Caroline Andrea Werlang

281 723 0951 • cwerlang@mit.edu

Education

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

- 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

NSF GRFP Fellow, Katharina Ribbeck Lab, *MIT* Jan 2017 – present

- Studying the interaction between oral pathogens (*Streptococcus mutans)* and salivary mucins.
- Collaborated to design mucin-mimetic polymers using synthetic chemistry and recombinant expression systems
- Utilized gene expression quantification (qPCR) and phenotype assays; experience in single particle tracking

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

Teaching Assistant, *Massachusetts Institute of Technology*

- Tissue Engineering and Applied Developmental Biology (*Linda Griffith*) Spring 2018
- Awarded department Teaching Assistant Excellence Award for 2017-2018 academic year

Training

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

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

Publications

1. Werlang, C.; Cárcamo-Oyarce, G.; Ribbeck, K.; "Engineering mucin polymer mimetics to recreate the microbiome environment." *Nature Materials Reviews.* In revision.
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

Fellowships and Awards

Teaching Assistant Excellence Award, Department of Biological Engineering	2018
NSF Graduate Research Fellowship	2015-2020
U.S. Fulbright Scholarship, Switzerland	2015-2016
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

Mentoring + Service

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

- Underwent a four day training course in conflict management and peer coaching
- Developed seminars and resources to help peers navigate graduate school milestones
- Led 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 guidance 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)

Presentations and Posters

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

Other

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

Computer Languages

- Experience in Python, MATLAB, HTML

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)