

Courtney Reichhardt, Ph.D.

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EDUCATION

B.S., Chemistry; Montana State University, 2010 *Highest honors*

Ph.D., Chemistry; Stanford University, 2016

Advisor: Lynette Cegelski

Thesis Title: *Atomistic insights into microbial biofilms*

Postdoctoral researcher, Microbiology; University of Washington, 2016-2021

Advisor: Matthew Parsek

APPOINTMENTS

Assistant Professor of Chemistry, Washington University in St. Louis, 2021-*present*

Affiliate Assistant Professor of Biochemistry and Molecular Biophysics, Washington University in St. Louis, 2022-*present*

AWARDS AND RECOGNITION

- 2023 Outstanding Faculty Mentor, WUSTL Office of Postdoctoral Affairs
- 2019-2024 K99/R00 “Pathway to Independence” Award, NIGMS
- 2019-2024 Postdoc-to-Faculty Transition Award, Cystic Fibrosis Foundation (CFF)
- 2019 Cystic Fibrosis Mentored Research Innovation Award, Vertex - *awarded but declined*
- 2017-2019 Carol Basbaum Memorial Research Fellowship, CFF - *awarded to top ranked applicant*
- 2017 American Heart Association (AHA) Postdoctoral Fellowship - *awarded but declined*
- 2016-2017 Cystic Fibrosis Research Development Program Postdoctoral Fellowship
- 2014 ENC Student Travel Stipend, Suraj P. Manrao Science Foundation
- 2013-2015 Althouse Family Stanford Graduate Fellowship
- 2013 NSF Graduate Research Fellowship Program-Honorable Mention
- 2011 NSF Graduate Research Fellowship Program-Honorable Mention
- 2010 MSU Women’s Center Student of Achievement Award
- 2010 Ralph A. Olsen Creativity Award, Montana State University
- 2009-2010 Beckman Scholar, Arnold and Mabel Beckman Foundation
- 2009-2010 Howard Hughes Medical Institute Scholar at Montana State University - *science outreach*
- 2008 Arthur and Lois Fry Award, Department of Chemistry, Montana State University
- 2008 IDEa Network of Biomedical Research Excellence Scholar, INBRE, NIH
- 2007 Center for Bio-Inspired Nanomaterials (CBIN) Summer Research Fellowship

PUBLICATIONS

- 27. Fazio, N. T.*, **Reichhardt, C.** Structural biology: Proteobacterial accessories for diverse cellulose synthesis. *Current Biology* **2024**, doi: 10.1016/j.cub.2023.12.029. [***postdoc supervised directly by CR**]
- 26. Amyx-Sherer, K.*, **Reichhardt, C.** Challenges and opportunities in elucidating the structures of biofilm exopolysaccharides: A case study of the *Pseudomonas aeruginosa* exopolysaccharide called Pel. *Magnetic Resonance in Chemistry* **2023**, doi: 10.1002/mrc.5405. [***student supervised directly by CR**]
- 25. **Reichhardt, C.** The *Pseudomonas aeruginosa* biofilm matrix protein CdrA has similarities to other fibrillar adhesin proteins. *Journal of Bacteriology-Special Series: 2022 ASM Conference on Biofilms* **2023**, e00019-23.

24. Razvi E., Whitfield G.B., **Reichhardt C.**, Dreifus J., Willis A., Gluscencova O., Gloag E., Awad T., Rich J., Passos da Silva D., Bond W., Le Mauff F., Sheppard D.C., Hatton B., Stoodley P., Reinke A., Boulianne G., Wozniak D., Harrison J., Parsek M., Howell P.L. Glycoside hydrolase processing of the Pel polysaccharide alters biofilm biomechanics and *Pseudomonas aeruginosa* virulence. *NPJ Biofilms Microbiomes* **2023**, *9*, 7.
23. Le Mauff F., Razvi E., **Reichhardt C.**, Sivarajah P., Parsek M.R., Howell P.L., Sheppard D.C. The Pel polysaccharide is predominantly composed of a dimeric repeat of α -1,4 linked galactosamine and N-acetylgalactosamine. *Communications Biology* **2022**, *5*, 502.
22. Morris A.J., Jackson L., Cw Yau Y., **Reichhardt C.**, Beaudoin T., Uwumarenogie S., Guttman K.M., Lynne Howell P., Parsek M.R., Hoffman L.R., Nguyen D., DiGiandomenico A., Guttman D.S., Wozniak D.J., Waters V.J. The role of Psl in the failure to eradicate *Pseudomonas aeruginosa* biofilms in children with cystic fibrosis. *NPJ Biofilms Microbiomes* **2021**, *7*, 63.
21. Jennings L.K., Dreifus J.E., **Reichhardt C.**, Storek K.M., Secor P.R., Wozniak D.J., Hisert K.B., M.R. Parsek, *Pseudomonas aeruginosa* aggregates in cystic fibrosis sputum produce exopolysaccharides that likely impede current therapies. *Cell Reports* **2021**, *34*, 108782.
20. Limqueco E., Passos Da Silva D., **Reichhardt C.**, Su F., Das D., Chen J., Srinivasan S., Convertine A., Skerrett S.J., Parsek M.R., Stayton P.S., and Ratner D.M., Mannose conjugated polymer targeting *P. aeruginosa* biofilms. *ACS Infectious Diseases* **2020**, *6*, 2866-2871.
19. **Reichhardt C.**, Jacobs H.M., Matwichuk M., Wong C., Wozniak D.J., and M.R. Parsek, The versatile *Pseudomonas aeruginosa* biofilm matrix protein CdrA promotes aggregation through different extracellular EPS interactions. *Journal of Bacteriology* **2020**, *202*, e00216-20.
18. **Reichhardt C.** and M.R. Parsek, Confocal laser scanning microscopy for analysis of *Pseudomonas aeruginosa* biofilm architecture and matrix localization. *Frontiers Microbiology* **2019**, *10*, 677.
17. Passos da Silva D., Matwichuk M.L., Townsend D.O., **Reichhardt C.**, Lamba D., Wozniak D.J., and M.R. Parsek, The *Pseudomonas aeruginosa* lectin LecB binds to Psl and stabilizes the biofilm matrix. *Nature Communications* **2019**, *10*, 2183.
16. **Reichhardt C.**, Joubert L.-M., Clemons K.V., Stevens D.A., and L. Cegelski, Integration of electron microscopy and solid-state NMR analysis for new views and compositional parameters of *A. fumigatus* biofilms. *Medical Mycology* **2019**, *57*, S239–S244.
15. **Reichhardt C.**, Wong C., Passos da Silva D., Wozniak D.J., and M.R. Parsek, CdrA interactions within the *Pseudomonas aeruginosa* biofilm matrix safeguard it from proteolysis and promote cellular packing. *mBio* **2018**, *9*, e01376-18.
14. Tseng B.S.* , **Reichhardt C.***, Merrihew G.E., Harrison J.J., MacCoss M.J., and M.R. Parsek, A biofilm matrix-associated protease inhibitor protects *Pseudomonas aeruginosa* from proteolytic attack. *mBio* **2018**, *9*, e00543-18 [*co-first authors]
13. **Reichhardt C.#** and L. Cegelski#, The Congo red derivative FSB binds to curli amyloid fibers and specifically stains curled *E. coli*. *PLOS ONE* **2018**, *13*, e0203226. [#co-corresponding authors]
12. **Reichhardt C.**, Stevens, D.A., and L. Cegelski, Fungal biofilm composition and opportunities in drug discovery. *Future Medicinal Chemistry* **2016**, *8*, 1455-1468.

11. **Reichhardt C.**, McCrate O.A., Zhou X., Lee J., and L. Cegelski, Influence of the amyloid dye Congo red on curli, cellulose, and the extracellular matrix in *E. coli* during growth and matrix purification. *Analytical and Bioanalytical Chemistry* **2016**, *408*, 7709-7717.
10. **Reichhardt C.***, Jacobson A.*, Maher M., Uang J., McCrate O.A., Eckart M., and L. Cegelski, Congo red interactions with curli-producing *E. coli* and native curli amyloid fibers. *PLOS ONE* **2015**, *10*, e0140388. [*co-first authors]
9. **Reichhardt C.***, Ferreira J.A.G.*, Joubert L.M., Clemons K.V., Stevens D.A., and L. Cegelski, Analysis of the *Aspergillus fumigatus* biofilm extracellular matrix by solid-state nuclear magnetic resonance. *Eukaryotic Cell* **2015**, *14*, 1064-1072. [*co-first authors]
8. **Reichhardt C.**, Fong J. N., Yildiz F., and L. Cegelski, Characterization of the *Vibrio cholerae* extracellular matrix: a top-down solid-state NMR approach. *Biochimica Biophysica Acta-Biomembranes* **2015**, *1848*, 378-383.
7. **Reichhardt C.** and L. Cegelski, Solid-state NMR for bacterial biofilms. *Molecular Physics* **2014**, *112*, 887-894.
6. McCrate O.A., Zhou X., **Reichhardt C.**, and L. Cegelski, Sum of the parts: composition and architecture of the bacterial extracellular matrix. *Journal of Molecular Biology* **2013**, *425*, 4286-4294.
5. Jolley C., Lucon J., Uchida M., **Reichhardt C.**, Vaughn M., LaFrance B., and T. Douglas, Structure, dynamics, and solvation in a disordered metal-organic coordination polymer: a multiscale study. *Journal of Coordination Chemistry* **2011**, *64*, 4301-4317.
4. **Reichhardt C.**, Uchida M., O'Neil A., Li R., Previlege P., and T. Douglas, Templated assembly of organic-inorganic materials using the core shell structure of the P22 bacteriophage. *Chemical Communications* **2011**, *47*, 6326-6328.
3. O'Neil A., **Reichhardt C.**, Johnson B., Previlege P., and T. Douglas, Genetically programmed in vivo packaging of protein cargo and its controlled release from bacteriophage P22. *Angewandte Chemie International Edition* **2011**, *50*, 7425-7428.
2. Jolley C., Uchida M., **Reichhardt C.**, Harrington R., Kang S., Klem M., Parise J., and T. Douglas, Size and crystallinity in protein-templated inorganic nanoparticles. *Chemistry of Materials* **2010**, *22*, 4612-4618.
1. Uchida M., Kang S., **Reichhardt C.**, Harlen K., and T. Douglas, The ferritin superfamily: Supramolecular templates for materials synthesis, *Biochimica Biophysica Acta-General Subjects* **2010**, *1800*, 834-845.

INVITED CONFERENCE TALKS

“Molecular-scale mapping of the *Pseudomonas aeruginosa* biofilm matrix,” ASM Microbe Biofilms Mini-Conference, Atlanta, GA, June 13th, 2024.

“Molecular-scale mapping of the *Pseudomonas aeruginosa* biofilm matrix,” The University of Minnesota’s Biofilms and Microbial Communities Club Annual Symposium, Minneapolis, MN, April 19th, 2024. **Keynote speaker**

“Molecular-scale mapping of the *Pseudomonas aeruginosa* biofilm matrix,” Solid-state NMR seminar, The School of Chemistry and Chemical Engineering, Queen’s University, Belfast, April 25th, 2024 (virtual)

“Solid-state NMR analysis of the *Pseudomonas aeruginosa* biofilm matrix,” 8th Gateway NMR Conference, University of Notre Dame, South Bend, ID, October 21st, 2023.

“Solid-state NMR analysis of the *Pseudomonas aeruginosa* biofilm matrix,” Washington Area NMR and Imaging Group (WANIG), IBBR, Rockville, MD, August 25th, 2023.

“The *Pseudomonas aeruginosa* biofilm matrix adhesin CdrA,” ASM Conference on Biofilms, Charlotte, NC, November 14th, 2022.

“Towards elucidating the structure of the *Pseudomonas aeruginosa* biofilm matrix protein called CdrA,” Midwest Microbial Pathogenesis Conference (MMPC), Madison, WI, October 1st, 2022.

“Challenges and opportunities in elucidating the structures of biofilm exopolysaccharides,” GlycoNMR Summit, Complex Carbohydrate Research Center, University of Georgia, May 26th, 2022 (virtual).

ADDITIONAL RECENT TALKS AND INVITED SEMINARS

“Molecular-scale mapping of the *Pseudomonas aeruginosa* biofilm matrix,” Department of Chemistry, Michigan State University, East Lansing, MI, April 2nd, 2024.

“Untangling the *Pseudomonas aeruginosa* biofilm matrix,” Department of Microbiology and Immunology Seminar, Loyola University – Chicago, Chicago, IL, May 18th, 2024.

“Solid-state NMR analysis of the *Pseudomonas aeruginosa* biofilm matrix,” 64th Experimental Nuclear Magnetic Resonance Conference (ENC), Pacific Grove, CA, April 18th, 2023.

“Molecular-scale mapping of the *Pseudomonas aeruginosa* biofilm matrix,” Washington University Department of Biochemistry and Molecular Biophysics seminar, January 31st, 2023.

“The *Pseudomonas aeruginosa* biofilm matrix protein CdrA,” Department of Chemistry & Biochemistry Seminar, Missouri State University, Springfield, MO, October 19th, 2022.

“The *Pseudomonas aeruginosa* biofilm matrix adhesin CdrA,” WUSTL BBSB Retreat, Potosi, MO, October 14th, 2022. **Keynote speaker**

“*Pseudomonas aeruginosa* biofilm assembly,” WUSTL MMMP Retreat, Grafton, IL, September 14th, 2022.

“Dynamics of biofilm assembly in the model organism *Pseudomonas aeruginosa*,” Pseudomonas 2022, Atlanta, GA, April 20th, 2022.

“Untangling the *Pseudomonas aeruginosa* biofilm matrix,” Pediatric Molecular Medicine Seminar, Washington University School of Medicine, St. Louis, MO, February 10th, 2022 (virtual).

“The *Pseudomonas aeruginosa* biofilm matrix adhesin CdrA,” Program in Molecular Medicine Seminar, The Hospital for Sick Children, Toronto, ON, January 31st, 2022 (virtual).

“Untangling the assembly of microbial biofilm matrices,” Washington University Department of Biochemistry and Molecular Biophysics Seminar, September 21st, 2021 (virtual).