

Michael Sheets

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mbsheets.com

RESEARCH

- Dunlop Lab** - Graduate Researcher April 2018 – Present
- Developed optogenetic recombinases for bacterial genetics
 - Studied spatiotemporal dynamics of antibiotic persistence & transient resistance
 - Designed & tested genetic constructs using Gibson and Golden-Gate Assembly, single-cell microscopy, gel electrophoresis, and flow- cell cytometry
- Huang Lab** - Microbiology Researcher Sept 2013 – Dec 2016, Summer 2014
- Characterized anoxygenic photosynthetic communities by genetic diversity and metabolic processes (esp. cellulose degradation, nitrogen fixation)
 - Analyzed of microbial community reactions to environmental and composition perturbations
 - Studied collective motion of diverse bacterial systems and potential applications (i.e. turning gears)
- Tetragenetics** – Research Intern, Genetics Dept. Jun 2016 – Jun 2017
- Purified five ion channels in milligram quantities from whole cells by affinity chromatography (anti-FLAG, IMAC) for industry partners and internal use for antibody development and screening
- Tarveda** (formerly Blend) **Therapeutics** - Formulations Intern May – Aug 2015
- Co-developed polymeric nanoparticles for delivery of proprietary drug conjugates to in vivo xenograft models to develop treatment for cancer
 - Designed, optimized, and executed feasibility studies of nanoparticles from lab- to pilot-scale
 - Responsible for compiling source references for company's first IND application
- International Genetically Engineered Machine (iGEM), BioBuilderClub** Sept 2011 – Aug 2013
- Designed and built a synthetic genetic sensor circuit

EDUCATION

- Boston University** – Boston, MA Sept 2017-Current
- Recipient of Distinguished Biomedical Engineering Fellowship
Recipient of Translational Research in Biomaterials NIH T32 Training Grant, Sept 2017-Aug 2019
- Franklin W. Olin College of Engineering** – Needham, MA May 2017
- Recipient of 4-year Olin Merit Scholarship, GPA 3.91
Relevant Coursework: Microbial Diversity, Transport in Biological Systems, Tissue Engineering, Organic Chem., Partial Differential Equations, Affordable Design & Entrepreneurship, User-Oriented Collaborative Design

PROJECTS

Lab & Design

- Otter Newborn Warmer** Fall 2016
- Refined a newborn warmer to work with phototherapy as part of the firm Design that Matters
- Tissue Engineering Skin** Spring 2015
- Differentiated a “keratinocyte” containing skin-like tissue from bone marrow stems cells
- “Rapid Refuge” for Domestic Abuse Support Network Volunteers** Spring 2015
- Interviewed and co-designed with DASVs, prototyped a personal private pop-up space
- Community Change for Disability Accommodation** Spring 2016
- Designed and ran campus-wide social experiments with a d/Deaf member of the Olin community to improve disability awareness & accommodation on campus

Modeling & Review

- Collective Tumor Cell Autologous Chemotaxis** Fall 2015
- Created a model of metastasis of cancer cells from tumor to lymph in COMSOL

- Statistical Analysis of Vertical & Horizontal Health Aid** Fall 2015
 - Analyzed the effect of donor and recipient motivations, limitations, & behaviors on foreign aid efficacy and efficacy metrics in Sub-Saharan Africa
- Microbial Bioreactor Modeling** Fall 2014
 - Created a linear system to model a microbial bioreactor using data from lab cultures
- Vaccine Refrigeration & Cold Chain Systems** Fall 2014
 - Extensively reviewed recent scientific & technological advancements in vaccine refrigeration
- Body-Identity Asynchrony & Narrative Psychology** Fall 2016
 - Conducted grounded theory analysis of a life story interview with a transgender man

PRESENTATIONS AND PUBLICATIONS

MB Sheets, WW Wong, MJ Dunlop. "Light-Inducible Recombinases for Bacterial Optogenetics." (Manuscript accepted to ACS Synthetic Biology Jan 2020.)

MB Sheets, WW Wong, MJ Dunlop. "Light-Inducible Recombinases for Bacterial Optogenetics." QBP-TRB Symposium. Boston, MA, Dec. 2019. *Best Poster Award.

MB Sheets, MJ Dunlop. "Development of an Optogenetically-Controlled Recombinase for E. coli." Engineering Biology Research Consortium Retreat. Boston, MA, Mar. 2019.

MB Sheets, I El Meouche, MJ Dunlop. "Optogenetic Inactivation of Efflux Pumps During Transient Antimicrobial Resistance." Engineering Biology Research Consortium Retreat. Fort Collins, CO, Sep. 2018.

MB Sheets, A Wu, JJ Huang, R Christensen. "Collective Motion in Diverse Bacterial Systems." Boston Bacterial Meeting. Harvard University, Cambridge, MA, Jun. 2014.

MB Sheets, C Sato, A Knapp, R Van der Heyde, JJ Huang. "A Microbial Study in Pink: Cultivation of Streptomyces sp." Northeast Microbial Physiology and Ecology Meeting, Jun. 2014.

TEACHING

Teaching Assistant – Molecular Bioengineering (2018-19)

Course Assistant – Microbial Diversity (2016), Modern Biology (2015-16), Six Microbes That Changed the World (2014-15), Tissue Engineering (2014)

- Helped prepare and run lab sessions for courses, held office hours to answer students' questions
- Assisted in curriculum development and soliciting student feedback
- High teaching assistant rating from peers

OUTREACH AND ACTIVITIES

BDC Communication Lab Aug 2018–Present

- Peer-coached and ran workshops for effective scientific communication

BioBuilderClub Mentor Sep 2017–Present

- Mentored high school team completing hands-on synthetic biology projects

iGEM Jamboree Judge Oct 2018, Oct 2019

- Assessed teams on judge panels for Giant Jamboree

Glass Club Co-President May 2014–Dec 2016

- Manage funding and purchases, coordinate sessions, and give tutorials

Peer Advocate May 2014–May 2016

- Trained to provide confidential support for survivors of sexual misconduct and partner abuse

Disney College Program Cast Member Jan–May 2017

- Assisted hundreds of guests daily in roles requiring quick decision making and extensive knowledge of the park

SKILLS

- **Lab:** Cell culture, Molecular biology, Genome analysis, Anaerobic microbiology, Liposome preparation, Membrane protein purification, Protein concentration, & analysis (BCA, OD₂₈₀), Photolithography, High-pressure homogenization processes, Tangential flow filtration (TFF), Particle sizing, basic HPLC
- **Code:** MatLab, Arduino, basic SolidWorks, COMSOL
- **Other:** Beekeeping, Glass working, Pasta making