Michael Sheets

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Bioengineering | Strain Optimization | Fermentation
Scientist and project manager excited about optimizing and scaling bioproduction. Passionate about the power of microbes and introducing the next generation to biotechnology.

EXPERIENCE

Sunflower Therapeutics — *Scientist, Strain Eng. & Fermentation*

JUNE 2023 - PRESENT

- Engineered over 250 *Pichia pastoris* yeast strains for therapeutic protein production across molecule classes, including mAbs and nanoparticles
- Developed an IP-free gene knockout strategy and a catalog of thirty base strains, regularly showing an over 2X increase in production
- Scaled fermentation processes from initial strains to 1L bioreactor campaigns, including productivity and product quality analysis
- Led multiple projects for external clients, from developing project agreements and timelines to successful completion
- Managed the strain engineering team, including three direct reports
- Served as Biosafety Officer and on the Civic Engagement Committee

Dunlop Lab — *Graduate Researcher*

APRIL 2018 - MAY 2023

- Designed optogenetic recombinases for gene control in *E. coli*
- Created an inducible antibiotic resistance system for improved production of medium-chain fatty acids
- Studied spatiotemporal dynamics of antibiotic persistence & resistance
- Mentored six rotation students and engaged in multiple cross-group collaborations

AbCellera Boston — *Genetics Research Intern*

JUNE 2016 - JUNE 2017

- Engineered protist *Tetrahymena thermophila* for production of recombinant human ion channels
- Purified five ion channels in milligram quantities from whole cells by chromatography for industry partners

Tarveda Therapeutics — *Formulations Intern*

MAY 2015 - AUGUST 2015

- Co-developed polymeric nanoparticles for cancer drug conjugates
- Designed, optimized, and executed feasibility studies of nanoparticles from lab- to pilot-scale

Huang Lab — *Microbiology Researcher*

SEPTEMBER 2013 - DECEMBER 2016

- Characterized anoxygenic photosynthetic communities by genetic diversity and metabolic processes (cellulose degradation, nitrogen fixation)
- Analyzed of microbial community reactions to environmental and composition perturbations

SKILLS

Lab: Molecular biology, Yeast & bacterial transformation, Genome editing, Fermentation, Protein expression, Cell culture, SDS-PAGE, Western blot, Single-cell fluorescence microscopy, Flow cytometry, Media development, Anaerobic microbiology, Basic LC-MS

Software: Benchling, Snapgene, Python, Matlab, ImageJ, Illustrator, Prendio, LabArchives, Automated image analysis

Other: Project management, Technical writing, Mentorship

EDUCATION

Boston University — *Ph.D., Biomedical Engineering*

MAY 2023

Thesis: *Light-inducible tools for control of bacterial gene expression and antibiotic resistance.*

Olin College — *B.S., Engineering:Bioengineering*

MAY 2017

PUBLICATIONS

MB Sheets, WW Wong, MJ Dunlop. **"Light-Inducible Recombinases for Bacterial Optogenetics."** *ACS Synthetic Biology.* 2020, 9 (2) 227-235. https://doi.org/10.1021/acssynbio.9b00395

MB Sheets, N Tague, MJ Dunlop. **"An Optogenetic Toolkit for Light-Inducible Antibiotic Resistance."** *Nature Communications.* 2023, 14 (1) 1034. https://doi.org/10.1038/s41467-023-36670-2

MB Sheets, J Atkinson, M Styczynski, E Aurand, EBRC Education Working Group. **"Introduction to Engineering Biology: A Conceptual Framework for Teaching Synthetic Biology."** *ACS Synthetic Biology.* 2024, 12 (6) 1574-1578. https://doi.org/10.1021/acssynbio.3c00194

N Tague, C Coriano-Ortiz, MB Sheets, MJ Dunlop. **"Light-inducible protein degradation in E. coli with the LOVdeg tag."** *eLife.* 2024, 12 RP87303. https://doi.org/10.7554/eLife.87303.3

PRESENTATIONS

MB Sheets. **"Strategies for Bioproduction."** Invited Lecture. SCI1230: Think Like a Biologist, Olin College. Sept 2024.

MB Sheets. **"Optogenetics."** Invited Lecture. ENGR3499B: Life & Light, Olin College. Feb 2024.

MB Sheets. **"Genetic Control of Microbes."** Invited Lecture. SCI1230: Think Like a Biologist, Olin College. Oct 2023.

MB Sheets, MJ Dunlop. **"Optogenetic Control of Antibiotic Resistance to Understand Impact of Activation Dynamics on Bacterial Survival."** Invited Student Talk. QBP/TRB/SB2 Symposium. Dec 2022.

MB Sheets. **"Optogenetics."** Invited Lecture. SCI1230: Think Like a Biologist, Olin College. Oct 2022.

MB Sheets, MJ Dunlop. **"Optogenetic Control of Antibiotic Resistance Genes."**
Poster. Boston Bacterial Meeting. June 2022.
Poster. Synthetic Biology: Engineering, Evolution, & Design. June 2021.
Flash Talk, Poster. Boston Bacterial Meeting. June 2021.

MB Sheets, WW Wong, MJ Dunlop. **"Light-Inducible Recombinases for Bacterial Optogenetics."**
Flash Talk. Boston Bacterial Meeting. July 2020.
Poster. Engineering Biology Research Consortium. Apr 2020.
Poster. Synthetic Biology: Engineering, Evolution, & Design. June 2019.

MB Sheets, A Wu, JJ Huang, R Christensen. **"Collective Motion in Diverse Bacterial Systems."** Boston Bacterial Meeting. June 2014.

References available upon request.

OUTREACH

BioBuilder Foundation
Advisory Board 2024 - Present
Contributed industry perspective for K-12 biotechnology education

BioBuilderClub
Mentor 2017 - Present
Mentored high school teams completing hands-on synthetic biology projects

BDC Communication Lab -
Fellow 2018 - 2023
Peer-coached and ran workshops for effective scientific communication

EBRC Student & Postdoc Association
Vice President 2020-2023
Developed undergraduate educational module and co-ran virtual workshops

Out in STEM BU
Secretary 2018-2022
Organized monthly professional development events for queer STEM graduate students

iGEM Jamboree
Judge 2018-2021
Assessed teams on judge panels for the Giant Jamboree

AWARDS

Translational Research in Biomaterials Training Grant (NIH T32) – BU/NIH, 2017-2019

Best Graduate Student Poster Award – Boston Bacterial Meeting, June 2022

Poster Award – EBRC Annual Conference, Mar 2020

Best Poster Award – Quantitative & Translational Symposium, BU, Dec 2019