

Jerome M. Fox

Department of Chemical and Biological Engineering
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Education

- Harvard University 2013-2015
Postdoctoral Fellow, Department of Chemistry and Chemical Biology
- University of California, Berkeley 2012
Ph.D., Chemical Engineering
- Johns Hopkins University 2007
B.S., Environmental Engineering (with honors)
2nd Major: Natural Science (concentration in chemistry)
Minor: Mathematics

Research and Professional Experience

- Assistant Professor, University of Colorado, Boulder 2016-pres.
Department of Chemical and Biological Engineering
- Postdoctoral Fellow, Harvard University 2013-2015
Department of Chemistry and Chemical Biology
Advisor: George Whitesides
Molecular recognition, complex systems, optical metamaterials
- Ph.D. Student, University of California, Berkeley 2007-2012
Department of Chemical and Biomolecular Engineering
Advisors: Doug Clark and Harvey Blanch
Molecular-level investigations and mathematical modeling of enzymatic cellulose hydrolysis

Honor and Awards

- Outstanding Undergraduate Teaching Faculty Award, Department of Chemical and Biological Engineering, University of Colorado – Boulder 2020
- Army-ECASE Award 2018
- ARO Young Investigator Award 2018
- NSF CAREER Award 2018
- NSF Graduate Fellow 2008-2011
- Best Student Poster Award, Symposium on Biotechnology for Fuels and Chemicals 2010
- Lucien Brush Award for Excellence in Environmental Engineering, Johns Hopkins University 2007
- Certificate in the Arts (theater), Johns Hopkins University 2007
- Tau Beta Pi, Engineering Honor Society 2006
- Vredenburg Scholar, University of Sydney, Australia 2006

Teaching Experience

- Instructor, General Chemistry for Engineers 1(CHEN 1201, spring) 2021
- Instructor, Chemical Engineering Thermodynamics (CHEN 3320, fall) 2016-2020
- Instructor, General Chemistry for Engineers (CHEN 1210, spring) 2019
- Instructor, Synthetic Biology and Biological Control (CHEN 5838, spring) 2018
- Instructor, Biochemical Engineering Fundamentals (CHEN 6820, spring) 2016
- Mentor (while at CU Boulder): 4 high school students, 8 undergraduates, 6 graduate students, 1 postdoctoral researcher 2016-pres.

Professional Service

- Co-Chair, *Engineering Protein Therapeutics*, AIChE Annual Meeting 2020
- Co-Chair, *Biomolecular Technology Sessions*, ACS Fall National Meeting. 2020
- Co-Chair, *Biomolecular Engineering*, AIChE Annual Meeting 2019
- Co-Chair, *Computational Approaches to Protein Engineering*, AIChE Annual Meeting 2019
- Instructor, *Synthetic Biology, EngiNearMe, University of Colorado Boulder (hands-on educational initiative for high school students underrepresented in STEM)* 2018
- Co-Chair, *Combinatorial Techniques in Protein Engineering*, AIChE Annual Meeting 2018
- Co-Chair, *Big Data and Biomanufacturing*, ACS National Meeting 2017
- Grant Review: 2016-pres.
 - NSF GRFP Panel
 - NSF CBET Panel: CAREER (2019)
 - NSF CBET Panel: Reaction Networks (2018)
 - NSF CBET: Ad hoc (2017)
 - Kentucky Science and Engineering Foundation (2016)
- Member, American Chemical Society 2015-pres.
- Member, American Institute of Chemical Engineers 2013-pres.
- Journal Review: *PNAS, ACS Catalysis, Metabolic Engineering, Biochemistry J. Phys. Chem. B., J. Med. Chem., Biotechnology and Bioengineering, Biochemical Engineering Journal, Mathematical Biosciences, FEBS Letters Annual Review of Chemical and Biomolecular Engineering, PLOS ONE, Bioprocess and Biosystems Engineering* 2008-pres.

Entrepreneurship

- Founder, Think Bioscience, Inc. (a company focused on the development of small-molecule therapeutics) 2018

Invited Oral Presentations

- Army Research Lab. Adelphi, MD. 2019
- University of Nebraska, Lincoln. Lincoln, CA. 2019
- University of California, Riverside. Riverside, CA. 2018
- Rowland Institute, Harvard University. Cambridge, MA. 2015
- Department of Chemical Engineering, Columbia University. New York, NY. 2015
- Department of Biochemistry and Department of Chemical and Biological Engineering, University of Wisconsin, Madison. Madison, WI. 2015
- Institute for Molecular Engineering and Institute for Genomics and Systems Biology, University of Chicago. Chicago, IL. 2015
- Department of Chemical Engineering, Massachusetts Institute of Technology. Cambridge, MA. 2015
- Department of Chemical and Biological Engineering, University of Colorado, Boulder. Boulder, CO. 2015
- Biotechnology Institute and Department of Biochemistry, Molecular Biology, and Biophysics, University of Minnesota, Twin Cities. Minneapolis, MN. 2015
- School of Chemical Engineering, Purdue University. West Lafayette, IN. 2014
- School of Chemical and Biomolecular Engineering, Georgia Institute of Technology. Atlanta, GA. 2014
- Genencor, Inc. (now Dupont Industrial Biosciences). Palo Alto, CA. 2012

Contributed Presentations

- AIChE Annual Meeting. San Francisco, CA. Two oral presentations. 2020
- ACS Fall 2020 National Meeting. San Francisco, CA. Two oral presentations. 2020
- ACS Spring 2019 National Meeting. Orlando, FL. Three oral presentations. 2019
- AIChE Annual Meeting. Pittsburgh, PA. Oral presentation. 2018
- AIChE Annual Meeting. Pittsburgh, PA. Poster presentation. 2018
- Gordon Conference on Biocatalysis. Poster presentation. 2018
- AIChE Annual Meeting. San Francisco, CA. Oral presentation. 2016
- AIChE Annual Meeting. Atlanta, GA. Oral presentation. 2014
- AIChE Annual Meeting. San Francisco, CA. Oral presentation. 2013
- Society for Industrial Microbiology (SIM): Symposium on Biotechnology for Fuels and Chemicals. Oral presentation. 2012
- Gordon Conference on Cellulases, Cellulosomes, and Other Carbohydrate Modifying Enzymes. Poster presentation. 2011
- Society for Industrial Microbiology (SIM): Symposium on Biotechnology for Fuels and Chemicals. Poster presentation. 2010

Submitted Publications

- Sarkar A, Kim EY, Jang T, Hongdusit A, Kim H, Choi JM, and **Fox JM** (2020). Microbially guided discovery and biosynthesis of biologically active natural products. DOI: 10.21203/rs.3.rs-92116/v1.

Publications (CU Boulder)

- Hongdusit A and **Fox JM**. Optogenetic Analysis of Allosteric Control in Protein Tyrosine Phosphatases. *Biochemistry* [in press]; DOI: <https://dx.doi.org/10.1021/acs.biochem.0c00841>.
- Ruppe A, Mains K, and **Fox JM** (2020). A Kinetic Rationale for Functional Redundancy in Fatty Acid Biosynthesis. *Proceedings of the National Academy of Sciences*, 117 (38), 23557-23564
- Hongdusit A, Liechty ET, and **Fox JM** (2020). Optogenetic interrogation and control of cell signaling. *Current Opinion in Biotechnology*, 66, 195-206.
- Hongdusit A, Zwart PH, Sankaran B, and **Fox JM** (2020). Minimally Disruptive Optical Control of Protein Tyrosine Phosphatase 1B. *Nature Communications*, 11 (1), 1-11.
- Ruppe A and **Fox JM** (2018). Analysis of Interdependent Kinetic Controls of Fatty Acid Synthases. *ACS Catalysis*, 8, 11722-11734.
- Hjortness MK, Riccardi L, Zwart PH, Sankaran B, De Vivo M, and **Fox JM** (2018). Evolutionarily Conserved Allosteric Communication in Protein Tyrosine Phosphatases. *Biochemistry*, 57 (45), 6443-6451.
- Hjortness MK, Riccardi L, Hongdusit A, Ruppe A, Zhao M, Kim EY, Zwart P, Sankaran B, Arthanari H, Sousa MC, De Vivo M, and **Fox JM** (2018). Abietane-Type Diterpenoids Inhibit Protein Tyrosine Phosphatases by Stabilizing an Inactive Enzyme Conformation. *Biochemistry*, 57 (40), 5886-5896.
- **Fox JM**, Zhao M., Fink MJ, Kang K, and Whitesides GM (2018). The Molecular Origin of Enthalpy/Entropy Compensation in Biomolecular Recognition. *Annual Review of Biophysics*, 47 (1).

Publications (Berkeley and Harvard)

- **Fox JM**, Kang K, Sastry, M, Sherman W, Sankaran B, Zwart P, and Whitesides GM (2017). Water-Restructuring Mutations Can Reverse the Thermodynamic Signature of Ligand Binding to Human Carbonic Anhydrase. *Angewandte Chemie International Edition*, 56 (14), 3833-3837.
- Semenov SN, Kraft LJ, Ainla A, Zhao M, Baghbanzadeh M, Campbell VE, Kang K, **Fox JM**, and Whitesides GM (2016). Autocatalytic, Bistable, Oscillatory Networks of Biologically Relevant Organic Reactions. *Nature*, 537 (7622), 656-660.

- Kang K, Choi J-M, **Fox JM**, Snyder PW, Moustakas DT, and Whitesides GM (2016). Acetylation of Surface Lysing Groups of a Protein Alters the Organization and Composition of Its Crystal Contacts. *Journal of Physical Chemistry B*, 120 (27), 6461-6468.
- **Fox JM**, Kang K, Lockett MR, Baghbanzadeh M, Sherman W, Héroux A, Sastry M, Whitesides GM (2015). Interactions between Hofmeister Anions and the Binding Pocket of a Protein. *Journal of the American Chemical Society*, 137 (11), 3859-3866.
- **Fox JM** and Whitesides GM (2015). Warning Signals for Eruptive Events in Spreading Fires. *Proceedings of the National Academy of Sciences*, 112 (8), 2378-2383.
- Nemiroski A, Gonidec M, **Fox JM**, Jean-Remy P*, Turnage E*, and Whitesides GM (2014). Engineering Shadows to Fabricate Optical Metasurfaces. *ACS Nano*, 8 (11), 11061-11070.
- **Fox JM**, Jess P, Jambusaria RB*, Moo GM*, Liphardt J, Clark DS, Blanch HW (2013). A Single-Molecule Analysis Reveals Morphological Targets for Cellulase Synergy. *Nature Chemical Biology*, 9 (6), 356-61.
- **Fox JM**, Levine SE, Blanch HW, and Clark DS (2012). An Evaluation of Cellulose Saccharification and Fermentation with an Engineered *Saccharomyces cerevisiae* Capable of Cellobiose and Xylose Utilization. *Biotechnology Journal*, 7 (3), 351-373.
- **Fox JM**, Levine SE, Clark DS, and Blanch HW (2012). Initial- and Processive-Cut Products Reveal Cellobiohydrolase Rate Limitations and Role of Companion Enzymes. *Biochemistry*, 51 (1), 442-452.
- Levine SE, **Fox JM**, Clark DS, and Blanch HW (2011). A Mechanistic Model for Rational Design of Optimal Cellulase Mixtures. *Biotechnology and Bioengineering*, 108 (11), 2561-2570.
- Levine SE, **Fox JM**, Blanch HW, and Clark DS (2010). A Mechanistic Kinetic Model of the Enzymatic Hydrolysis of Cellulose. *Biotechnology and Bioengineering*, 107 (1), 37-51.

*Denotes contribution from an undergraduate coauthor.

Research Support

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|---|----------|---------------------------------|
| 1. CU Venture Challenge | Fox (PI) | 01/01/2021-12/31/2022 |
| \$125,000 (total) | | |
| Breakdown: \$100,000 to Fox Group; \$25,000 to Think Bioscience, Inc. | | |
| A Class-Wide Screen for Biosynthetic Inhibitors with Therapeutic Applications | | |
| 2. DOD DURIP | Fox (PI) | 03/01/2019-02/29/2020 |
| \$256,770 | | |
| Instrumentation for the Analysis and Design of Tunable, Stimuli-Responsive Biocatalytic Systems | | |
| 3. ECASE | Fox (PI) | 12/15/2018-12/14/2023 |
| (PECASE nomination pending) | | |
| \$999,575 total | | |
| Analysis and Design of Nonlinear Processing and Emergent Dynamics in Biocatalytic Networks | | |
| 4. NSF | Fox (PI) | 07/01/2018-06/30/2023 |
| \$357,613 total | | |
| Minimally Disruptive Optical Interrogation of Intracellular Signaling Networks | | |
| 5. ARO YIP | Fox (PI) | Original: 05/01/2018-04/30/2021 |
| Original: \$359,999 total | | Revised: 05/01/2018-12/15/2018 |
| Revised: \$60,000 total (replaced with ECASE) | | |
| Analysis and Design of Nonlinear Processing and Emergent Dynamics in Biocatalytic Networks | | |
| 6. NSF CAREER | Fox (PI) | 04/15/2018-04/14/2023 |
| \$590,655 total | | |
| CAREER: Biosynthesis and Evolution of Pharmaceutical Leads | | |