Rose K. Cersonsky

rose.cersonsky@epfl.ch • RoseCersonsky.com • rosecers

Education

2014–2019 **Ph.D.**, *University of Michigan*, Ann Arbor, MI.
Macromolecular Science and Engineering GPA: 3.74/4.0
Thesis Advisor: Prof. Sharon Glotzer

2010–2014 **B.S. in Engineering**, *University of Connecticut*, Storrs, CT.
Materials Science and Engineering GPA: 3.86/4.0
Minor Concentration: Computer Science and Engineering
Magna Cum Laude, Honors Degree
Honors Thesis Advisor: Prof. Mu-Ping Nieh
Senior Thesis Advisors: Prof. Serge Nakhmanson, Dr. Hillary Huttenhower

Professional Experience

2019–present **Postdoctoral Researcher with Prof. Michele Ceriotti**,
Ecolè Polytechnique Fèdèrale de Lausanne, Lausanne, Switzerland.
Developed machine learning methods and software for analyzing atomistic simulations and datasets of materials and molecules
Investigated role of molecular geometry on hierarchical assemblies

2014–2019 **Graduate Student Researcher with Prof. Sharon Glotzer**,
University of Michigan, Ann Arbor, MI.
Investigated of 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 students in mathematics and computer programming, completing 300+ hours of instruction

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 with Prof. Mu-Ping Nieh**,
SAFN Laboratory, Storrs, CT.
Investigated the effects of polymer composition and film preparation on film fluorescence

Societies and Affiliations

American Institute of Chemical Engineers (AIChE), Materials Research Society (MRS), American Chemical Society (ACS), American Physical Society (APS), Alpha Sigma Mu

Publications

Refereed Journal Articles

1. **Cersonsky, Rose K**, Helfrecht, B. A., Engel, E. A., Kliavinek, S. & Ceriotti, M. Improving Sample and Feature Selection with Principal Covariates Regression. *Machine Learning: Science and Technology* **2,** 035038 (2021).
2. **Cersonsky, Rose K**., Antonaglia, J. A., Dice, B. D. & Glotzer, S. C. The Diversity of Three-Dimensional Photonic Crystals. *Nature Communications* **12,** 2543 (2021).
3. Helfrecht, B. A., **Cersonsky, Rose K**, Fraux, G. & Ceriotti, M. Structure-property maps with kernel principal covariates regression. *Machine Learning: Science and Technology* **1,** 045021 (2020).
4. Travitz, A., Muniz, A., Beckwith, J. K. & **Cersonsky, Rose K**. Bringing Science Education and Research together to REACT. *American Society for Engineering Education.* doi:10.18260/1-2--35030 (2020).
5. Fraux, G., **Cersonsky, Rose K** & Ceriotti, M. Chemiscope: Interactive structure-property explorer for materials and molecules. *Journal of Open Source Software* **5,** 2117 (2020).
6. **Cersonsky, Rose K**, Dshemuchadse, J., Antonaglia, J., van Anders, G. & Glotzer, S. C. Pressure-tunable photonic band gaps in an entropic colloidal crystal. *Physical Review Materials* **2,** 125201 (2018).
7. **Cersonsky, Rose K**, van Anders, G., Dodd, P. M. & Glotzer, S. C. Relevance of packing to colloidal self-assembly. *Proceedings of the National Academy of Sciences* **115,** 1439–1444 (2018).
8. **Cersonsky, Rose K**, Foster, L. L., Ahn, T., Hall, R. J., Van Der Laan, H. L. & Scott, T. F. Augmenting Primary and Secondary Education with Polymer Science and Engineering. *Journal of Chemical Education* **94,** 1639–1646 (2017).

Monographs and Technical Reports

9. **Cersonsky, Rose K**. *Designing Nanoparticles for Self-Assembly of Novel Materials* (University of Michigan, 2019). <https://deepblue.lib.umich.edu/handle/2027.42/153520>.
10. **Cersonsky, Rose K**. *Design Rules for Composites from Resin Transfer Molded Polyimides.* (*Technical Report*, University of Connecticut and Pratt & Whitney, 2014).
11. **Cersonsky, Rose K**, Jang, H.-s. & Nieh, M.-P. *Optimizing Polymer Fluorescence for Explosives Detection* (University of Connecticut, 2014). <https://opencommons.uconn.edu/srhonors_theses/388>.

Manuscripts in Preparation

12. **Cersonsky, Rose K**, Fraux, G., Kliavinek, S., Goscinski, A., Helfrecht, B. A. & Ceriotti, M. *scikit-COSMO: A Toolbox of Machine Learning Methods for Materials Science*
13. **Cersonsky, Rose K.**, Pahknova, M., Engel, E. A. & Ceriotti, M. *Identifying high-stability motifs in molecular crystals*
14. Gazzarini, E., Bercx, M., **Cersonsky, Rose K**, Adorf, C. S. & Marzari, N. *The magic rule of 4: tackling emerging features in inorganic databases*
15. Zhou, Y., **Cersonsky, Rose K** & Glotzer, S. C. *A New Route to the Diamond Colloidal Crystal*

Honors and Awards

Honors

Jun. 2021 **Victor K. LaMer Award**, *ACS Colloids Division*.
Feb. 2019 **Biointerfaces Institute Innovator Award**, *University of Michigan (UM)*.
Oct. 2018 **Towner Award for Graduate Research**, *UM*, 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**, *ACS POLY/PMSE*.
May 2014 **Commencement Speaker**, *UConn*.
May 2014 **Outstanding Academic Achievement Award, School of Engineering**, *UConn*.
2012-2014 **New England Scholar**, *UConn*.
2011 **Babbidge Scholar**, *UConn*.
2010-2014 **Dean's List**, *UConn*.

Grants, Fellowships, and Scholarships

2018-2019 **Rackham Predoctoral Fellowship**, *UM*.
2017 **Science Communication Fellow, Museum of Natural History**, *UM*.
2014-2018 **Rackham Merit Fellowship**, *UM*.
2014 **Michigan Institute for Computational Discovery and Engineering Fellowship**, *UM*.
2013-2014 **GE Advanced Materials Endowment Scholarship**, *UConn*.
2013 **Marshall Scholarship Finalist**.
2013 **Rhodes Scholarship Nominee**.
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 **2nd Place, Student Presentations**, *Materials Research Society*.
Nov. 2016 **3rd Place, Student Posters**, *Engineering Graduate Symposium*.
Apr. 2016 **3rd Place, Student Posters**, *MICDE Symposium*.
Oct. 2015 **1st Place, Student Presentations**, *Macromolecular Science and Engineering Symposium*.

Seminar and Conference Presentations

Seminars and Distinguished Lectures

1. *Victor K. LaMer Dissertation Award Lecture* Virtual (ACS Colloids, June 2021).
2. *Biointerfaces Innovator Award Lecture* University of Michigan, Ann Arbor, MI (Biointerfaces Institute, Apr. 2019).
3. *Seminar* Oxford University, Oxford, Great Britain (Oct. 2018).
4. *Visiting Researcher Presentation* Eidgenoessische Technische Hochschule (ETH), Zurich, Switzerland (Sept. 2018).
5. *Seminar* Ècole Polytechnique Lausanne (EPFL), Lausanne, Switzerland (Sept. 2018).

National Meetings, Workshops, and Conferences

6. *APS March Meeting* Virtual. Oral Presentation (Mar. 2021).
7. *MRS Fall Meeting* Boston, MA. Poster, Poster Award for Session (Dec. 2019).
8. *AIChE Annual Meeting* Orlando, FL. Oral Presentation (Oct. 2019).
9. *APS March Meeting* Boston, MA. Oral Presentation (Mar. 2019).
10. *MRS Fall Meeting* Boston, MA. Oral Presentation (Nov. 2018).
11. *AIChE Annual Meeting* Pittsburgh, PA. Oral Presentation (Oct. 2018).
12. *Anisotropic Particles Symposium* Konstanz, Germany. Oral Presentation (Sept. 2018).
13. *Self-Assembly of Colloidal Systems* Bordeaux, France. Oral Presentation (Sept. 2018).
14. *Foundations of Molecular Modeling and Simulation* Delavan, WI. Poster (July 2018).
15. *APS March Meeting* Los Angeles, CA. Oral Presentation (Mar. 2018).
16. *AIChE Annual Meeting* Minneapolis, MN. Oral Presentation (Nov. 2017).
17. *Macromolecular Science and Engineering Symposium* University of Michigan, Ann Arbor, MI. Poster (Oct. 2017).
18. *MRS Meeting* Phoenix, AZ. Oral Presentation, *2nd Place for Presentations* (Apr. 2017).
19. *ACS Meeting* San Francisco, CA. Oral Presentation (Apr. 2017).
20. *APS March Meeting* New Orleans, LA. Oral Presentation (Mar. 2017).
21. *Engineering Graduate Symposium* University of Michigan, Ann Arbor, MI. Poster, *3rd Place for Posters* (Nov. 2016).
22. *Macromolecular Science and Engineering Symposium* University of Michigan, Ann Arbor, MI. Poster (Oct. 2016).
23. *Michigan Institute for Computational Discovery and Engineering Symposium* University of Michigan, Ann Arbor, MI. Poster, *3rd Place for Posters* (Apr. 2016).
24. *Macromolecular Science and Engineering Symposium* University of Michigan, Ann Arbor, MI. Poster, *1st Place for Posters* (Oct. 2015).
25. *Soft Matter Summer School* University of Massachusetts, Amherst, MA. Poster (June 2015).
26. *Senior Design Exposition* UConn, Storrs, CT. Poster (May 2014).

Workshops and Events Organized

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"*.

Teaching Experience and Service

Mentorship and Supervision of Junior Researchers

2020-present **Maria Pakhnova**, *Project Inspire Student, EPFL*.
Project: Identifying High-Stability Components of Molecular Crystals. *Publication in preparation.*

2020-present **Sergei Kliavinek**, *Semester Project Student, EPFL*.
Project: Comparing Feature Spaces for Materials and Molecules. *Publication in Machine Learning, Science and Technology [1]*

2020-2021 **Pengkang Guo**, *Semester Project Student, EPFL*.
Project: 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 [3]*

2018-2020 **Yuan Zhou**, *PhD Student, University of Michigan*.
Project: A new possibility for making diamond colloidal crystals. *Publication in preparation [15].*

2016-2018 **Alyssa Travitz**, *PhD Student, University of Michigan*.
Mentored through University of Michigan Mentorship Program, *Publication in ASEE proceedings [4].*

2017-2018 **Sophie Barterian**, *Undergraduate Student, University of Michigan*.
Project: When don't Colloids form FCC? *Presented by Barterian at 2018 APS March Meeting*

Service and Leadership

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

2015-2019 **Outreach Chair**, *UM ACS POLY/PMSE Student Chapter*.

2010-2014 **Vice President**, *United Technologies Corporation UConn Engineering Ambassadors*.

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

Professional Skills

Coding Proficiencies: Python (Advanced),
Java (Intermediate-Advanced),
MATLAB (Intermediate),
LaTeX, git, bash/UNIX scripting, Scheme,
slurm, TORQUE
Python packages: MatPlotLib, NumPy, SciPy, IPython/Jupyter

Languages: English (Native) German (Conversational)
Spanish (Conversational) French (Beginner)

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. *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

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

Contributor

4. *Freud. a simple, flexible, powerful set of tools for analyzing trajectories obtained from molecular dynamics or Monte Carlo simulations* <https://github.com/glotzerlab/freud>.
5. *Freud-Examples. a repository of examples to employ the Freud module* <https://github.com/glotzerlab/freud-examples>.
6. *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>.
7. *Plato. efficient visualization of particle data* <https://github.com/glotzerlab/plato>.
8. *Pythia. generate numerical descriptions of particle systems* <https://github.com/glotzerlab/pythia>.
9. *Signac. provides a simple and robust data model to create a well-defined indexable storage layout for data and metadata.* <https://github.com/glotzerlab/signac>.
10. *Signac-Flow. provides the basic components to set up simple to complex workflows for projects as part of the signac framework, including the submission of operations to high-performance super computers* <https://github.com/glotzerlab/signac-flow>.

Personal Interests

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

Performing Arts

2017-2019 **Technical Vocal Study**, *Instructor: Rachel Barg*.

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

2014 **Leading Role**, *Sherlock Holmes and the Case of the Jersey Lily*, UConn Dramatic PAWS, Storrs, CT.

2013 **Leading Role, Original Cast**, *Never Alone*, UConn Dramatic PAWS, Storrs, CT.

2013 **Leading Role**, *Fiorello!*, The Gary-The Olivia at the Abbey of Regina Laudis, Bethlehem, CT.

2010 **Featured Actor**, *South Pacific*, The Gary-The Olivia at the Abbey of Regina Laudis, Bethlehem, CT.

2009 **Featured Actor**, *The Pajama Game*, The Gary-The Olivia at the Abbey of Regina Laudis, Bethlehem, CT.

2008 **Featured Actor**, *West Side Story*, The Gary-The Olivia at the Abbey of Regina Laudis, Bethlehem, CT.