

## Education

- 2014–2019 **Doctor of Philosophy**, *University of Michigan*, Ann Arbor, MI  
Macromolecular Science and Engineering  
Thesis: "Designing Particle Shapes for Self-Assembly of Novel Colloidal Crystals"  
Thesis Advisor: Prof. Sharon Glotzer  
GPA: 3.74/4.0
- 2010–2014 **Bachelor of Science in Engineering**, *University of Connecticut*, Storrs, CT  
Materials Science and Engineering, *Magna Cum Laude*, Honors Degree  
Minor Concentration: Computer Science and Engineering  
Theses: "Optimization of Polymer Fluorescence for Explosives Detection" – Advisor: Prof. Mu-Ping Nieh  
"Design Rules for RTM Polyimides Composites" – Advisors: Prof. Serge Nakhmanson, Dr. Hillary Huttenhower  
GPA: 3.86/4.0

## Professional Experience

- 2019–present **Postdoctoral Researcher with Prof. Michele Ceriotti**, *Ecole Polytechnique Fédérale de Lausanne*, Lausanne, Switzerland
- 2014–2019 **Graduate Student Researcher with Prof. Sharon Glotzer**, *University of Michigan*, Ann Arbor, MI  
Investigated the role of shape in free energy optimization of colloidal crystals and design of novel photonic materials  
Contributed to open-source software packages for simulation and data management (HOOMD-blue and signac)
- 2014–2019 **Freelance Tutor**, *WyzAnt, Inc.*, Ann Arbor, MI  
Mentored and tutored middle and high school students in mathematics and computer programming
- 2012, 2013 **Intern, Structural Alloys (2012), Polymeric Materials (2013)**, *Pratt and Whitney*, East Hartford, CT  
Developed surface treatments to promote adhesion, processing for polymer foams and repair for coatings  
Investigated effects of microstructural imperfections in jet engine alloys
- 2012–2014 **Undergraduate Student Researcher under Prof. Mu-Ping Nieh**, *SAFN Laboratory*, Storrs, CT  
Investigated the effects of polymer composition and film preparation on film fluorescence

## Journal Articles

1. Y. Zhou, **Cersonsky, Rose K**, S. C. Glotzer, "A New Route to the Diamond Colloidal Crystal", *In preparation*.
2. **Cersonsky, Rose K**, B. A. Helfrecht, E. A. Engel, S. Kliavinek, M. Ceriotti, "Improving Sample and Feature Selection with Principal Covariates Regression", *In Press.*, 2021, <https://arxiv.org/abs/2012.12253>.
3. **Cersonsky, Rose K.**, J. A. Antonaglia, B. D. Dice, S. C. Glotzer, *Nature Communications* **12**, <https://doi.org/10.1038/s41467-021-22809-6> (2021).
4. B. A. Helfrecht, **Cersonsky, Rose K**, G. Fraux, M. Ceriotti, *Machine Learning: Science and Technology* **1**, 045021 (2020).
5. A. Travitz, A. Muniz, J. K. Beckwith, **Cersonsky, Rose K.**, 2020 *Virtual American Society for Engineering Education*, <https://doi.org/10.18260/1-2--35030> (2020).
6. G. Fraux, **Cersonsky, Rose K**, M. Ceriotti, *Journal of Open Source Software* **5**, 2117 (2020).
7. **Cersonsky, Rose K**, J. Dshemuchadse, J. Antonaglia, G. van Anders, S. C. Glotzer, *Physical Review Materials* **2**, 125201 (2018).
8. **Cersonsky, Rose K**, G. van Anders, P. M. Dodd, S. C. Glotzer, *Proceedings of the National Academy of Sciences* **115**, 1439–1444 (2018).
9. **Cersonsky, Rose K**, L. L. Foster, T. Ahn, R. J. Hall, H. L. Van Der Laan, T. F. Scott, *Journal of Chemical Education* **94**, 1639–1646 (2017).
10. **Cersonsky, Rose K**, H.-s. Jang, M.-P. Nieh, "Optimizing Polymer Fluorescence for Explosives Detection", tech. rep. (University of Connecticut, 2014), [https://opencommons.uconn.edu/srhonors\\_theses/388](https://opencommons.uconn.edu/srhonors_theses/388).

## Mentorship and Supervision of Junior Researchers

- 2020–present **Maria Pakhnova**, *Project Inspire Student, EPFL*  
Project Name: Identifying High-Stability Components of Molecular Crystals.
- 2020–present **Sergei Kliavinek**, *Semester Project Student, EPFL*  
Project Name: Comparing Feature Spaces for Materials and Molecules. *Publication submitted (2)*

- 2020-2021 **Pengkang Guo**, *Semester Project Student, EPFL*  
Project Name: Implementing Dimensionality Reduction with Kernel PCovR Analysis.
- 2019-2021 **Benjamin Helfrecht**, *PhD Student, EPFL*  
Project Name: Structure-property maps with kernel principal covariates regression, *Publication in Machine Learning, Science and Technology* (4)
- 2018-2020 **Yuan Zhou**, *PhD Student, University of Michigan*  
Project Name: A new possibility for making diamond colloidal crystals. *Publication in preparation* (1).
- 2016-2018 **Alyssa Travitz**, *PhD Student, University of Michigan*  
Mentored through University of Michigan Mentorship Program, *Publication in ASEE proceedings* (5).
- 2017-2018 **Sophie Barterian**, *Undergraduate Student, University of Michigan*  
Project Name: When don't Colloids form FCC? *Presented by Barterian at 2018 APS March Meeting*

## Honors and Awards

### Honors

- Apr. 2021 **Victor K. LaMer Award**, *American Chemical Society Colloids Division*
- Feb. 2019 **Biointerfaces Institute Student Innovator Award**, *University of Michigan (UM)*
- Oct. 2018 **Towner Award for Graduate Research**, Honorable Mention
- Oct. 2018 **Charles G. Overberger Award for Excellence in Research**, *UM*
- Jan. 2018 **North Campus Martin Luther King Spirit Award**, *UM*
- Oct. 2017 **Nonna Hamilton Student Service Award**, *UM*
- 2016, 2017 **Prof. Albert and Mrs. Yee Student Leadership Award**, *UM*
- April 2017 **Chapter of the Year**, *American Chemical Society POLY/PMSE*
- May 2014 **Commencement Speaker**, *UConn*
- May 2014 **Outstanding Academic Achievement Award**, *School of Engineering, UConn*
- 2013 **Marshall Scholarship Finalist**
- 2013 **Rhodes Scholarship Nominee**
- 2012-2014 **New England Scholar**, *UConn*
- 2011 **Babbidge Scholar**, *UConn*
- 2010-2014 **Dean's List**, *UConn*

### Fellowships and Scholarships

- 2018-2019 **Rackham Predoctoral Fellowship**, *UM*
- Dec. 2017 **Science Communication Fellow**, *Museum of Natural History, UM*
- July 2014 **Michigan Institute for Computational Discovery and Engineering Fellowship**, *UM*
- 2014-2018 **Rackham Merit Fellowship**, *UM*
- 2013-2014 **GE Advanced Materials Endowment Scholarship**, *UConn*
- 2012-2013 **Art McEvily Academic Scholarship**, *UConn*
- 2010-2014 **Academic Excellence Scholarship**, *UConn*

### Travel Awards

- Jul. 2018 **National Science Foundation FOMMS Travel Award**, *National Science Foundation*
- Jan. 2018 **Ovshinsky Student Travel Award**, *Americal Physical Society*
- Jan. 2018 **DCOMP Travel Award**, *Americal Physical Society*

### Presentation Awards

- Dec. 2019 **Poster Award**, *Materials Research Society*
- Apr. 2017 **2<sup>nd</sup> Place, Student Presentations**, *Materials Research Society*
- Nov. 2016 **3<sup>rd</sup> Place, Student Posters**, *Engineering Graduate Symposium*
- Apr. 2016 **3<sup>rd</sup> Place, Student Posters**, *MICDE Symposium*
- Oct. 2015 **1<sup>st</sup> Place, Student Presentations**, *Macromolecular Science and Engineering Symposium*

## Contributions to Open-Source Software

All contributions can be found on *GitHub* page: <https://github.com/rosecers>.

### Lead Developer

1. *Kernel-Tutorials*, a set of tutorials introducing users to kernel-based machine learning methods, <https://github.com/cosmo-epfl/kernel-tutorials>.
2. *UnitCell-Photonics*, software to take molecular dynamics simulation results and compute the photonic band structure using MIT Photonic Bands (MPB), [https://github.com/glotzerlab/unitcell\\_photonics](https://github.com/glotzerlab/unitcell_photonics).

3. *scikit-COSMO*, a package of functions modeled after *scikit-learn* (*sklearn*) including machine learning tools, some of which have been extended for materials science and chemical physics, <https://github.com/cosmo-epfl/sklearn-cosmo>.

### Core Developer

4. *Chemiscope*, a visualization suite for correlating mapped data with 3D molecular visualization, <https://github.com/cosmo-epfl/chemiscope/>.

### Contributor

5. *FSPH*, fast computing of spherical harmonics, <https://github.com/glotzerlab/fsph>.
6. *Freud*, a simple, flexible, powerful set of tools for analyzing trajectories obtained from molecular dynamics or Monte Carlo simulations, <https://github.com/glotzerlab/freud>.
7. *Freud-Examples*, a repository of examples to employ the *Freud* module, <https://github.com/glotzerlab/freud-examples>.
8. *LibRascal*, a versatile and scalable fingerprint and machine learning code. It focuses on the efficient construction of representations of atomic structures, that can then be fed to any supervised or unsupervised learning algorithm, <https://github.com/cosmo-epfl/librascal>.
9. *Plato*, efficient visualization of particle data, <https://github.com/glotzerlab/plato>.
10. *Pythia*, generate numerical descriptions of particle systems, <https://github.com/glotzerlab/pythia>.
11. *Signac*, provides a simple and robust data model to create a well-defined indexable storage layout for data and metadata. This makes it easier to operate on large data spaces, streamlines post-processing and analysis and makes data collectively accessible, <https://github.com/glotzerlab/signac>.
12. *Signac-Flow*, provides the basic components to set up simple to complex workflows for projects as part of the *signac* framework. That includes the definition of data pipelines, execution of data space operations and the submission of operations to high-performance super computers, <https://github.com/glotzerlab/signac-flow>.

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## Seminar and Conference Presentations

### Seminars and Invited Talks

1. "Designing Nanoparticles for Self-Assembly of Novel Colloidal Crystals.", University of Michigan, Ann Arbor, MI, Apr. 2019 (Biointerfaces Institute Research Day).
2. "Designing Particle Shapes for Self-Assembly of Novel Colloidal Crystals.", Oxford University, Oxford, Great Britain, Oct. 2018.
3. "Designing Particle Shapes for Self-Assembly of Novel Colloidal Crystals.", Eidgenoessische Technische Hochschule (ETH), Zurich, Switzerland, Sept. 2018.
4. "Designing Particle Shapes for Self-Assembly of Novel Colloidal Crystals.", École Polytechnique Lausanne (EPFL), Lausanne, Switzerland, Sept. 2018.

### Contributed Oral Presentations

5. "Unexpected Diversity of Three-Dimensional Photonic Crystals.", Orlando, FL, Oct. 2019 (American Institute of Chemical Engineers Annual Meeting).
6. "Can we design a reconfigurable photonic crystal in the visible light range?", Boston, MA, Mar. 2019 (APS March Meeting).
7. "Pressure-Tunable Photonic Band Gaps in an Entropic Crystal.", Boston, MA, Nov. 2018 (Materials Research Society Fall Meeting).
8. "Pressure-Tunable Photonic Band Gaps in an Entropic Crystal.", Pittsburgh, PA, Oct. 2018 (American Institute of Chemical Engineers Annual Meeting).
9. "Pressure-Tunable Photonic Band Gaps in an Entropic Crystal.", Konstanz, Germany, Sept. 2018 (Anisotropic Particles Symposium).
10. "Pressure-Tunable Photonic Band Gaps in an Entropic Crystal.", Bordeaux, France, Sept. 2018 (Self-Assembly of Colloidal Systems).
11. "Tunable Photonic Band Gaps in an Entropic Crystal.", Los Angeles, CA, Mar. 2018 (APS March Meeting).
12. "Distinguishing Packing and Assembly Behavior via Phase Transitions in Shape Space.", Minneapolis, MN, Nov. 2017 (American Institute of Chemical Engineers Annual Meeting).
13. "Distinguishing Packing and Assembly Behavior via Phase Transitions in Shape Space.", Phoenix, AZ, Apr. 2017 (Materials Research Society Meeting).
14. "Augmenting Primary and Secondary Education with Polymer Science and Engineering.", San Francisco, CA, Apr. 2017 (American Chemical Society Meeting).

15. "Distinguishing Packing and Assembly Behavior via Phase Behavior in Shape Space.", New Orleans, LA, Mar. 2017 (APS March Meeting).
16. "Enhanced Machine Learning Models for Structure-Property Mapping with Principal Covariates Regression", Virtual, Mar. 2021 (APS).

## Poster Presentations

17. "Unexpected Diversity of Three-Dimensional Photonic Crystals.", Boston, MA, Dec. 2019 (Materials Research Society Fall Meeting).
18. "Tunable Photonic Band Gaps in an Entropic Crystal.", Delavan, WI, July 2018 (Foundations of Molecular Modeling and Simulation).
19. "When does matter pack?", University of Michigan, Ann Arbor, MI, Oct. 2017 (Macromolecular Science and Engineering Symposium).
20. "Distinguishing Packing and Assembly Behavior via Phase Behavior in Shape Space.", University of Michigan, Ann Arbor, MI, Nov. 2016 (Engineering Graduate Symposium).
21. "Understanding Spatial Packing Through Variable Shape.", University of Michigan, Ann Arbor, MI, Oct. 2016 (Macromolecular Science and Engineering Symposium).
22. "Understanding Spatial Packing Through Variable Shape.", University of Michigan, Ann Arbor, MI, Apr. 2016 (Michigan Institute for Computational Discovery and Engineering Symposium).
23. "Shape-Based Molecular Dynamics Investigation of Protein Crystallization.", University of Michigan, Ann Arbor, MI, Oct. 2015 (Macromolecular Science and Engineering Symposium).
24. "Shape-Based Molecular Dynamics Investigation of Protein Crystallization.", University of Massachusetts, Amherst, MA, June 2015 (Soft Matter Summer School).
25. "Design Rules for Composites from RTM Polyimides.", UConn, Storrs, CT, May 2014 (Senior Design Exposition).

## Professional Skills

**Coding Proficiencies:** Python (Advanced), MATLAB (Intermediate), Java (Intermediate-Advanced),  
 $\text{\LaTeX}$ , git, bash scripting, Scheme  
 Python packages: Matplotlib, NumPy, SciPy, IPython/Jupyter

**Languages:** English (Native), German (Intermediate), Spanish (Intermediate), French (Beginner)

**Other Skills:** Microsoft Office, Statistical Analysis

## Professional Affiliations

2016-present **American Institute of Chemical Engineers**  
 2016-present **Materials Research Society**  
 2016-present **American Chemical Society**  
 2015-present **American Physical Society (APS)**  
 2012-present **Alpha Sigma Mu**

## Event Organization

Oct. 2018 **Student Coordinator**, *Macromolecular Science and Engineering Symposium*

2017-2019 **Creator, Lead Organizer**, *Research Education and Activities for Classroom Teachers (REACT)*  
 Developed and lead one-day workshop for Michigan K-12 STEM teachers on UM campus, including student talks, lab tours, and demonstrations of hands-on activities by student organizations.  
 Coordinated participation from multiple research groups and student organizations across 8 UM departments.  
 Expanded event from 19 participants in 2017 to 53 participants in 2018

June 2016 **Organizer**, *The Life and Death of Plastics*, *UM XPlore Engineering*

Sept. 2013 **Head Curator, Master of Ceremonies**, *TEDxUConn 2013: "Future in Focus"*

## Service

2017 **Student Ally**, *UM Diversity, Equity, and Inclusion Strategic Plan*

2015-2019 **UM ACS POLY/PMSE Student Chapter**  
 2015-2017 Outreach Chair - Organized group to bring plastics and polymer-based lessons to Detroit primary school classrooms; Developed presentation series aligned with state science standards to promote accessibility of polymer science

2010-2014 **United Technologies Corporation UConn Engineering Ambassadors**  
2013-2014 Vice President  
2012-2013 Director of Curriculum Development and Organizational Resources  
2010-2012 Middle School Outreach Coordinator

2013-2014 **Vice President, Curation, TEDxUConn**

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## Performing Arts

2015 **The Croswell Opera House, Croswell, MI**  
*Big Fish* Featured Actor

2008-2013 **The Gary-The Olivia at the Abbey of Regina Laudis, Bethlehem, CT**  
*Fiorello!* Dora (Principle Role)  
*South Pacific* Featured Ensemble  
*The Pajama Game* Ensemble  
*West Side Story* Ensemble

2013 **UConn Dramatic PAWS, Storrs, CT**  
*Never Alone* Carol (Principle Role, Original Cast)  
*Sherlock Holmes and the Case of the Jersey Lily* Professor Moriarty (Principle Role)

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## Personal Interests

Running (**Baltimore Marathon Finisher 2016**), Calligraphy, Baking, Bridge, Backgammon, Hiking, Climbing