Laura (Ellie) Porath

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LinkedIn, Google Scholar, ORCID

Education

University of Illinois Urbana-Champaign — Champaign, IL
Ph.D., Materials Science and Engineering — *May 2022*
Advisor: Professor Christopher M. Evans
Defense: March 30, 2022
Dissertation: *"Viscoelasticity in Vitrimers: Tunability and Applications of Dynamic Networks"*

The University of Chicago — Chicago, IL
B.A., Physics with General Honors — *June 2017*
Minor in South Asian Languages and Civilizations

Employment History

ESPCI Paris + L'Oréal — Paris, France
Postdoctoral Researcher – Soft Materials Science and Engineering (SIMM) Lab — *Mar 2024 – current*
Advisor: Prof. Yvette Tran, Laurent Corté

- Creating an artificial skin for adaption to sensors for measuring touch
- Probing diffusion and adsorption of solvents on various substrate textures

ETH Zürich – Soft Materials Group — Zürich, Switzerland
Postdoctoral Researcher – Department of Materials — *Sept 2022 – current*
Advisor: Prof. Jan Vermant

- Investigated effect of active motion (Janus particles) on hydrogel viscoelasticity
- Compared bacterial biofilms to colloidal gel rheological behavior

University of Illinois – Evans Research Group — Champaign, IL
Graduate Research Assistant – Materials Science Department — *Aug 2017 – May 2022*
Advisor: Prof. Christopher M. Evans

- Probed molecular origin of viscoelastic properties in polymer networks through rheology
- Developed new metric for classifying dynamic networks
- Invented an ultra-thin self-healing hydrophobic coating from vitrimers

Argonne National Laboratory — Lemont, IL
Department of Energy Intern – Materials Science Department — *May - Aug 2016*
Advisor: Prof. Amanda Petford-Long

- Designed nanoscale resistive switching networks in clean room facility
- Created and visualized block copolymer structures with Atomic Layer Deposition and Scanning Electron Microscopy

IBM — Almaden, CA
Materials Research Science and Engineering Center Intern – Chemistry Department — *May - Aug 2015*
Advisor: Dr. Rudy J. Wojtecki

- Identified and quantified impurities in block copolymers using NMR techniques called Contrast Enhanced Diffusion Ordered Spectroscopy

University of Chicago – York Research Group Chicago, IL
Research Assistant – Astrophysics, Physics Department *May - Aug 2014*
Advisor: Prof. Don York

- Measured star spectra to identify interstellar medium (Diffuse Interstellar Bands)
- Analyzed and compared DIB measurements with Fortran programming

Publications

Peer-Reviewed Papers

(+Equal Contribution, *Corresponding Authors)

6. **L. Porath**, Ramlawi, N., Huang, J., Hossain, MT, Derkaloustian, M., Ewoldt, R., Evans, C.*, "Molecular Design of Multimodal Viscoelastic Spectra Using Vitrimers," *Chemistry of Materials* **Feb 2024** 36, 4, 1966-1974. 10.1021/acs.chemmater.3c02852

5. **L. Porath,** Huang, J., Ramlawi, N., Derkaloustian, M., Ewoldt, R., Evans, C.*, "Relaxation spectra of vitrimers with kinetically distinct mixed dynamic bonds," *Macromolecules*, **Dec 2021**, 55, 11, 4450–4458. 10.1021/acs.macromol.1c02613

4. **L. Porath**+, Soman, B. +, Jing, B. +, Evans, C.*, "Vitrimers: Using dynamic associative bonds to control viscoelasticity, functionality, and assembly in polymer networks," *ACS Macro Letters* **Mar 2022**, 11, 475–483. 10.1021/acsmacrolett.2c00038

3. Ma, J.+, **Porath, L.**+, Haque, M., Sett, S., Rabbi, K., Nam, S., Miljkovic, N.*, Evans, C.*, "Ultra-thin self-healing vitrimer coatings for durable hydrophobicity," *Nature Communications* **Sept 2021** 12, 5210. 10.1038/s41467-021-25508-4

2. **L. Porath,** Evans, C.*, "Importance of Broad Temperature Windows and Multiple Rheological Approaches for Probing Viscoelasticity and Entropic Elasticity in Vitrimers," *Macromolecules* **May 2021** 54 (10), 4782-4791. 10.1021/acs.macromol.0c02800

1. Lee, J., Jing, B., **Porath, L.**, Sottos, N., Evans, C.*, "Shock Wave Energy Dissipation in Catalyst-Free Poly(dimethylsiloxane) Vitrimers," *Macromolecules* **June 2020** 53 (12), 4741-4747. 10.1021/acs.macromol.0c00784

Patents

1. Miljkovic, N., Evans, C., Ma, J., **Porath, L.** "Hydrophobic, Self-Healing Coating and Coated Substrate, and Fabrication Method," US20230399540A1, **Dec 2023**, U.S. Patent and Trademark Office (USPTO), 17980225. patent/US20230399540A1/en

Conference Papers

2. Barrows, F., Nealey, P., Segal-Peretz, T., Stan, L., Elam, J., Mane, A., **Porath, L.**, Phatak, C., Petford-Long, A.*, "Honeycomb Networks of Metal Oxides from Self-Assembling PS-PMMA Block Copolymers," *Microscopy and Microanalysis Conference* **Aug 2017**

1. **Porath, L.**, Vora, A., Schmidt, K., Cheng, J., Chunder, A. Nelson, A., Sanders, D. Wojtecki, R.*, "Contrast Enhanced Diffusion NMR (CEDOSY): Quantifying impurities in block copolymers for DSA," *SPIE Advanced Lithography Conference Proceedings* **Mar 2016**

Prizes, Awards, Fellowships

Racheff-Intel Award, *University of Illinois* *April 2022*
- For excellent graduate research in UIUC Department of Materials Science and Engineering

Mavis Future Faculty Fellowship, *University of Illinois* *Aug 2021 – May 2022*
- Selected to participate in a year-long course to prepare students for engineering faculty positions
- Learned techniques for how to be an effective researcher, mentor, and teacher

Outstanding Materials Science Student Award *Oct 2020*
- Awarded by the University of Illinois Grainger College of Engineering

Teaching Assistants Ranked as Excellent by Their Students *May 2019, May 2020*
- Achieved a rank of "outstanding" (4.8/5) based on student responses

Dean's List, *University of Chicago* *2014 – 2017*

Supervision of Junior Researchers

Master's Students

Sarah Marroquin-Burgos, *Chimie-ParisTech* *May – August 2023*
- 12-week internship on artificial biofilms for sprayable hydrogels

Bachelor's Students

Ronja Wyss, *ETH Zurich* *June – August 2023*
- Bachelor's thesis project (8 weeks) on weakening biofilms with Janus particles

Maryanne Derkaloustian, *University of Illinois* *Jan 2020 – May 2022*
- Multiple unique and achievable polymer rheology research projects over 2 years

Teaching and Mentoring Activities

Mentor for Society of Women in Natural Sciences, *ETH Zürich* *Nov 2023 – March 2024*
- Developed material and taught multiple lectures with active learning techniques
- Designed final project ideas and participated in evaluation for 25 students

Engineering with Soft Materials, *ETH Zürich* *November 2022, 2023*
- Developed material and taught multiple lectures with active learning techniques
- Designed final project ideas and participated in evaluation for 25 students

Future Faculty Workshop, *University of Delaware* *June 2022*
- Selected to attend two-day NSF funded workshop led by Soft Materials faculty
- Practiced and received feedback on chalk-talk idea for future applications

Certificate in Foundations of Teaching, *University of Illinois* *May 2021*
- Developed skillsets in active learning and inductive teaching for instructing students in problem solving
- Guest-lectured and was observed by current faculty for constructive feedback on my teaching

SPARK (Strategic Preparation for Academic Resilience and Know-how) Program *May – Aug 2021*

- Selected along with 12 women to participate in a preparatory program for becoming tenured STEM faculty
- Prepared and reviewed documents for faculty applications

Stem[xx] Chats, *National Non-profit Start-up* *Aug 2020 – March 2022*

- Develop organizational structure and future goals as part of the Leadership Team
- Mentored high school girls with biweekly conversations and resources on: Combating Imposter Syndrome, Managing Stress, Finding Internships

Teaching Assistant for MSE 458: Polymer Physics, *University of Illinois* *Jan – May 2019, 2020*

- Lectured six classes for 25 undergraduate and graduate students, covering material on Rubbers and Networks
- Advised and supported students struggling with course material

Girls Learning About Materials (Mid-GLAM) Summer Camp, *University of Illinois* *June 2019*

- Taught 20 middle school girls about materials through interactive lab demonstrations
- Designed and supplied exciting, level-appropriate polymer experiments

Science Teacher, *Metro Achievement Center: Chicago* *May – Aug 2017*

- Instructed 125 inner-city middle school girls in basic physics, focusing on energy and motion
- Created relevant and engaging labs, worksheets, and field trips to facilitate fun learning

Institutional Responsibilities

Graduate Student Advisory Committee, *University of Illinois* *Aug 2020 – Aug 2021*

- Informed department head about graduate concerns through monthly meetings
- Advocated for graduate student support in personal and professional capacities

Graduate Recruitment Chair, *University of Illinois* *Jan 2019 – May 2021*

- Led 6 days of visit weekend events including poster sessions, lab tours, faculty interactions
- Managed 20+ graduate student volunteers and organized travel for nearly 50 prospective students

President of Materials Research Society, *University of Illinois Chapter* *Aug 2018 – Aug 2019*

- Planned bi-monthly events to promote knowledge exchange and collaboration, developed educational opportunities, and led fundraising efforts for over 100 graduate students
- Collaborated with department professors and staff to create a diverse, welcoming climate

Participation in Conferences

2024

L. Porath[+], Vermant, J. (*poster*) "Active Particles Affect Viscoelasticity of Hydrogels," *Interdisciplinary Challenges in Non-Equilibrium Physics*

2023

L. Porath[+], Vermant, J. (*presentation*) "Shaping Materials from the Inside Out," *Swiss Soft Days*

L. Porath[+], Vermant, J. (*presentation*) "Shaping Materials from the Inside Out," *Gordon Research Conference Soft Condensed Matter*

L. Porath[+], Marroquin-Burgos, S., Wyss, R., Vermant, J. (*poster*) "Designing and Destroying Biofilms," *Gordon Research Conference Soft Condensed Matter*

L. Porath[+] (*session chair*) "Rheology of Living and Active Systems 2," *International Congress of Rheology*

L. Porath[+], Vermant, J. (*presentation*) "Shaping Materials from the Inside Out," *International Congress of Rheology*

L. Porath[+], Vermant, J. (*poster*) "Active Particles in Polymer Networks Model Bacteria Behavior in Biofilms," *American Physical Society Conference March Meeting*

L. Porath[+], Ramlawi, N., Ewoldt, R., Evans, C. (*presentation*) "Effect of Vitrimer Microstructure on Hierarchical Relaxation," *American Physical Society Conference March Meeting*

2022

L. Porath[+], Ramlawi, N., Ewoldt, R., Evans, C. (*presentation*) "Effect of Vitrimer Microstructure on Hierarchical Relaxation," *Society of Rheology Meeting*

L. Porath[+], Evans, C. (*presentation*) "Tunability and Mixing Rules in PDMS Vitrimers," *Materials Research Society Spring Conference*

L. Porath[+], Evans, C. (*presentation*) "Using Dynamic Covalent Chemistry to Control Viscoelasticity in Vitrimers for Vibration Damping Applications," *American Chemical Society Spring Conference*

L. Porath[+], Evans, C. (*presentation*) "Tuning the Relaxation Spectra of Vitrimers via Crosslinker Chemistry and Mixing," *American Physical Society Conference March Meeting*

2021

L. Porath[+], Evans, C. (*presentation*) "Tuning Viscoelastic Behavior of Vitrimers via Crosslinker and Backbone Control," *Society of Rheology Conference*

L. Porath[+], Ma, J., Miljkovic, N., Evans, C. (*presentation*) "PDMS Dynamic Networks: Rheology and Thin Films," *American Chemical Society Spring Conference* (virtual)

J. Ma[+], Porath, L., Evans, C., Miljkovic, N. (*presentation*) "Self-Healing Vitrimer Coatings for Robust Hydrophobicity," *Materials Research Society Spring Conference* (virtual)

L. Porath[+], Evans, C. (*presentation*) "Probing the Viscoelastic Properties of Vitrimers," *American Physical Society March Meeting Conference* (virtual)

2020

L. Porath[+], Evans, C. (*presentation*) "Viscoelasticity of PDMS Vitrimers over a Wide Temperature Window," *International Congress on Rheology* (virtual)

L. Porath[+], Evans, C. (*presentation*) "PDMS Vitrimers: Temperature-dependent Viscoelasticity," *Virtual Polymer Physics Symposium*
L. Porath[+], Evans, C. (*presentation*) "Molecular weight effects on viscoelastic behavior in PDMS vitrimers," *APS March Meeting Conference* (cancelled due to pandemic)

2019

L. Porath[+], Evans, C. (*poster*) "Temperature-dependent stress relaxation of neutral and ionic dynamic polymers," *Society of Rheology Conference*

2018

B. Jing[+], Porath, L. [+], Evans, C. (*poster*) "Dynamic Ionic Networks for Solid Polymer Electrolytes," *Energy and Biosciences Institute Conference*

Active Memberships in Scientific Societies

American Chemical Society *2021 – Present*

Society of Rheology *2019 – Present*
Student Engagement Team Member (April 2021 – Jan 2022)

- Assisted in planning, budget, and organization of trivia event for 100+ graduate students
- Aimed to improve involvement and community among the Society's student members

American Physical Society *2014 – Present*

Personal Skills

Languages: English (*Native*), French (*Limited Working Proficiency*), Hindi (*Elementary Proficiency*), German (*Elementary Proficiency*)

Professional Skills: Origin, Microsoft Office, Python