Caroline Andrea Werlang

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Education

Ph.D. Biological Engineering, *Massachusetts Institute of Technology* 2021 (expected)

- GPA: 4.9/5.0

B.S. Chemical Engineering, *California Institute of Technology* 2015

- Major GPA: 3.9/4.0 • Overall GPA: 3.7/4.0

Research

Graduate Student, Katharina Ribbeck Lab, *MIT* Jan 2017 – present

- Studying the interaction between oral pathogens (*Streptococcus mutans)* and salivary mucins.
- Studying the transport of peptides through mucin gels using microfluidic devices
- Experience in single particle tracking and microrheology

Fulbright Fellow, Sebastian Maerkl Lab, *EPFL, Switzerland* Sep 2015 – Aug 2016

- Measured protein-RNA interactions using PDMS microfluidic chips
- Developed the fluorescent RNA aptamer Spinach for use in *in vitro* real-time monitoring of RNA synthesis

Research Fellow, Frances Arnold Lab, *Caltech* Jan 2014 – Jun 2015

- Assisted in the implementation of an algorithm for NAD(P)H cofactor switching (CSR-SALAD)
- Studied a pathway for extracellular electron transport in *E. coli* using mtrABC proteins from *S. oneidensis*
- Utilized directed evolution, protein purification, cloning, and high-throughput screening methods

Research Fellow, Tony Mikos Lab, *Rice University* Jun 2013 – Sep 2013

- Evaluated the efficacy of statins for bone tissue engineering delivered through polymer microparticle scaffolds
- Designed experiments and developed protocols to test for antimicrobial and osteogenic properties
- Utilized mammalian and bacterial cell culture, polymer chemistry, and high pressure liquid chromatography

Research Fellow, Harry Gray and Nate Lewis Labs, *Caltech* Mar 2012 – Sep 2012

- Characterized and developed nanoparticle catalyst (Ni-Mo) for electrochemical hydrogen evolution
- Designed experiments for various electrochemical characterization and synthesis processes

Teaching

Training

- Teaching College-Level Science & Engineering (25 hour course taken at MIT) Fall 2017

Teaching Assistant, *Massachusetts Institute of Technology*

- Tissue Engineering and Applied Developmental Biology (*Linda Griffith*) Spring 2018

Teaching Assistant, *California Institute of Technology*

- Principles of Biology (*Dianne Newman; Co-head TA*) Spring 2013, 2014, 2015
- Dynamics and Control of Chemical Systems (*John Seinfeld*) Spring 2015
- Chemical Reaction Engineering (*Frances Arnold*) Winter 2015
- Fundamental Techniques of Experimental Chemistry Laboratory (*Jeff Mendez*) Fall 2013

Fellowships and Awards

NSF Graduate Research Fellowship	2015
U.S. Fulbright Scholarship, Switzerland	2015
Caltech-Cambridge Scholars Program, *St. John's College, University of Cambridge*	2014
Amgen Scholars Program Research Fellowship	2014
Monticello Foundation Research Fellowship	2013
ExxonMobil Latinos on Fast Track (LOFT) Fellowship	2013
Caltech Summer Undergraduate Research Fellowship	2012

Publications

1. Werlang, C.; Cárcamo-Oyarce, G.; Ribbeck, K.; "Engineering mucin polymer mimetics to recreate the microbiome environment." *Submitted.*
2. Schuergers, N.; Werlang, C.; Ajo-Franklin, C.; Boghossian, A. "A synthetic biology biology approach to engineering living photovoltaics." *Energy & Environmental Science* 2017
3. Cahn, J.; Werlang, C.; Baumschlager, A.; Brinkmann-Chen, S.; Mayo, S.; Arnold, F. "A general tool for engineering the NAD/NADP cofactor preference of oxidoreductases." *ACS Synthetic Biology* 2016
4. Shah, S.; Werlang, C.; Kasper, F.; Mikos, A., "Novel Applications of Statins for Bone Regeneration." *National Science Review* 2014
5. McKone, J.; Sadtler, B.; Werlang, C.; Lewis, N.; Gray, H., "Ni–Mo Nanopowders for Efficient Electrochemical Hydrogen Evolution." *ACS Catalysis* 2012

Presentations and Posters

1. Poster: "Salivary Mucins Suppress Virulence Traits of Cavity-causing Streptococcus mutans." *MIT Biological Engineering Department Retreat, Cambridge, MA.* October 2018
2. Presentation: "Salivary Mucins Suppress Virulence Traits of Cavity-causing Streptococcus mutans." *MIT Bioengineering and Toxicology Seminar*. September 2018
3. Presentation: "Teaching analytical skills to bioengineers: a case study in course development." *The Abdul Latif Jameel World Education Lab, Cambridge, MA.* July 2018
4. Poster: "Salivary mucin suppresses natural transformation of cavity-causing *Streptococcus mutans*." *MIT Polymer Day, Cambridge, MA.* April 2018
5. Poster: "Salivary mucin suppresses natural transformation of cavity-causing *Streptococcus mutans*." *MIT Biological Engineering Department Retreat, Cambridge, MA.* October 2017
6. Presentation: "Improving Extracellular Electron Transport by Directed Evolution." *Caltech Seminar Day, Pasadena, CA.* August 2014
7. Presentation: "Assessing the Role of Molybdenum in Nickel-Molybdenum Alloy Electrocatalysts." *Caltech Seminar Day, Pasadena, CA.* October 2012

Mentoring + Service

Peer Counsellor, *MIT Resources for Easing Friction and Stress (REFS)*

- Underwent a four day training course in conflict management and peer coaching (January 2018)
- Developed seminars and resources to help peers navigate graduate school milestones
- Engaged in one-on-one conflict coaching sessions with peers

Research Mentor

- *MIT Amgen Scholars Program*: Mentored a rising senior for 8 weeks (Summer 2018)
- *MIT Undergrad Research Opportunities Program*: Mentored a freshman for 4 weeks (Winter 2018)

Professional Mentor

- *BE Application Assistance Program:* Helped applicants from underrepresented communities improve their personal statements and CVs for graduate school admissions (Fall 2016, 2017, 2018)
- *Harvard Amgen Scholars Program:* Gave career and professional advice to two mentees (Summer 2018)

Community Outreach

- Seminar on mucus for elementary school students at the Boston Museum of Science (2017, 2018)
- Engaged with the local community at Cambridge Science Fair (2018) and MIT Girl's Day (2017)
- ESL volunteer night tutor for MIT employees (Summer 2017)

Extracurricular

Secretary, *MIT Biological Engineering Graduate Student Board* 2017 to present

Boston Event Coordinator, *Caltech Alumni Association* 2018 to present

Information Officer, *Eastgate Executive Committee (MIT Residence)* 2017 to present

Chair, Secretary, *Caltech Student Investment Fund* 2012 to 2015

- Led the management of a $500,000 stock portfolio as Chair of the Board of Directors

Minority Recruitment Program Coordinator and Tour Guide, *Caltech Admissions* 2012 to 2015

Title IX Student Advisory Board, *Caltech Dean's Office* 2013 to 2015

Foreign Languages

- Portuguese: experienced conversational Brazilian Portuguese (dual citizen of Brazil)
- French: conversational Swiss French, spoken weekly (A2/B1 level certified)
- Spanish (A2 level certified)