Monica L. Ohnsorg, Ph.D.

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Education

University of Colorado – BoulderNovember 2021- PresentPostdoctoral Researcher, Chemical and Biological Engineering Advised by:Kristi S. Anseth			
University of Minnesota – Twin CitiesAugust 2016 – September 2021Doctor of Philosophy, ChemistryDissertation: End-Group Modified Bottlebrush Polymers to Deliver Active Pharmaceutical IngredientsField of Study:Polymer ChemistryAdvised by:Theresa M. Reineke and Frank S. Bates			
Hope College – Holland, MIBachelor of Science, Magna Cum LaudeMajor:Chemistry – American Chemical Society (ACS) CertifiMinors:Engineering and Mathematics		August 2012 – May 2016 GPA: 3.79 Certified	
Honors and Awards			
 Nin 132 Interdisciplinary Training in Muscubskeletar Research Eastman Chemical Student Award in Applied Polymer Science Winner (ACS PMSE) CAS Future Leader (https://www.cas.org/about/futureleaders) Paul and Gerda Gassman Presentation Award Paul and Gerda Gassman Presentation Award National Science Foundation Graduate Research Fellowship Program - Awarded University of Minnesota Departmental Fellowship - Chemistry National Science Foundation Graduate Research Fellowship Program - Honorable Mention Hope College Chemistry Senior Award for Research Sigma Xi Research Award ACS 2016 Division of Inorganic Chemistry Award for Undergraduate Research 2016 Division of Colloid and Surface Chemistry Best Poster (ACS Spring 2015) NDConnect Undergraduate Research Competition National Finalist Distinguished Scholar Award (2012-16) and Jaecker Chemistry Scholarship 			
	Research Experien	63(

 Postdoctoral Research:
 Bottlebrush Hydrogels
 November 2021 - Present

 Department of Chemical and Biological Engineering - University of Colorado Boulder
 Advisor: Prof. Kristi S. Anseth

- Synthesize PEG-based bottlebrush polymers via RAFT and ROMP
- Cross-link bottlebrush hydrogels using thiol-ene click reactions and characterize material properties
- Encapsulate and culture hMSCs within PEG bottlebrush hydrogels to understand cell-matrix interactions

<u>Graduate Research</u>: Bottlebrush Polymers for Oral Drug Delivery Department of Chemistry – University of Minnesota – Twin Cities Advisors: Prof. Theresa M. Reineke and Prof. Frank S. Bates

- Synthesized thermoresponsive linear and bottlebrush copolymers via RAFT polymerization and ROMP
- Enhanced the solubility of small molecule pharmaceutics using polymeric excipients for oral drug delivery
- Characterized polymers using light and x-ray scattering
- Investigated structure-property relationships

July 2016 – September 2021

Research Experience (cont.)

<u>Undergraduate Research:</u> Metal-Organic Framework Thin Films *Department of Chemistry - Hope College Advisor: Dr. Mary E. Anderson*

May 2013 - May 2016

- Nanomaterial synthesis, assembly, and characterization
- Synthesized metal-organic coordinated thin film systems (MOFs and Multilayers)
- Characterized films using scanning probe microscopy, ellipsometry, and contact angle goniometry

Techniques/Instrumentation: Reversible Deactivation Radical Polymerization, Ring-Opening Metathesis Polymerization, Small Molecule Synthesis, Dynamic and Static Light Scattering, Small Oscillatory Shear Rheology, Cell Culture, Confocal Microscopy, Immunocytochemical staining, Spray Drying, HPLC, Dissolution Assays, Size Exclusion Chromatography, Nuclear Magnetic Resonance Spectroscopy, Scanning Probe Microscopy (PeakForce Tapping, C-AFM, MFM), Ellipsometry, Contact Angle Goniometry, Image J

Publications

- <u>Ohnsorg, M. L.</u>; Barr, K. E.; Sarode, A.; Nagapudi, K.; Liberman, L.; Corcoran, L. G.; Feder, C.; Bates, F. S.; Reineke, T. M. "Increasing the Solubility of the Selective Estrogen Receptor Degrader, GDC-0810: Defining the Utility of Bottlebrush Excipients over Linear Analogues," *in preparation.*
- 2. <u>Ohnsorg, M. L.=</u>; Dalal, R. J.=; Panda, S.; Reineke, T. M. "Hydrophilic Surface-Modification of Cationic Unimolecular Bottlebrush Vectors Moderate pDNA and RNP Bottleplex Stability and Delivery Efficacy," *Biomacromolecules* 2022, Article ASAP (doi: <u>https://doi.org/10.1021/acs.biomac.2c00999</u>)
- Fung, F. M.; Jilani, S. Z.; <u>Ohnsorg. M. L.</u>; Pinals, R. L.; Saraf, M.; Tropp, J.; Carlton, P. "How Early-Career Scientists Responded with Resiliency to the Space Created by the COVID-19 Pandemic," *ACS Cent. Sci.* 2022, 8, 3, 294-296. (doi: <u>https://doi.org/10.1021/acscentsci.2c00094</u>)
- 4. Dalal, R. J.; Kumar, R.; <u>Ohnsorg, M. L.</u>; Brown, M.E.; Reineke, T.M. "Cationic Bottlebrush Perform Outperform Linear Polycation Analogues for pDNA Delivery and Gene Expression," *ACS Macro Lett.* **2021**, 10, 886-893. (doi: <u>https://doi.org/10.1021/acsmacrolett.1c00335</u>)
- 5. <u>Ohnsorg, M. L.</u>; Prendergast, P. C.; Robinson, L. L.; Bockman, M.R.; Bates, F. S.; Reineke, T. M. "Bottlebrush Polymer Excipients Enhance Drug Solubility: Influence of End-Group Hydrophilicity and Thermoresponsiveness," *ACS Macro Lett.* 2021, 10, 375-381. (doi: <u>https://doi.org/10.1021/acsmacrolett.0c00890</u>)
 Featured in Color Me PhD – "Polymer Parachutes" Coloring Book Page (<u>https://bit.ly/3uL7wm7</u>)
- 6. <u>Ohnsorg. M. L.</u>; Ting, J. M.; Jones, S. D.; Jung, S.; Bates, F. S.; Reineke, T. M. "Tuning PNIPAm self-assembly and thermoresponse: roles of hydrophobic end-groups and hydrophilic comonomer," *Polym. Chem.* 2019, 10, 3469–3479. (doi: <u>https://doi.org/10.1039/C9PY00180H</u>)
- 7. Lau, J.; Trojniak, A. E.; Maraugha, M. J.; VanZanten, A. J.; Osterbaan, A. J.; Serino, A. C.; <u>Ohnsorg. M. L.</u>; Cheung, K. M.; Ashby, D. S.; Weiss, P. S.; Dunn, B. S.; Anderson, M. E. "Conformal Ultrathin Film MOF Analogs: Characterization of Growth Porosity, and Electronic Transport," *Chem. Mater.* **2019**, 31, 8977-8986. (doi: <u>https://doi.org/10.1021/acs.chemmater.9b03141</u>)
- Bowser, B. H.; Brower, L. J.; <u>Ohnsorg, M. L.</u>; Gentry, L.; Anderson, M. E. "Comparison of Surface-Bound and Free-Standing Variations of HKUST-1 MOFs: Effect of Activation and Ammonia Exposure on Morphology, Crystallinity, and Composition," *Nanomaterials* 2018, *8*, 650. (doi: <u>https://doi.org/10.3390/nano8090650</u>)
- 9. <u>Ohnsorg, M. L.</u>; Beaudoin, C. K.; Anderson, M. E. "Fundamentals of MOF Thin Film Growth via Liquid-Phase Epitaxy: Investigating the Initiation of Deposition and the Influence of Temperature," *Langmuir.* 2015, 31, 6114–6121. (doi: <u>https://doi.org/10.1021/acs.langmuir.5b01333</u>)
- Benson, A. S.; Elinski, M. B.; <u>Ohnsorg, M. L.</u>; Beaudoin, C. K.; Alexander, K. A.; Peaslee, G. F.; DeYoung, P. A.; Anderson, M. E. "Metal-Organic Coordinated Multilayer Film Formation: Quantitative Analysis of Composition and Structure," *Thin Solid Films.* **2015**, 590, 103–110. (doi: <u>https://doi.org/10.1016/i.tsf.2015.07.048</u>)

Patents

1. Reineke, T.; Bates, F.S.; <u>Ohnsorg. M.L.</u> "Macromonomers and Bottle Brush Polymers for Delivery of Biological Agents," U.S. Patent US 20220339288 A1, October 27, 2022.

Select Presentations

Oral Presentations:

1. "Bottlebrush Copolymer Excipients to Non-Covalently Sequester and Solubilize Active Pharmaceutical Ingredients" 2022 MCE Future London Service - Vieture Mary 10, 2022 Northurstern University

2022 MSE Future Leaders Seminar Series – Virtual, May 18, 2022, Northwestern University.

- 2. "End-Group Modified Bottlebrush Copolymer Excipients Enhance Oral Drug Solubility" Young Macromolecular Researcher Webinar – Virtual, April 28, 2022., hosted by University of Warwick.
- **3. "Copolymer Excipients to Improve the Solubility and Delivery of an Orally Administered Breast Cancer Therapeutic"** *ACS Nat'l Conference, Fall 2021.* PMSE – General Papers/New Concepts in Polymer Materials

4. "Thermoresponsive Bottlebrush Polymers for Oral Drug Delivery: Influence of End-Group Hydrophilicity and Hydrophobicity"

ACS Nat'l Conference, Virtual, April 2021. Eastman Chemical Student Award Winner in Applied Polymer Science

5. "Thermoresponsive Bottlebrush Polymers for Oral Drug Delivery: An Investigation of End-Group Functionality"

Graduate Research Symposium, University of Minnesota, June 4, 2019, Gassman Presentation Award.

6. "Architectural Design of Thermoresponsive Multiblock Copolymers Reveal Self-Assembly into Higher Order Nanostructures"

National Graduate Research Polymer Conference, University of Minnesota, June 11, 2018.

- 7. "Layer-by-layer assembly of metal-organic coordinated thin films: Fundamentals of formation..." Invited - ACS Nat'l Conference, March 2016, "Frontiers in Undergraduate Research" symposium (INOR).
- 8. "Understanding Fundamental Thin Film Growth to Further Integration into Applied Devices" ND Connect Research Competition, Notre Dame University (NDNano), October 23, 2015. <u>Awarded 2nd Place</u>.

Poster Presentations:

- 1. "Strain-stiffening Bottlebrush Polymer Hydrogels Influence hMSC Morphology and Mechanotransduction" ACS POLY, Polymers in Medicine and Biology, November 2022, <u>Best Poster Award.</u>
- 2. "End-Group Modified Bottlebrush Copolymers to Deliver Active Pharmaceutical Ingredients" ACS Nat'l Conference, March 2022, Division of Polymer Chemistry.
- **3. "Tuning PNIPAm Self-Assembly and Thermoresponse using End-Group and Hydrophilic Comonomer Incorporation"** *IPrime Annual Meeting, University of Minnesota, May 28-29, 2019.*

IFTIME Annual Meeting, Oniversity of Minnesola, May 20-29, 2019.

- 4. "Understanding Fundamental Thin Film Growth to Further Integration into Applied Devices" ND Connect Research Competition, Notre Dame University (NDNano), October 23, 2015.
- 5. "Metal-Organic Thin Film Formation: Fundamentals to Applications" Beckman Scholars Symposium 2015 (Irvine, CA), August 9, 2015.
- 6. "Foundational Layer Formation of Metal-Organic Coordinated Thin Films" Selected for SciMix ACS Nat'l Conference, March 2015, <u>Colloid and Surface Chemistry Best Poster Award</u>.

Mentoring Experience		
September 2022 – Present	Kayla Mash, undergraduate student mentee	
September 2022 – Present	Danial Saeb, high school student mentee	

Mentoring ExperienceJuly 2022 – PresentElla Hushka, graduate student mentee, NSF GRFP FellowNovember 2020 – September 2021Kaylee Barr, graduate student mentee, NSF GRFP FellowSummer 2019Paige Prendergast, MRSEC REU Student
currently: Technical Services Engineer, Epic SystemsAugust 2017 – May 2019Cameron Swenson, undergraduate student mentee
currently: 3nd Year Grad Student, University of California, Berkeley

Select Outreach and Community Involvement

Leadership:

Secretary of the Postdoctoral Association of Colorado Boulder (PAC) (https://colorado.edu/pac)

2022-present • University of Colorado Boulder

Organize events to connect the postdoctoral community at CU Boulder and surrounding national labs.

President of UMN ACS POLY/PMSE Student Chapter (https://polypmse.chem.umn.edu/)

2018-2020 • *University of Minnesota – Twin Cities* Organize polymer related workshops, seminars, and networking opportunities for graduate students and post-docs.

National Graduate Research Polymer Conference Planning Committee (www.ngrpc18.umn.edu)

March 2018 • *University of Minnesota – Twin Cities* Organized and hosted all aspects of a national conference with a team of 7 other graduate students.

SciMentors - GED Science Lab Curriculum Supplement (http://scimentors.chem.umn.edu/)

March 2018 • OpenDoor Learning Center – Minneapolis, MN Developed and lead a lab experiment for GED seeking adults to explain elements, compounds, and mixtures

Women in Science and Engineering - Cool Chem! (https://cse.umn.edu/chem/cool-chemistry)

April 2018-19 • University of Minnesota – Twin Cities Organized, prepared, and lead a polymer themed demonstration and activity for 7th and 8th grade girls Performed a large-scale chemistry demonstration show for attendees and parents

Treasurer of UMN ACS POLY/PMSE Student Chapter

2017-2018 • University of Minnesota – Twin Cities

Campus:

Energy and U (https://cse.umn.edu/chem/energy-and-u)

January 2017, 2019 • College of Science and Engineering, University of Minnesota – Twin Cities On-stage fire safety for live demonstrations and in-crowd ushering.

MRSEC Polymer Day

July 2016-2019 • Materials Research Science and Engineering Center, University of Minnesota – Twin Cities Prepared and led polymer demonstrations for high school students.

Community:

Meet a Scientist - CU Science Ambassadors 2022

2022 • CU Science Discovery

Developed my own outreach activity to teach children and parents at the Lafayette Public Library that "Not all plastics are the same!"

Guest Scientist and Illustrator for Color Me PhD (https://www.colormephd.org/)

$2020\text{-}2021 \bullet \textit{Color} \textit{Me PhD}$

Illustrated my own research as a coloring page with an accessible research description. Work with scientists to turn their own research projects into coloring pages.

SciMentors - Math and English Tutoring

2016-2018 • Open Door Learning Center – Minneapolis, MN Tutored Math and English for GED seeking adults

Cool Chem!

April 2017 • *Women in Science and Engineering, University of Minnesota – Twin Cities* Organized and led science-based activities for 7th and 8th grade girls from surrounding school districts.

References

Kristi S. Anseth – Postdoctoral Research Mentor (University of Colorado Boulder) Email: kristi.anseth@colorado.edu Phone: 303-735-5336

Theresa M. Reineke – Graduate Research Mentor (University of Minnesota) Email: treineke@umn.edu Phone: 612-624-8042

Frank S. Bates – Graduate Research Mentor (University of Minnesota) Email: bates001@umn.edu Phone: 612-624-0839