineering Analysis |

Honors

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| honor societies | Tau Beta Pi |
| dean's list | 5 semesters at CWRU |