Jerome M. Fox

Assistant Professor
Department of Chemical and Biological Engineering
University of Colorado, Boulder

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

- National Institutes of Health Maximizing Investigators' Research Award (MIRA) — 2021
- Outstanding Undergraduate Teaching Faculty Award, Department of Chemical and Biological Engineering, CU Boulder — 2020
- Army Early Career Award for Scientists and Engineers (ECASE) — 2018
- Army Research Office Young Investigator Award — 2018
- National Science Foundation 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 — 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, 15 undergraduates, 10 graduate students, 2 postdoctoral researchers — 2016-pres.

Professional Service

- Session Chair, *Dissipation in Open Material Systems*, Virtual Research Seminar Series on Complex Active and Adaptive Material Systems — 2021
- 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 Panel (2021)
    - 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.
- Editorial Board: *Synthetic and Systems Biotechnology*
- 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 Presentations

- Department of Molecular Biology & Biophysics, UConn Health — 2021
- 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

- International Conference on Biomolecular Engineering. Virtual. One oral presentation. 2021
- 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

Publications (CU Boulder)

- Sarkar A, Kim EY, Jang T, Hongdusit A, Kim H, Choi JM, and **Fox JM** (2021). Microbially guided discovery and biosynthesis of biologically active natural products. ***ACS Synthetic Biology***, 10 (6), 1505-1519.
- Hongdusit A and **Fox JM** (2021). Optogenetic Analysis of Allosteric Control in Protein Tyrosine Phosphatases. ***Biochemistry,*** 60 (4), 254-258.
- 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 Lysine 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.

Research Support

1. NIH 1R35GM143089-01 Fox (PI) 07/01/2021 – 04/30/2026
$1,763,162 total
Microbially Guided Discovery and Biosynthesis of Biologically Active Natural Products

2. TB 000002 Fox (PI) 04/13/2021-04/18/2022
$47,748 total
Personnel Support for Microbial Discovery and Biosynthesis of Targeted Protease Inhibitors (COVID-19)

3. NSF STTR Kramer (PI), Kaar (Co-PI) 12/17/2020 – 11/30/2021
$81,534 total (research in Fox Lab)
Microbial Discovery and Biosynthesis of Targeted Protease Inhibitors (COVID-19)

4. OEDIT DO 2021-2417 Fox (PI) 03/02/2021 - 02/28/2022
$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

5. DOD W911NF1910135 Fox (PI) 03/01/2019-02/29/2020
$256,770 total
DURIP: Instrumentation for the Analysis and Design of Tunable, Stimuli-Responsive Biocatalytic Systems

6. ECASE W911NF-18-1-0159 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

7. NSF CBET 1804897 Fox (PI) 07/01/2018-06/30/2023
$357,613 total
Minimally Disruptive Optical Interrogation of Intracellular Signaling Networks

8. ARO W911NF-18-1-0159 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)
YIP: Analysis and Design of Nonlinear Processing and Emergent Dynamics in Biocatalytic Networks

9. NSF CBET 1750244 Fox (PI) 04/15/2018-04/14/2023
$590,655 total
CAREER: Biosynthesis and Evolution of Pharmaceutical Leads