Whitney S. Loo

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Employment

07/2023 – Present	Conway Assistant Professor
01/2023 – 06/2023	Assistant Professor Department of Chemical and Biological Engineering **University of Wisconsin Madison**, Madison, WI
09/2020 – 11/2022	Postdoctoral Scholar Pritzker School of Molecular Engineering, Paul F. Nealey Group **University of Chicago,** Chicago, IL Nanofabrication Facility, Molecular Foundry, Ricardo Ruiz Group **Lawrence Berkeley National Lab,** Berkeley, CA
08/2017 – 08/2020	National Science Foundation Graduate Research Fellow
01/2016 – 08/2017	Graduate Student Researcher Department of Chemical and Biomolecular Engineering, Nitash P. Balsara Group **University of California Berkeley,** Berkeley, CA

Education

University of California Berkeley Berkeley, CA
Ph.D. Chemical and Biomolecular Engineering, August 2020.
Advisor: Professor Nitash P. Balsara
Thesis: Thermodynamics and Dynamics of Block Copolymer Electrolytes

Massachusetts Institute of Technology Cambridge, MA
BS Chemical Engineering with Minor in Chemistry, June 2015.

Awards and Honors

2023	Named Conway Assistant Professor in the Dept. of Chem. and Biol. Engr.
2022	Winner, Best Poster Award (Molecular Foundry User Meeting)
2021	Recipient, Forum for Early Career Scientists (FECS) Mini-Travel Grant (APS)
2020	Winner, Best Poster Award (PMSE Division ACS Fall Meeting)
2019	Finalist, Excellence in Graduate Polymer Research (AIChE)
2019	Recipient, Women in Chemical Engineering (WIC) Travel Award (AIChE)
2019	Participant, MIT Rising Stars in Chemical Engineering
2019	Finalist, Padden Award (APS DPOLY)
2018	Excellence in Lab Safety Award: Large Chemical Sciences (UC Berkeley)
2016 – 2020	National Science Foundation Graduate Research Fellowship
2015	MIT Eloranta Research Fellowship
2015	MIT Department of Chemical Engineering Outstanding Teaching Assistant Award
2014, 2015	MIT Department of Chemical Engineering Special Service Award

Publications (* Equal Contributions)

(36) **Loo, W.S.**, Feng, H. Ferron, T.J., Ruiz, R.R., Sunday, D.F., Nealey, P.F. Determining Thermodynamics of A-*b*-(B-*r*-C) Copolymers, *ACS Macro Lett,* **2023**, 12, 118-124. DOI: 10.1021/acsmacrolett.2c00645

(35) Chang, B.*, **Loo, W.S.*,** Yu, B., Dhuey, S., Nealey, P.F., Ruiz, R. Sequential Brush Grafting for Chemically and Dimensionally Tolerant Directed Self-Assembly of Block Copolymers. *ACS Appl. Mater. Interfaces,* **2023,** 15, 1, 2020-2029. DOI: 10.1021/acsami.2c16508

(34) Feng, H., Dolejsi, M., Zhu, N., Yim, S., **Loo, W.S.,** Ma, P., Zhou, C., Craig, G., Chen, W., Wan, L., Ruiz, R., de Pablo, J., Rowan, S., Nealey, P. Optimized Design of Block Copolymers with Covrying Properties for Nanolithgraphy. *Nat. Mater.,* **2022,** 21, 1426-1433. DOI: 10.1038/s41563-022-01392-1

(33) Grundy, L.S., Galluzzo, M.D., **Loo, W.S.,** Fong, A.Y., Balsara, N.P., Takacs, C.J., Inaccessibly Polarization-Induced Phase Transitions in a Block Copolymer Electrolyte. *Macromolecules,* **2022,** 55, 17, 7637-7649. DOI: 10.1021/acs.macromol.2c00922

(32) **Loo, W.S.*,** Fang, C.*, Balsara, N.P., Wang, R., Uncovering Local Correlations in Polymer Electrolytes Through a Combined Experimental and Computational Approach. *Macromolecules,* **2021**, 54, 14, 6639-6648. DOI: 10.1021/acs.macromol.1c00995

(31) Veeraraghavan, V.D., Frenck, L., Maslyn, J.A., **Loo, W.S.**, Parkinson, D.Y., Balsara, N.P., Evolution of Protrusions on Lithium Metal Anodes Stabilized by a Solid Block Copolymer Electrolyte Studied Using Time-Resolved X-ray Tomography, *ACS Applied Materials and Interfaces,* **2021**, 13, 23, 27006-27018. DOI: 10.1021/acsami.1c04582

(30) Maslyn, J.A., Frenck, L., Veeraraghavan, V.D., Muller, A., Ho, A.S., Marwaha, H., **Loo, W.S.,** Parkinson, D.Y., Minor, A.M., Balsara, N.P., Limiting Current in Nanostructured Block Copolymer Electrolytes, *Macromolecules,* **2021**, 54, 4010-4022. DOI: 10.1021/acs.macromol.1c00425

(29) Fang, C., **Loo, W.S.,** Wang, R., Salt Activity Coefficient and Chain Statistics in Poly(ethylene oxide)-based Electrolytes, *Macromolecules,* **2021**, 54, 2873-2881. DOI: 10.1021/acs.macromol.0c01850

(28) Shah, N., Dadashi-Silab, S., Galluzzo, M., Chakraborty, S., **Loo, W.,** Matyjaszewski, K., Balsara, N.P. Effect of Added Salt on Disordered Poly(ethylene oxide)-Block-Poly(methyl methacrylate) Copolymer Electrolytes, *Macromolecules,* **2021**, 54, 1414-1424. DOI: 10.1021/acs.macromol.0c02493

(27) Galluzzo, M.D., **Loo, W.S.,** Zhu, C., Schaible, E., Balsara, N.P. Dynamic Structure and Phase Behavior of a Block Copolymer Electrolyte under Dc Polarization, *ACS Applied Materials and Interfaces,* **2020**, 12, 57421-57430. DOI: 10.1021/acsami.0c16209

(26) Frenck, L., Veeraraghavan, V., Maslyn, J.A., Muller, A., Ho, A., **Loo, W.S.,** Minor, A., Balsara, N.P. Effect of Salt Concentration Profiles on Protrusion Growth in Lithium-Polymer-Lithium Cells, *Solid State Ionics,* **2020**, 358, 115517. DOI: 10.1016/j.ssi.2020.115517

(25) Ho, A., Barai, P., Maslyn, J.A., Frenck, L., **Loo. W.S.**, Parkinson, D., Srinivasan, V., Balsara, N.P. Uncovering the Relationship between Diameter and Height of Electrodeposited Lithium Protrusions in a Rigid Electrolyte, *ACS Appl. Energy Mater.,* **2020***, 3* (10), 9645-9655. DOI: 10.1021/acsaem.0c01175

(24) Gao, K. W., **Loo, W. S**., Snyder, R., Abel, B., Choo, Y., Lee, A., Teixeria, S., Garetz, B., Coates, G., Balsara, N.P. Miscible Polymer Blend Electrolytes, *Macromolecules,* **2020**, 53 (14), 5728-5739. DOI: 10.1021/acs.macromol.0c00747

(23) Maslyn, J.A., McEntush, K., Harry, K., Frenck, L., **Loo, W. S**., Parkinson, D., Balsara, N.P. Preferential Stripping of a Lithium Protrusion Resulting in Recovery of a Planar Electrode, *J. Electrochem. Soc,* **2020**, 167 (10), 100553. DOI: 10.1149/1945-7111/ab9d62

(22) Hou, K. H., **Loo, W. S.,** Balsara, N. P., Qin, J.; Comparing Experimental phase Behavior of Ion-Doped Block Copolymers with Theoretical Predictions Based on Selective Ion Solvation. *Macromolecules.* **2020**, 53, 3956-3966. DOI: 10.1021/acs.macromol.0c00559

(21) **Loo, W. S**., Faraone, A. A., Grundy, L. S., Gao, K. W., Balsara, N. P.; Polymer Dynamics in Block Copolymer Electrolytes Detected by Neutron Spin Echo. *ACS Macro Lett.,* **2020**, 9, 639-645. DOI: 10.1021/acsmacrolett.0c00236

(20) Mongcopa, K. I., Gribble, D. A., **Loo, W. S.,** Tyagi, M. S., Mullin, S. A., Balsara, N. P. Segmental Dynamics Measured by Quasi-elastic Neutron Scattering and Ion Transport in Chemically-Distinct Polymer Electrolytes. *Macromolecules.* **2020**, 53, 2406-2411. DOI: 10.1021/acs.macromol.0c00091

(19) Galluzzo, M.D., **Loo W.S.**, Wang, A., Walton, A., Maslyn, J., Balsara, N.P.; Measurement of Three Transport Coefficients and the Thermodynamics Factor in Block Copolymer Electrolytes with Different Morphologies, *J. Phys. Chem. B,* **2020***,* 124, 921-935. DOI: 10.1021/acs.jpcb.9c11066

(18) Frenck, L., Maslyn, J.A., **Loo, W.S**., Parkinson, D., Balsara, N.P.; Impact of Salt Concentration on Non-uniform Lithium Electrodeposition through Rigid Block Copolymer Electrolytes, *ACS Appl. Mater. Interfaces,* **2019**, 11, 47878-47885. DOI: 10.1021/acsami.9b15606

(17) **Loo, W.S**., Mongcopa, K.I., Gribble, D.A., Faraone, A.A., Balsara, N.P.; Investigating the Effect of Added Salt on the Chain Dimensions of Poly(ethylene oxide) through Small Angle Neutron Scattering, *Macromolecules,* **2019**, 52 (22), 8724-8732. DOI: 10.1021/acs.macromol.9b01509

(16) Maslyn, J.A., Frenck, L., **Loo, W.S**., Parkinson, D., Balsara, N.P.; Extended Cycling through Rigid Block Copolymer Electrolytes Enabled by Reducing Impurities in Lithium Metal Electrodes, *ACS Appl. Energy Mater.,* **2019**, 2 (11), 8197-8206. DOI: 10.1021/acsaem.9b01685

(15) Gribble, D.A., Frenck, L., Shah, D. B., Maslyn, J. A., **Loo, W.S.**, Mongcopa, K.I., Pesko, D., Balsara, N.P.; Comparing Experimental Measurements of Limiting Current in Polymer Electrolytes with Theoretical Predictions, *J. Electrochem. Soc.,* **2019**, 166 (14), A3228-A3234. DOI: 10.1149/2.03919jes

(14) **Loo, W. S.**, Sethi, G. K., Teran, A. A., Galluzzo, M. D., Maslyn, J. A., Oh, H. J., Moncopa, K. I., Balsara, N. P.; Composition Dependence of Flory Huggins Interactions Parameters of Block Copolymer Electrolytes and the Isotaksis Point, *Macromolecules,* **2019**, 52 (15), 5590-5601. DOI: 10.1021/acs.macromol.9b00884

(13) Sethi, G., Jung, H. A., **Loo, W. S**., Sawhney, S., Park, M. J., Balsara, N. P., Villaluenga, I.; Structure and Thermodynamics of Hybrid Organic-Inorganic Diblock Copolymers with Salt, *Macromolecules,* **2019,** 52 (9), 3165-3175. DOI: 10.1021/acs.macromol.9b00042

(12) Galluzzo, M. D., Halat, D., **Loo, W. S.,** Mullin, S. A., Reimer, J., Balsara, N. P.; Dissolution of Lithium Metal in Poly(ethylene oxide), *ACS Energy Lett.,* **2019**, 4, 903-907. DOI: 10.1021/acsenergylett.9b00459

(11) **Loo, W. S.**, Balsara, N. P.; Organizing Thermodynamic Data obtained from Salt-Containing Polymer Blends and Block Copolymers, *J Poly. Sci. B,* **2019**, *57*, 1177-1187. DOI: 10.1002/polb.24800

(10) Li, X.*, **Loo, W. S**.*, Jiang, X., Wang, X., Galluzzo, M., Mongcopa, K. I., Wang, A., Balsara, N. P., Garetz, B.; Confined versus Unconfined Crystallization in Block Copolymer/Salt Mixtures Studied by Depolarized Light Scattering, *Macromolecules*, **2019**, 52 3, 982-991. DOI: 10.1021/acs.macromol.8b02142

(9) Grundy, L., Sethi, G., Galluzzo, M., **Loo, W. S**., Maslyn, J., Teran, A., Thelen, J., Timachova, K., Reimer, J., Madsen, L., Balsara, N. P.; Detection of the Order-to-Disorder Transition in Block Copolymer Electrolytes Using Quadrupolar ^{7}Li NMR Splitting, *ACS Macro. Lett.,* **2019**, 8, 107-112. DOI: 10.1021/acsmacrolett.8b00809

(8) Oh, H. J., Aboian, M., Yi, M., Maslyn, J. A., **Loo, W. S**., Jiang, X., Parkinson, D., Wilson, M., Moore, T., Yee, C., Robbins, G., Barth, F., DeSimone, J. M., Hetts, S., Balsara, N. P.; 3D Printed Absorber for Capturing Chemotherapy Drugs before they Spread through the Body, *ACS Cent. Sci.*, **2019**, 5 (3), 419-427. DOI: 10.1021/acscentsci.8b00700

(7) Maslyn, J. A., **Loo, W. S**, McEntush, K., Oh, H.J., Harry, K., Parkinson, D., Balsara, N. P.; Growth of Lithium Dendrites and Globules through a Solid Block Copolymer Electrolyte as a Function of Current Density, *J. Phy. Chem. C*, **2018**, 122 (47), 26797-26804. DOI: 10.1021/acs.jpcc.8b0635å

(6) Wang, D., Shah, D., Maslyn, J. A., **Loo, W. S**., Nelson, E., Latimer, M., Feng, J., Prendergast, D., Pascal, T., Balsara, N. P.; Discharge Mechanism in a Solid-State Lithium-Sulfur Cell by Operando X-ray Absorption Spectroscopy, *J. Electrochem. Soc.,* 2018, 165 (14), A3487-A3495. DOI: 10.1149/2.0981814jes

(5) **Loo, W. S**, Galluzzo, M. D., Li, X., Maslyn, J. A., Oh, H. J., Mongcopa, K. I., Zhu, C., Wang, A. A., Wang, X., Garetz, B. A., Balsara, N. P.; Phase Behavior of Mixtures of Block Copolymers and a Lithium Salt, *J. Phy. Chem. B,* **2018**, 122 (33), 8065-8074.

(4) Sethi, G. K., Jiang, X., Chakraborty, R., **Loo, W. S**., Villaluenga, I., Balsara, N. P. Anomalous Self-Assembly and Ion Transport in Nanostructured Organic – Inorganic Solid Electrolytes. *ACS Macro Lett.* **2018**, 7, 1056-1061. DOI: 10.1021/acsmacrolett.8b00583

(3) **Loo, W. S.,** Jiang, X., Maslyn, J. A., Oh, H. J., Zhu, C., Downing, K. H., Balsara, N. P. Reentrant phase behavior and coexistence in asymmetric block copolymer electrolytes. *Soft Matter*, **2018**, **14**, 2789 – 2795. DOI: 10.1039/c8sm00175h

(2) Wang, X.; Li, X.; **Loo, W**.; Newstein, M. C.; Balsara, N. P.; Garetz, B. A. Depolarized Scattering from Block Copolymer Grains Using Circularly Polarized Light. *Macromolecules* **2017**, 50 (13), 5122-5131. DOI: 10.1021/acs.macromol.7b01048

(1) Veiseh, O., Doloff, J.C., Ma, M., Vegas, A.J., Tam, H.H., Bader, A.R., Li, J., Langan, E., Wyckoff, J., **Loo, W.S.,** *et al.,* Size- and shape-dependent foreign body immune response to materials implanted in rodents and non-human primates. *Nat. Mater.* **2015**, **14,** 643–651. DOI: 10.1038/nmat4290

Peer Reviewer for *Macromolecules* (2019-Present).

Successful Proposals

(5) “Fine Tuning the Interaction Parameter for Sub-10 nm Block Copolymer Directed Self-Assembly”, Proposals 6931, 7373, Molecular Foundry, Lawrence Berkeley National Lab, 2020-2022.
(4) “Investigating the effect of salt on Rouse dynamics and tube reptation in block copolymer/salt mixtures”, Proposal 2511, NIST Center for Neutron Research, NG-7 SANS and NSE, 2019.
(3) “Probing the spatial distribution of salt in block copolymer electrolytes with RSoXS”, Proposal 09617, Advanced Light Source, Beamline 11.0.1.2, RSoXS, 2018-2019.
(2) “Study of asymmetric block copolymer electrolyte thermodynamics through X-ray scattering”, Proposal 4894A, Stanford Synchrotron Radiation Lightsource, Beamline 1-5, SAXS/WAXS, 2017-2019.
(1) “Study of asymmetric block copolymer electrolyte thermodynamics through X-ray scattering”, Advanced Light Source, Beamline 7.3.3, SAXS/WAXS. 2018-2019.

Invited Presentations

(8) 06/2023 Telluride Science Workshop: Molecular Engineering of Soft Matter, Telluride, CO
“Self-Healing Directed Self-Assembly of A-*b*-(B-*r*-C) Copolymers”
(7) 09/2022 Molecular Foundry Seminar Series, Berkeley, CA
“Self-Healing Directed Self-Assembly of Block Copolymers for Lithographic Applications”
(6) 10/2020 P3S Webinar Series, *Virtual Format*
“The Effect of Salt on Polymer Dynamics through Neutron Spin-Echo Spectroscopy”
(5) 1/2020 NCNR Division Seminar, NIST, Gaithersburg, MD,
“Using neutron scattering techniques to probe the effect of salt on the chain dimensions and segmental dynamics of polymer electrolytes”
(4) 11/2019 AIChE Annual Meeting, Orlando, FL
“Investigating the Effect of Salt on Segmental Dynamics in Block Copolymer Electrolytes for Lithium Batteries”
(3) 9/2019 Chemical Engineering Department Seminar, Berkeley, CA
“Interaction parameters governing self-assembly of ion-containing block copolymers”
(2) 3/2019 APS March Meeting, Boston, MA
“Interaction parameters governing self-assembly of ion-containing block copolymers”
(1) 7/2018 Gordon Research Seminar Polymer Physics, Mount Holyoke, MA
“Probing coexisting ordered structures in block copolymer electrolytes with X-ray scattering techniques”

Contributed Presentations

(16) 03/2023 ACS Spring Meeting, Indianapolis, IN
“Self-Healing Directed Self-Assembly of Block Copolymers for Lithographic Applications”
(15) 03/2023 APS March Meeting, Las Vegas, NV
“Self-Healing Directed Self-Assembly of Block Copolymers for Lithographic Applications”
(14) 08/2022 Molecular Foundry User Meeting, Berkeley, CA
“Self-Healing Directed Self-Assembly of Block Copolymers for Lithographic Applications”, *Poster Presentation*
(13) 07/2022 Gordon Research Conference, Polymer Physics, South Hadley MA
“Self-Healing Directed Self-Assembly of Block Copolymers for Lithographic Applications”, *Poster Presentation*
(12) 06/2022 Tosoh Polymer Conference, Hollywood, CA
“Self-Healing Directed Self-Assembly of Block Copolymers for Lithographic Applications”, *Poster Presentation*
(11) 04/2022 SPIE Advanced Lithography and Patterning, San Jose CA

"Effect of Pattern Transfer Process on Resulting Roughness of Block Copolymer Patterns from Directed Self-Assembly"

(10) 03/2022 APS March Meeting, Chicago IL
"Determining Lamellar Structure with Soft X-ray Reflectivity"

(9) 11/2021 AIChE Annual Meeting, Boston MA
"Fine Tuning the Interaction Parameter for Sub-10 nm Block Copolymer Directed Self-Assembly"

(8) 03/2021 APS March Meeting, *Virtual Meeting*
"Determining Lamellar Structure with Soft X-ray Reflectivity"

(7) 11/2020 AIChE Annual Meeting, *Virtual Meeting*
"The Effect of Salt on Polymer Dynamics through Neutron Spin-Echo Spectroscopy"

(6) 8/2020 ACS Fall Annual Meeting, *Virtual Meeting,* ***Winner Best Poster Prize***
"Polymer Dynamics in Block Copolymer Electrolytes detected by Neutron Spin-Echo", *Poster Presentation, Selected for Participation in Sci-Mix Poster Session*

(5) 3/2020 APS March Meeting, Denver CO, *Virtual Session*
"The Effect of Salt on Polymer Dynamics through Neutron Spin-Echo Spectroscopy",

(4) 10/2018 Advanced Light Source User Meeting, Berkeley CA
"Phase behavior of block copolymers mixed with a Lithium salt", *Poster Presentation*

(3) 7/2018 Gordon Research Conference Polymer Physics, Mount Holyoke, MA
"Phase behavior of block copolymers mixed with a Lithium salt", *Poster Presentation*

(2) 3/2018 APS March Meeting, Los Angeles, CA
"Probing coexisting ordered structures in block copolymer electrolytes with X-ray scattering techniques"

(1) 3/2017 APS March Meeting, New Orleans, LA
"The effect of salt on the morphologies of compositionally asymmetric block copolymer electrolytes"

Professional Affiliations

American Physical Society, American Institute of Chemical Engineers, American Chemical Society

Service and Outreach

(15) Member (2023-2025), Advanced Light Source User Executive Committee
(14) Member, Nominating Committee (2022-2024), DPOLY Division of APS
(14) Early Career Member-at-Large of Executive Committee (2021-2023), DPOLY Division of APS
(13) Focus Session Organizer and Chair (2023), APS March Meeting, Las Vegas NV
(12) Symposium Organizer (2022), Molecular Foundry Annual User Meeting, Berkeley CA
(11) Creator and Admin (2020-2022), Early Career Researchers in Polymer Physics Slack Channel
(10) Chair (2020-2022), 2022 Polymer Physics Gordon Research Seminar, Mount Holyoke, MA
(9) Discussion Leader (2022), 2022 Tosoh Polymer Conference, Los Angeles, CA
(8) Session Chair (2021), AIChE Annual Meeting, Boston MA
(7) Workshop Leader (2021), Advanced Light Source User Meeting, Berkeley CA
(6) Workshop Organizer (2020), 2020 Winter Chicago Expanding Your Horizons Conference, *Virtual*
(5) Organizer (2020), 2020 Virtual Polymer Physics Symposium
(4) Chair (2018-2020), 2020 Polymer Physics Gordon Research Seminar, Mount Holyoke, MA
(3) President (2018-2019), Secretary (2017-2018), Social Chair (2016-2017), Graduate Student Advisory Committee Department of Chemical and Biomolecular Engineering, Berkeley, CA
(2) Co-chair (2018-2020), Member (2015-2020), MIT10 Volunteer Corps, Cambridge, MA
(1) Mentor (2015-2017), Students for Environmental Energy Development, Berkeley, CA

Teaching Experience

(8) Instructor, *Polymer Science and Technology*, CBE540, Department of Chemical and Biological Engineering, University of Wisconsin Madison, Spring 2023.
(7) Guest Lecturer, *Principles of Polymer Chemistry,* CBE165, Department of Chemical and Biomolecular Engineering, UC Berkeley, Spring 2019.
(6) Graduate Student Instructor, *Thermodynamics,* CBE141. Department of Chemical and Biomolecular Engineering, UC Berkeley, Spring 2018.
(5) Graduate Student Instructor, *Mass Transport and Separations,* CBE150B. Department of Chemical and Biomolecular Engineering, UC Berkeley, Fall 2016.
(4) Graduate Student Instructor, *Introduction to Chemical Engineering,* CBE40. Department of Chemical and Biomolecular Engineering, UC Berkeley, Fall 2015.
(3) Teaching Assistant, *Challenge of Leadership in Teams,* 10.10s. Department of Chemical Engineering, MIT, Summer 2015.
(2) Teaching Assistant, *Chemical Engineering Projects Laboratory,* 10.26. Department of Chemical Engineering, MIT, Spring 2015.
(1) Teaching Assistant, *Engineering Leadership Lab,* ELL.201. Gordon Engineering Leadership Program, MIT, Fall 2014, Spring 2015.

Students Supervised

(4) Marissa Gallmeyer, University of Wisconsin Madison, January 2023 – present, PhD student
(3) Jenny Wu, University of Wisconsin Madison, January 2023 – present, PhD student
(2) Daniel Gribble, UC Berkeley CBE, October 2018 – June 2019, undergraduate researcher (currently PhD at Purdue University)
(1) Andrew Wang, UC Berkeley CBE, January 2017 – May 2018, undergraduate researcher (PhD, 2022, Cambridge University)

References

Prof. Paul Nealey – nealey@uchicago.edu
Dr. Ricardo Ruiz – ricardo.ruiz@lbl.gov
Prof. Nitash Balsara – nbalsara@berkeley.edu