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EDUCATION

California Institute of Technology	2010 - 15
Ph.D. Chemistry	
Thesis: DNA-mediated charge transport devices for protein detection	
Advisor: Prof. Jacqueline K. Barton	
University of Chicago, Chicago, IL	2008 - 10
B.S. Chemistry with Honors, GPA 3.92	
Honors Thesis: Study of the solution state properties of the Snow Flea Antifreeze Protein	
Wesleyan University, Middletown, CT	2007 - 08

RESEARCH

Associate Professor of Chemical Engineering	2025 - present
<i>Massachusetts Institute of Technology</i>	
Paul M. Cook Career Development Professorship	2022 - 25
<i>Massachusetts Institute of Technology</i>	
Raymond (1921) & Helen St. Laurent Assistant Professor of Chemical Engineering	2019 - 22
<i>Massachusetts Institute of Technology</i>	
Assistant Professor of Chemical Engineering	2019 - present
<i>Massachusetts Institute of Technology</i>	
Arnold O. Beckman Postdoctoral Fellow with Prof. Matthew B. Francis	2015 - 19
<i>University of California, Berkeley</i>	
Graduate Researcher with Prof. Jacqueline K. Barton	2010 - 15
<i>California Institute of Technology</i>	
Undergraduate Researcher with Prof. Stephen B. H. Kent	2008 - 10
<i>University of Chicago</i>	
Research Assistant with Prof. Shelley Minteer	2005, 2008
<i>Saint Louis University</i>	

ACADEMIC & PROFESSIONAL HONORS

C&EN Talented 12	2025	Paul M. Cook Career Development Professorship	2022
Sloan Research Fellow	2025		
Jonathan L. Sessler Fellowship for Emerging Leaders in Bioinorganic and Medicinal Inorganic Chemistry	2025	Female Founders Competition, 1st Place	2022
NSF CAREER Award	2024	MIT UROP (Undergraduate Research) Mentor Award	2022
MIT Chemical Engineering DEI Award	2024	Finalist, Beckman Young Investigators	2022
Scialog Negative Emissions Awardee	2024	CIFAR Azrieli Global Scholar	2022
MIT 100K Competition, 1st Place	2023	Future Founders Prize, Finalist	2022
NIH DP2 New Innovator Award	2023	Electrochemical Society Early Career Travel Grant	2021
Eastern Analytical Society Young Investigator Award	2023	ECS Dennis Peters Retrospective Symposium Speaker	2021
AIChE Women in Chemical Engineering Rising Star	2023	ACS Sensors Young Investigator Symposium Speaker	2020
Dreyfus Teacher Scholar Award	2023	Raymond (1921) & Helen St. Laurent Professorship	2019
Scialog Negative Emissions Fellow	2023		
3M Non-Tenured Faculty Award	2022 -23	Remsen Bird Lecturer	2018
MIT CESIF Fellow	2023	Travel Award to ACS P2F workshop	2017
MIT Climate and Energy Prize, 1st Place	2023, 24	Arnold O. Beckman Postdoctoral Fellowship	2016-19
Empower Competition, 2nd Place	2023	Gray-Hill Lecturer	2014
MIT 100K Competition, 2nd Place	2023	Phi Beta Kappa	2010
AAAS 2023 Marion Milligan Mason Awardee	2023	Graduated with Honors, University of Chicago	2010
Frontiers in Engineering EU-US Participant	2022	Dean's List, U. Chicago & Wesleyan University	2008-10
ARO Early Career Research Award	2022		
STS Forum Young Leader	2022		

APPOINTMENTS & ELECTED POSITIONS

JOURNALS

Associate Editor, *Journal of the Electrochemical Society* (2025-present)

Associate Editor, *Sensors+* (2023-2025)

Editorial Board: ACS Sensors, iScience, ACS Measurement Science Au, ACS Chem & Bio Engineering, J. Applied Electrochemistry

Guest Editor: RSC Chemical Biology Themed Collection (2024-25), J. Electrochemical Soc. Special Issue (2024-25)

PROFESSIONAL ORGANIZATIONS

American Institute of Chemical Engineers (AIChE)

- Women in Chemical Engineering (WIC)
 - Communications Chair (Elected Position, 2020-22)
 - Member-at-Large (Elected Position, 2022-23)
- Area 1E (Electrochemistry Fundamentals)
 - Secretary (Elected Position, 2023-24)
 - Vice Chair (Elected Position, 2024-25)
 - Co-Chair of Awards Committee (Elected Position, 2022-present)
- Sensors Topical Chair (Elected Position, 2022-present)

Electrochemical Society (ECS)

- Organic and Biological Electrochemistry
 - Member-at-Large (Elected Position, 2022-23)
 - Secretary/Treasurer (Elected Position, 2022-24)
 - Chair (Elected Position, 2024-present)

International Society of Microbial Electrochemistry and Technology

- Member of the Board (Elected Position)

Bioanalytical Gordon Research Conference

- Vice Chair for 2026 Meeting (Elected Position)

American Chemical Society (ACS)

- Symposium organizer, ENFL 015

MIT COMMITTEES

Deputy Center Director and MIT PI for the NSF CASFER ERC

NIEHS Superfund Program RETCC Core Co-Lead

Bioeconomy Working Group Member

Martin Trust Center Advisory Board

UROP Strategic Planning Committee

MIT Solve Judging Team

MITEI Eni Steering Committee

TATA Strategic Planning Committee

TATA Fellowship Committee

Future of ESI Committee

Program in Polymers and Soft Materials (PPSM) Seminar Coordinator (2021-present)

Memberships:

- Center for Environmental Health Sciences
- Microbiology Graduate Program
- Program in Polymers and Soft Materials

MIT Department of Chemical Engineering:

- Diversity, Equity, and Inclusion Committee (2021-23)
- Graduate Committee (2021-24)
- Graduate Admissions Committee (2019-present)
- Seminar Organizer (2022-24)
- Undergraduate Advisor (2021-present)

PUBLICATIONS

Corresponding and Co-corresponding Author

69. A. Agee, M. Armstrong, E. Bazakas, A. L. Furst. Mechanisms behind unexpected gene circuit performance in a non-model microbe. *Submitted*.
68. G. T. Vercelli, X. Zhou, S. Moreno-Gómez, R. Gregor, J. Słomka, A. Dagadu, A. L. Furst, O. X. Cordero. A universal surface functionalization technique to chemically enhance live microbial cells. *Submitted*.
67. S. Jeon, X. Qin, M. Zamani, A. Furst, C. Callmann. Polymer Display of 2-Deoxyglucose Confers Antibacterial Activity Against Drug-Resistant Pathogens. *Submitted*.
66. S. Dey, M. E. Laws, S. Yeon, J. M. Lopez Baltazar, C.-C. Kuo, A. L. Furst. Metal-phenolic networks improve interfacial electron transfer in bio-electrochemical systems. *Submitted*.
65. L. C. I. Faria, S. Q. Nascimento, F. C. D. A. Lima, G. C. Sedenho, T. Bertaglia, R. M. Iost, J. C. P. de Souza, S. Lanceros-Méndez, S. D. Minter, S. Cosnier, A. L. Furst, F. N. Crespilho. Bioelectrochemical systems: prioritizing energy density, long term stability and validation. *ACS Energy Lett.* **10**, 4470 (2025).
64. G. C. Sedenho, J. C. Pacheco, M. Gut, P. C. D. A. Lima, F. N. Crespilho, A. L. Furst. Genetic Surfaceome *E. coli* Re-programming Enables Selective Water Oxidation. *Adv. Mater.* *Accepted*.
63. M. Zamani, K. Monir, A. L. Furst. Self-assembled nanomaterials enable extended lithium release. *J. Mat. Chem. B.* **13**, 10170 (2025).
Featured in the journal's themed collection "Journal of Materials Chemistry B HOT Papers"
62. S. Yeon, X. Zhou, M. Zamani, A. L. Furst. Fast, Simple Electrochromic Biosensors for Point-of-Use Infectious Disease Diagnosis. *Analytical Chem.* **97**, 17184 (2025).
61. D. Ferreira-Garcia, S. Haque, B. Burke, A. L. Furst, G. G. Botte. Electrochemical organic waste conversion: a route toward food security and a circular economy. *Curr. Opin. Opin. Chem. Eng.* **49**, 101156 (2025).
60. X. Zhou, J. Slaughter, S. Riki, C.-C. Kuo, A. L. Furst. Polymer coating for the long-term storage of immobilized DNA. *ACS Sens.* **10**, 5019 (2025).
Featured in MIT News

59. M. Gut, T. Wilhelm, O. Benson, S. Ogundipe, A. L. Furst. Lanmodulin-decorated microbes for efficient lanthanide

recovery. *Adv. Mater.* **37**, 2412607 (2025).

Featured as a frontispiece of the journal.

58. M. Monaco, M. Zamani, A. Sarram, C.-C. Kuo, C. Abeyrathne, M. Li, A. L. Furst. Complementary Cost-Effective Electrochemical Platforms for Point-Of-Use Biosensing. *Adv. Sensor Res.* **4**, 2400058 (2025).
Featured on the cover of the journal.
57. G. G. Botte, D. Donneys-Victoria, C. E. Alvarez-Pugliese, J. Adjei, S. Sahin, N. W. Wilson, K. Millerick, A. Hardberger, A. L. Furst, N. Hu, A. J. Medford. Innovative Approach to Sustainable Fertilizer Production: Leveraging Electrically Assisted Conversion of Sewage Sludge for Nutrient Recovery. *ACS Omega*. **9**, 49692 (2024).
56. A. Spormann, J. Lee, K. Dassbjerg, L. Angenent, M. Victoria, T. Skrydstrup, H. A. Bunzel, M. Cargnello, A. L. Furst, S. Garcia, M. Köpke, K. Lassen, R. D. Milton, D. Z. Sousa. Dream reactions of CO₂ capture, conversion, and beyond. *Cell Reports Physical Science Voices*. **5**, 102302 (2024).
55. G. Anderson, A. Agee, A. L. Furst. Imidazolium-based ionic liquids support biosimilar flavin electron transfer. *Mater. Adv.* **5**, 6813-6819 (2024).
Featured on the cover of the journal.
54. A. Agee, G. Pace, V. Yang, R. Segalman, A. L. Furst. Mixed Conducting Polymers Alter Electron Transfer Thermodynamics to Boost Current Generation from Electroactive Microbes. *J. Amer. Chem. Soc.* **146**, 19728-19736 (2024).
53. G. C. Sedenho, S. Q. Nascimento, M. Zamani, F. N. Crespiho, A. L. Furst, Secondary Structure in Enzyme-Inspired Polymer Catalysts Impacts Water Oxidation Efficiency. *Advanced Science*, **11**, 2402234 (2024).
52. N. Zaragoza, S. Widder, H. Huynh, M. Zamani, A. L. Furst, Electrocatalytic properties of electrochemically-polymerized metal-phenolic networks. *ChemElectroChem*, **11**, e202400093 (2024).
51. G. Fan, N. Corbin, M. Chung, T. M. Gill, E. B. Moore, A. A. Karbelkar, A. L. Furst. Highly Efficient Carbon Dioxide Electroreduction via DNA-Directed Catalyst Immobilization. *J. Am. Chem. Soc. Au*, **4**, 1413-1421 (2024).
Featured in MIT News and on the cover of the journal
50. N. Zaragoza, G. I. Anderson, S. Allison-Logan, K. Monir, A. L. Furst. Novel delivery systems for controlled release of bacterial therapeutics. *Trends Biotechnol.* **42**, 929-947 (2024).
49. X. Zhou, M. Zamani, K. Austin, M. De Bock, J. Chaj Ulloa, S. Riki, A. L. Furst. Improving electrochemical hybridization assays with restriction enzymes. *Chem Commun.* **60**, 1948-1951 (2024).
48. B. Burke, G. Fan, P. Wasuwanich, A. L. Furst. Self-Assembled Nanocoatings Protect Microbial Fertilizers for Climate-Resilient Agriculture. *J. Am. Chem. Soc. Au*, **3**, 2973-2980 (2023).
Selected as Outstanding Paper of the Year for JACS Au; featured in MIT News
47. J. Cottet, J. O. Oshodi, J. Yebouet, A. Leang, A. L. Furst, C. R. Buie. Zeta potential characterization using commercial microfluidic chips. *Lab Chip*, **24**, 234-243 (2023).
46. M. Allen, et al. 35+1 challenges in materials science being tackled by PIs under 35(ish) in 2023. *Matter*, **6**, 2480-2487 (2023).
45. T. A. Weiss, G. Fan, B. J. Neyhouse, E. B. Moore, A. L. Furst, F. R. Brushett, Characterizing the Impact of Oligomerization on Redox Flow Cell Performance. *Batteries and Supercaps*, e202300034.
44. B. Baskaran, T. Gill, A. L. Furst, An Improved Spectrophotometric Method for Toluene-4-Monooxygenase Activity. *Chem. Eur. J.*, e202203322 (2023).
43. A. Agee, T. Gill, G. Pace, R. Segalman, A. L. Furst, Electrochemical Characterization of Biomolecular Electron Transfer at Conductive Polymer Interfaces. *J. Electrochem. Soc.* **170**, 016509 (2023).
42. M. Zamani, C. M. Klapperich, A. L. Furst, Recent advances in gold electrode fabrication for low-resource setting biosensing. *Lab on Chip*, **23**, 1410-1419 (2023).
Featured on the cover of Lab on Chip
41. A. Karbelkar, R. Ahlmark, X. Zhou, G. Fan, V. Y. Yang, A. L. Furst, Carbon Electrode-Based Biosensing Enabled by Biocompatible Surface Modification with DNA and Proteins. *Bioconj. Chem.* **34**, 358-365 (2023).
Featured on the cover of Bioconj. Chem.
40. P. Wasuwanich, G. Fan, B. Burke, A. L. Furst, Metal-phenolic networks as tuneable spore coat mimetics. *J. Mater. Chem. B* **10**, 7600-7606 (2022).
39. T. M. Gill, A. L. Furst, Interfacial electrolyte effects on aqueous CO₂ reduction: Learning from enzymes to develop inorganic approaches. *Curr. Opin. Electrochem.* **35**, 101061 (2022).
38. X. Zhou, D. Schuh, L. M. Castle, A. L. Furst, Recent Advances in Signal Amplification to Improve Electrochemical Biosensing for Infectious Diseases, *Front. Chem.* **10**, 2296 (2022).
37. G. Fan, J. Cottet, M. R. Rodriguez-Otero, P. Wasuwanich, A. L. Furst, Metal-Phenolic Networks as Versatile Coating Materials for Biomedical Applications. *ACS Applied Bio Materials*, **5**, 4687-4695 (2022).
36. M. Zamani, T. G. Wilhelm, A. L. Furst, Electrochemical sensors for neurotransmitters and psychiatrics: steps towards physiological mental health monitoring. *J. Electrochem. Soc.* **169**, 047513 (2022).
35. M. Zamani, V. Y. Yang, L. Maziashvili, G. Fan, C. M. Klapperich, A. L. Furst, Surface Requirements for Optimal Biosensing with Disposable Gold Electrodes. *ACS Meas. Sci. Au* **2**, 91 (2022).

34. G. Fan, P. Wasuwanich, M. R. Rodriguez-Otero, A. L. Furst, Protection of anaerobic microbes from processing stressors using metal-phenolic networks. *J. Am. Chem. Soc.* **144**, 2438 (2022).
Featured on the cover of JACS
33. M. Zamani, A. L. Furst, C. M. Klapperich, Strategies for Engineering Affordable Technologies for Point-of-Care Diagnostics of Infectious Diseases," *Acc. Chem. Res.* **54**, 3772 (2021).
32. A. Karbelkar, E. E. Reynolds, R. A. Ahlmark, A. L. Furst, A Microbial Electrochemical Technology to Detect and Degrade Organophosphate Pesticides. *ACS Cent. Sci.* **7**, 1718 (2021).
31. M. C. Machado, M. Zamani, S. Daniel, A. L. Furst, Bioelectrochemical platforms to study and detect emerging pathogens. *MRS Bulletin* **46**, 840 (2021).
30. A. Nano, A. L. Furst, M. G. Hill, J. K. Barton, DNA Electrochemistry: Charge-Transport Pathways through DNA Films on Gold. *J. Am. Chem. Soc.* **143**, 11631 (2021).
29. M. Zamani, J. M. Robson, A. Fan, M. S. Bono Jr., A. L. Furst; C. M. Klapperich, Electrochemical strategy for low-cost viral detection. *ACS Cent. Sci.* **7**, 963 (2021).
Featured in: CRISPR-Based Electrochemical Sensor Permits Sensitive and Specific Viral Detection in Low-Resource Settings. ACS Cent. Sci. **7**, 926 (2021).
28. L. M. Castle, D. A. Schuh, E. E. Reynolds, A. L. Furst Electrochemical sensors to detect bacterial foodborne pathogens. *ACS Sensors* **6**, 1717 (2021).
27. A. R. Mahoney, M. M. Safaee, W. M. Wuest, A. L. Furst, The Silent Pandemic: Emergent Antibiotic Resistances Following the Global Response to SARS-CoV-2. *iScience* **24**, (2021).
26. G. Fan, P. Wasuwanich, A. L. Furst, Biohybrid systems for improved bioinspired, energy-relevant catalysis, *ChemBioChem* **22**, 2353 (2021).
25. C. Catania, A. Karbelkar, A. L. Furst, Engineering the interface between electroactive bacteria and electrodes. *Joule* **5**, 743 (2021).
24. S. H. Klass, L. E. Sofen, Z. F. Hallberg, T. A. Fiala, A. V. Ramsey, N. S. Dolan, M. B. Francis, A. L. Furst, Covalent capture and electrochemical quantification of pathogenic *E. coli*. *Chem. Commun.* **57**, 2507 (2021).
Featured on the Chem. Commun. blog.
23. J. Dai, G. J. Knott, W. Fu, T. W. Lin, A. L. Furst, D. R. Britt, M. B. Francis, Protein-Embedded Metalloporphyrin Arrays Templated by Circularly Permuted Tobacco Mosaic Virus Coat Proteins. *ACS Nano* **15**, 8110 (2021).
22. G. Fan, A. L. Furst, How far can microbial electrosynthesis go? *Joule* **4**, 2079 (2020).
21. A. Karbelkar, A. L. Furst, Electrochemical Diagnostics for Bacterial Infectious Diseases. *ACS Infect. Dis.* **6**, 1567 (2020).
20. L. E. Sofen, A. L. Furst, Electrochemical sensors to monitor endocrine disrupting pollutants. *J. Electrochem. Soc.* **167**, 037524 (2020).
19. Y. Dai, A. L. Furst, C. C. Liu, Strand Displacement Strategies for Biosensor Applications. *Trends Biotechnol.* **37**, 1367 (2019).
Featured on the cover of the December issue of Trends in Biotechnology

Prior Publications

18. A. L. Furst, N. B. Muren, M. G. Hill, Toward multimarker and functional assays from crude cell lysates: controlling spacing and signal amplification in DNA-CT-based bioelectrochemical devices. *Curr. Opin. Electrochem.* **4**, 104 (2019).
17. J. G. García-Cerdán, A. L. Furst, K. McDonald, D. Schuneman, M. B. Francis, K. K. Niyogi, A Thylakoid-Bound and Redox Active Rubredoxin (RBD1) is Essential in de novo Assembly and Repair of Photosystem II Complexes in Photosynthetic Eukaryotes. *Proc. Natl. Acad. Sci.* **116**, 16631 (2019).
16. A. L. Furst, S. H. Klass, M. B. Francis, DNA hybridization to control cellular interactions. *Trends Biochem. Sci.* **44**, 342 (2019).
Featured on the cover of Trends in Biochemical Sciences
15. A. L. Furst, M. B. Francis, Impedance-Based Detection of Bacteria. *Chem. Rev.* **119**, 700 (2019).
14. A. L. Furst, M. J. Smith, M. C. Lee, M. B. Francis, DNA hybridization to interface current-producing cells with electrode surfaces. *ACS Cent. Sci.* **4**, 880 (2019).
13. A. L. Furst, M. J. Smith, M. B. Francis, New Techniques for the Generation and Analysis of Tailored Microbial Systems on Surfaces. *Biochem.* **57**, 3017 (2018).
12. L. Olshansky, R. Huerta-Lavorie, A. I. Nguyen, J. Vallapurackal, A. L. Furst, T. D. Tilley, A. S. Borovik, Artificial Metalloproteins Containing Co₄O₄ Cubane Active Sites" *J. Am. Chem. Soc.* **140**, 2739 (2017).
11. A. L. Furst, M. J. Smith, M. B. Francis, M. B. Direct Electrochemical Bioconjugation on Metal Surfaces. *J. Am. Chem. Soc.* **139**, 12610 (2017).
10. J. A. Finbloom, K. Han, C. Slack, A. L. Furst, M. B. Francis, Cucurbit[6]uril-promoted click chemistry for protein modification. *J. Am. Chem. Soc.* **139**, 9691 (2017).
9. A. L. Furst, A. C. Hoepker, M. B. Francis, Quantifying Hormone Disruptors with an Engineered Bacterial Biosensor. *ACS*

Cent. Sci. **3**, 110 (2017).

Featured in: Impedance for Endocrine Disruption Compounds. *ACS Cent. Sci.* **2017**; 3: 99; Sensing Xenoestrogens. *ACS Chem. Biol.* **2017**; 12: 313.

8. A. L. Furst, M. G. Hill, J. K. Barton, Two-Electrode Platforms for Protein Biosensing based on Charge Transport through the DNA Double Helix. *Electroanalytical Chemistry*, A. Bard; C. Zoski, ed., 2017, Taylor & Francis.

7. A. L. Furst, J. K. Barton, DNA Electrochemistry Shows DNMT1 Methyltransferase Hyperactivity in Colorectal Tumors. *Chem. & Biol.* **22**, 938 (2015).

Featured in: New approach holds promise for earlier, easier detection of colorectal cancer: Chemists develop technique that could one day lead to early detection of tumors. *ScienceDaily*, 25 June 2015. and DNMT1 and Cancer: An Electrifying Link. *Chem. & Biol.* **22**, 810 (2015).

6. J. K. Barton, A. L. Furst, M. A. Grodick, DNA Sensors using DNA Charge Transport Chemistry. pp. 105-120 in *DNA in Supramolecular Chemistry and Nanotechnology*, E. Stultz; G. H. Clever, ed., 2015, Wiley.

5. A. L. Furst, M. G. Hill, J. K. Barton, A Multiplexed, Two-Electrode Platform for Biosensing Based on DNA-Mediated Charge Transport. *Langmuir* **31**, 6554 (2014).

4. A. L. Furst, N. B. Muren, M. G. Hill, J. K. Barton, Electrochemical Detection of DNMT1 Methyltransferase Activity in Tumors. *Proc. Natl. Acad. Sci. USA* **22**, 14985 (2014).

Featured in: Label-free electrochemical detection of methyltransferases. *SciBX* **7** (2014).

3. A. L. Furst, M. G. Hill, J. K. Barton, Electrocatalysis in DNA Sensors. *Polyhedron* **84**, 150 (2014).

2. A. L. Furst, S. Landefeld, M. G. Hill, J. K. Barton, Electrochemical Patterning and Detection of DNA Arrays on a Two-Electrode Platform. *J. Am. Chem. Soc.* **135**, 19099 (2013).

1. A. L. Furst, M. G. Hill, J. K. Barton, DNA-Modified Electrodes Fabricated Using Copper-Free Click Chemistry for Enhanced Protein Detection. *Langmuir* **29**, 16141 (2013).

PATENTS & DISCLOSURES

J. K. Barton, A. L. Furst, M. G. Hill, N. B. Muren. "Electrochemical Substrate Patterning and Analyte Detection on a Two-Electrode Platform." Patent Number 10316354, 2019.

A. L. Furst, R. A. Ahlmark, A. Karbelkar, E. E. Reynolds. "A Microbial Electrochemical Technology to Detect and Degrade Organophosphate Pesticides." Provisional Patent Number 18/690033.

A. L. Furst, C. Catania, G. Fan, P. Wasuwanich. "Protection of Next-Generation Probiotics During Processing." Utility Patent Filing PCT/US2025/023159.

A. L. Furst, T. M. Gill, M. Liu, Y. Zhang, C.-C. Kuo. "Facet Control of Copper Nanoparticles." Utility Patent Filing PCT/US2025/023193.

A. L. Furst, G. Fan, B. Baskaran. "Lipase-Expressing *E. coli*." Utility Patent Filing PCT/US2025/19815.

A. L. Furst, M. Gut. "Scaffolded Biomaterials for Efficient Lanthanide Recovery." Provisional Patent Number 63/753780.

A. L. Furst, G. Fan, P. Wasuwanich, B. D. Burke, E. B. Moore, T. P. Mui. "Seed Compositions for Improved Germination." Utility Patent Filing PCT/US2024/053573.

PRESENTATIONS

Invited Presentations in Current Role

2025

"Bio-Inspired and Bio-Derived Technologies for a Circular Economy," CEISA Webinar, FGV, Brasilia, Brazil (*virtual*).

"Microbial Engineering to Harness Redox Processes for Sustainable Technologies," Princeton University, CBE Dept, Princeton, NJ.

"Bio-Inspired and Bio-Derived Technologies for a Circular Economy," Kyocera, Kagoshima, Japan.

"Microbial Engineering to Harness Redox Processes for Sustainable Technologies," Bioelectrochemical Society Workshop, Hiroshima, Japan.

"Materials innovation for optimizing electron transfer in microbial electrochemical technologies," International Society of Electrochemistry Meeting, Mainz, Germany.

"Microbial Engineering to Harness Redox Processes for Sustainable Technologies," UT Austin, Dept of Chemical Engineering, Austin, TX.

"Enabling microbial electrochemical technologies through materials innovation," Sessler Award Symposium, ACS Fall Meeting, Washington, DC.

"Biomimetic biomolecular engineering," C&EN Talented 12 Award Symposium, ACS Fall Meeting, Washington, DC.

"Applying to Faculty Positions," Beckman Annual Symposium, Irvine, CA.

"Entrepreneurship as a Pre-Tenure Faculty Member," GLEEN, MIT, Cambridge, MA.

"Microbial Engineering for Human and Environmental Health," BeaverWorks Summer Institute, MIT, Cambridge, MA.

"Bio-Inspired Approaches to PFAS Detection and Degradation," MIT Alumni Weekend, MIT, Cambridge, MA.

"Microbial Engineering for Human and Environmental Health," University of Witwatersrand, Johannesburg, South Africa (*virtual*).

"The Importance of Data Standardization for Effective Implementation of CleanTech." HIDA CIFAR Summer School on Data

Science and Climate, Berlin, GE.
 Congressional Staff Briefing on Climate, MIT, Cambridge, MA.
 "Microbial Engineering to Harness Redox Processes for Sustainable Technologies," DTU Microbes Initiative Conference, Copenhagen, DK.
 "Microbial Engineering to Harness Redox Processes for Sustainable Technologies," Stanford University, Dept of Chemical Engineering, Stanford, CA.
 "Engineering biology for sustainability and clean energy," Oregon State University, Dept of Chemistry, Corvallis, OR.
 "Bio-Inspired Technologies for Sustainability and Clean Energy," Colorado School of Mines, Dept of Chemical Engineering, Golden, CO.
 "Bio-Inspired Technologies for Monitoring Human and Environmental Health," Session on Recent Advancements in Miniaturized Sensing Platforms for Biomolecular Monitoring, Pittcon, Boston, MA.
 "Bio-Inspired Technologies for Monitoring Human and Environmental Health," NASEM US-Africa Frontiers Conference, Kigali, Rwanda.
 Keynote seminar, "Enabling microbial electrochemical technologies through materials innovation," Africa ISMET, Cairo, Egypt.
 "Engineering biology for sustainability and clean energy," Michigan State University, Dept of Chemical Engineering, East Lansing, MI.
 "Engineering equitable technologies," Golden Speaker Series, MIT, Cambridge, MA.

2024

"Engineering biology for sustainability and clean energy," Melbourne Centre for Nanofabrication, Melbourne, Australia.
 "Engineering biology for sustainability and clean energy," University of Queensland, Institute for Molecular Bioscience, Brisbane, Australia.
 "Self-assembling "suits of armor" to enable formulation and delivery of delicate microbes," Bioformulations Symposium, SIMB 2024, Boston, MA.
 "Bottom-up materials design for and from microbes," SB12: Conductive Biological Materials, MRS Annual Meeting, Boston, MA.
 "Electrochemical Diagnostics to Support Equitable Healthcare," Nanomaterials in Biomedical Applications, University of Manipal, Karnataka, India.
 Keynote seminar, "Bio-Inspired Technologies for Monitoring Human and Environmental Health," EAS Awards Session, Young Investigator Award Seminar, Princeton, NJ.
 "Bio-inspired and bio-derived materials for sustainability," AIChE Annual Meeting 2024, Sustainable Low-Carbon Energy Solutions, San Diego, CA.
 "Bottom-up materials design for and from microbes," Emory University, Dept of Chemistry, Atlanta, GA.
 "Bio-inspired and bio-derived materials for sustainability," Climatech Planetary Stewardship, Boston, MA.
 Keynote seminar, "Bio-inspired and bio-derived materials for sustainability," Green Chemistry Seminar, UMass Lowell, Lowell, MA.
 "Bio-derived and bio-inspired approaches to CO₂ valorization," Novo Nordisk Dream Reactions of CO₂, Copenhagen, Denmark.
 "Bottom-up materials design for and from microbes," Tufts University, Dept of Chemistry, Boston, MA.
 "Bio-inspired and bio-derived materials for sustainability," Exxon Corporation, NJ.
 "Carbon Capture and Sequestration," International School for Materials for Energy and Sustainability, CO School of Mines, Golden, CO.
 "Bio-inspired and bio-derived materials for sustainability," Los Alamos National Lab, Los Alamos, NM.
 "Self-Assembling Materials to Protect Microbes from Processing Stresses," NIH High Risk-High Reward Annual Meeting, Baltimore, MD.
 "Bio-inspired and bio-derived materials for sustainability," Texas Tech University, Department of Chemical Engineering, Lubbock, TX.
 TEDx Boston, Boston, MA.
 TEDx MIT, Cambridge, MA.
 "Bio-inspired and bio-derived materials for sustainability," Beckman Macromolecule Symposium, Newton, MA.
 Keynote seminar, "Microbial technologies for human and environmental health," Pioneer Valley Microbe Day, Amherst, MA.
 "Facet-controlled copper electrocatalysts for the selective conversion of CO₂ to ethylene," ACS 2024 Fall Annual Meeting, Denver, CO.
 "Bio-Inspired Technologies for Monitoring Human and Environmental Health," TechConnect Conference, Baltimore, MD.
 "Bio-inspired and bio-derived materials for sustainability," Vale Research Symposium, Belem, Brazil.
 "Engineering biology for sustainability and clean energy," RAMACO Research Symposium, Sheridan, WY.
 "In vitro Platforms to Study and Deploy Membrane-Associated Proteins," Transmembrane Protein Gordon Research Conference, Sunday River, ME.
 "Bio-inspired systems for sustainability and environmental remediation," California Institute of Technology, Pasadena, CA.
 "Bio-inspired electrochemical technologies for human and environmental health," Clarkson University, Potsdam, NY.
 "Bio-inspired electrochemical technologies for human and environmental health," Sasol Chemicals, Virtual.
 "Bottom-up materials design for and from microbes," University of Washington, Dept of Chemistry, Seattle, WA.
 "Bio-inspired and bio-derived materials for sustainability," SLB, Cambridge, MA.
 "Harnessing Biochemical Electron Transfer for Equitable Technologies," NA-ISMET meeting, Rice University, Houston, TX.

2023

- "Bio-inspired electrochemical technologies for human and environmental health," Northwestern University, Chicago, IL.
- "Bio-inspired and bio-derived materials for sustainability," Bucknell University, Lewisburg, PA.
- "Bio-inspired and bio-derived materials for sustainability," MITel Annual Research Conference, Cambridge, MA.
- "Taking inspiration from nature for energy equity," WIC Rising Stars, AIChE Annual Meeting, Orlando, FL.
- "Taking inspiration from Nature: Bio-inspired systems for human and environmental health," Biosensors for Cells, AIChE Annual Meeting, Orlando, FL.
- "Multiscale Control of Copper Nanoparticle DNA Conjugates for Improved Electrochemical CO₂ Reduction," MIT Sustainability Conference, Cambridge, MA.
- "Bio-Inspired Technologies for Sustainability and Clean Energy," MIT.nano Conference, Cambridge, MA.
- "Multiscale Control of Copper Nanoparticle DNA Conjugates for Improved Electrochemical CO₂ Reduction," MIT Energy Conference, Cambridge, MA.
- "Bio-Inspired Technologies for Sustainability and Clean Energy," MIT Congressional Staff Briefing, Cambridge, MA.
- "Circularizing the Plastic Economy," Plastic Omnium Symposium, Paris, FR
- Keynote seminar for the Summer REU Program, "Bio-inspired materials for sustainability," Wellesley College, Wellesley, MA.
- "Bio-Inspired Technologies for Sustainability and Clean Energy," BWSI Program, MIT, Cambridge, MA.
- "Bio-Inspired Technologies for Sustainability and Clean Energy," Japan-US MIT ILP Conference, Cambridge, MA.
- "Harnessing Biochemical Electron Transfer for Equitable Technologies," Bioelectronics Gordon Conference, Andover, NH.
- "Taking inspiration from Nature: Bio-inspired systems for sustainability and clean energy," Chemical Engineering, University of New Hampshire, NH.
- "Taking inspiration from Nature: Bio-inspired systems for sustainability and clean energy," Chemistry, UNAM, Mexico City, Mexico.
- "Bio-Inspired Technologies for Sustainability and Clean Energy," Evonik Corporation, Cambridge, MA.
- "Bio-Inspired Technologies for Sustainability and Clean Energy," ILP USGA Symposium, Cambridge, MA.
- "Taking inspiration from Nature: Bio-inspired systems for sustainability and clean energy," Biophysical Society, Bioengineering, San Diego, CA.

2022

- "Functional biosensors for human and environmental health," Chemistry, Lehigh University, Allentown, PA.
- "Taking inspiration from Nature: Bio-inspired systems for sustainability and clean energy," Biochemistry, Michigan State University, East Lansing, MI.
- "Quantifying E. coli on an electrode," Session 15C, AIChE Fall 2022 Meeting, Phoenix, AZ.
- Keynote seminar, "Gold Leaf Electrodes for Improved Biosensing," Sensors Plenary Session, AIChE Fall 2022 Meeting, Phoenix, AZ.
- "Taking inspiration from Nature: Bio-inspired systems for sustainability and clean energy," MIT ILP Paris Symposium, Paris, France.
- "Taking inspiration from Nature: Bio-inspired systems for sustainability and clean energy," MIT ILP Canon Seminar Day, Cambridge, MA.
- "By your powers combined! Interdisciplinary research for a cleaner planet," Ten Talk, MIT, Cambridge, MA.
- "Taking inspiration from Nature: Bio-inspired systems for sustainability and clean energy," Chemical Engineering, University of Pittsburgh, Pittsburgh, PA.
- "Taking inspiration from Nature: Bio-inspired systems for sustainability and clean energy," Chemistry, University of Massachusetts, Lowell, MA.
- "Functional Biosensors for Human and Environmental Health," Bioanalytical Gordon Conference, Newport, RI.
- "Bio-derived Materials for Sustainability and Environmental Remediation," Bioengineering, University of Minnesota, St. Paul, MN.
- "Taking inspiration from Nature: Bio-inspired systems for sustainability and clean energy," Chemistry, University of Patras, Patras, Greece.
- "Taking inspiration from Nature: Bio-inspired systems for sustainability and clean energy," Chemical Engineering, Kansas State University, Manhattan, KS.

2021

- "Bioelectrochemistry for Sustainability and Environmental Remediation," Dow Chemical Company virtual.
- "Cell-based Electrochemical Biosensor to Detect Environmental Pollutants," 3422627, Pacifichem virtual.
- "Tuning the attachment of living cells to electroactive surfaces using DNA," 3422639, Pacifichem virtual.
- "DNA 'Velcro' to Interface Electron Transfer-Competent Cells with Electrodes," ECS Fall K01 virtual.
- "Capture and Electrochemical Detection of Pathogenic E. coli," ECS Fall M01 virtual.
- "Reagentless bioconjugation to electroactive surfaces," AIChE Fall 2021 Boston, MA.
- "DNA 'Velcro' to Interface Electron Transfer-Competent Cells with Electrodes," AIChE Fall 2021 Boston, MA.
- "Electrochemical Sensors to Detect Environmental Contaminants," ILP Conference, Cambridge, MA.
- "Functional Biosensors for Human and Environmental Health," Chemical Engineering, Purdue University, West Lafayette, IN.
- "Engineered microbial cocultures to detect and degrade organophosphates," J-WAFS Seminar Day, MIT, Cambridge, MA.
- "Engineered microbial cocultures to detect and degrade organophosphates," 210b Seminar, MIT, Cambridge, MA.
- "Functional Biosensors for Human and Environmental Health," PPSM Seminar Series, MIT, Cambridge, MA.
- "Functional Biosensors for Human and Environmental Health," Chemical Engineering, University of Rochester, Rochester, NY.
- "Tuning the attachment of living cells to electroactive surfaces using DNA," ACS Colloids, ACS Fall 2021 Atlanta, GA.

"Electrochemical Sensors to Detect Environmental Contaminants," ACS Sensors, ACS Fall 2021 Atlanta, GA.
 "DNA hybridization to interface living cells with electroactive surfaces," Dennis Peters Retrospective Symposium, ECS.
 "DNA hybridization to interface living cells with electroactive surfaces," Nanoengineering, University of California, San Diego.

2020

"Electrochemistry for Sensors and Energy," Chemistry, University of Idaho.
 "Electrochemical Biosensors," DEVCOM Soldier Center Water Sensor Symposium.
 "DNA Velcro to interface cells with electrode surfaces," ISMET Virtual Meeting.
 "Electrochemistry for Sensors and Energy," Langer Seminar, MIT, Cambridge, MA.
 "Electrochemistry for Sensors and Energy," Gamry Webinar.
 "Electrochemical Sensors to Detect Environmental Contaminants," ACS Sensors Young Investigators Symposium, ACS Fall 2020 Virtual Meeting.
 "Tuning the attachment of living cells to electroactive surfaces using DNA," ACS Colloids, ACS Fall 2020 Virtual Meeting.
 "DNA 'Velcro' to Interface Electron Transfer-Competent Cells with Electrodes," Interfacial Phenomena, AIChE meeting, virtual.
 "Electrochemical Sensors to Detect Environmental Contaminants," Sensors, AIChE meeting, virtual.
 "Electrochemical Biosensors," ARO Soldier Hydration Group.
 "Engineered microbial cocultures to detect and degrade organophosphates," SRP-CEHS Seminar, MIT, Cambridge, MA.
 "Controlling Microbial Adhesion using DNA 'Velcro'," M02, Electrochemical Society Virtual Meeting.
 "DNA 'Velcro' to Interface Electron Transfer-Competent Cells with Electrodes," K02, Electrochemical Society Virtual Meeting.
 "Electrochemistry for Sensors and Energy," Ngo Group Meeting, BME, Boston University, Boston, MA.
 "Electrochemistry for Sensors and Energy," Biocomputing Group, virtual.
 "Electrochemistry for Sensors and Energy," Chemistry, University of Zurich, Zurich, CH.
 "Electrochemical Biosensors," Chemical Engineering, Sensors Guest Lecture, Durham, NH.
 "Controlling Microbial Adhesion using DNA 'Velcro'," Microbial Sciences Initiative Annual Symposium, Harvard University, Boston, MA.

2019

"Controlling Microbial Adhesion using DNA 'Velcro'," Materials Research Society meeting, Boston, MA.
 "Electrochemical Sensors to Detect Environmental Contaminants," Materials Research Society meeting, Boston, MA.
 "Electrochemistry for Sensors and Energy," Chemistry, Boston University, Boston, MA.
 "Controlling Microbial Adhesion using DNA 'Velcro'," Materials in Chemical Engineering Symposium, University of Florida, Gainesville, FL.
 "Controlling Microbial Adhesion using DNA 'Velcro'," MURI Review, MIT, Boston, MA.
 "Controlling Microbial Adhesion using DNA 'Velcro'," DIMENSIONS Meeting, Harvard University, Cambridge, MA.
 "DNA 'Velcro' to Interface Electron Transfer-Competent Cells with Electrodes," Bioelectronics Gordon Research Conference, Proctor Academy, NH.

Selected Invited Presentations in Prior Roles

2018

Remsen Bird Lecturer Occidental College, Eagle Rock, CA.
 Bioenergetics Seminar, Lawrence Berkeley Labs, Berkeley, CA.
 Beckman Annual Symposium, Beckman Institute, Irvine, CA.

2017

QB3 Postdoctoral Seminar, Berkeley, CA.
 Supramolecular Chemistry and Self Assembly Gordon Research Seminar, Les Diabarets, Switzerland.
 Chemistry, Occidental College: Los Angeles, CA.

2014

Gray-Hill Lecturer, Gray-Hill Lecture Series, Occidental College, Los Angeles, CA.

TEACHING

Massachusetts Institute of Technology

10.569 Synthesis of Polymers, Instructor (2024-present)
 10.UAR Professional Development, Instructor (2023-present)
 5.310 Advanced General Chemistry Laboratory; Instructor, Course Developer (2019-2022)
 10.534 Bioelectrochemistry-Instructor, Course Developer (2019-present)
 15.366 Climate & Energy Ventures, Mentor (2023, 2024)
 Tech2Market, Mentor (2025)
 [Guest] 20.363 Biomaterials science and Engineering (2024)

California Institute of Technology

Head TA, Protein Thermodynamics (2012-2015)
 TA, Biophysics of Macromolecules (2011)

TA, General Chemistry Laboratory (2010)

Saint Louis University

Teaching Assistant, General Chemistry
 Teaching Assistant, Chemistry Laboratory

MENTORING

Postdoctoral Researchers Mentored

- Dr. Amruta Karbelkar, MIT (currently research scientist at Rice University)
- Dr. Gang Fan, MIT, (faculty at Rochester University)
- Dr. Marjon Zamani, MIT (senior scientist, Qiagen)
- Dr. Chelsea Catania, MIT (translational lead, DARPA contract)

- Dr. Moein Safaee, MIT (research scientist, Abbvie)
- Dr. Thomas Gill, MIT (research scientist, Lockheed Martin)
- Dr. Stephanie Allison-Logan, MIT (co-founder, Sustainable Polymers)
- Dr. Graziela Sedenho, MIT (research Faculty at University of Sao Paulo)
- Dr. Melanie Gut, MIT (senior scientist, Siegfried)
- Dr. Songyi Yeon, MIT
- Dr. Tali Dotan, MIT
- Dr. Yoo Kyung Go, MIT
- Dr. Swathi Penumutchu, MIT
- Dr. Max Fornerod, MIT
- Dr. Sunanda Dey, MIT
- Dr. Jesus Baltazar, MIT
- Dr. Cooper Tezak, MIT
- Dr. Ginevra Gangeri, MIT
- Dr. Farid Khoury, MIT

Graduate Researchers Mentored

- Yu-Shuo Lee (visiting student), NTU/MIT
- Josie Falagan, MIT **NSF GRFP**
- Kylie Akiyama, MIT
- Chih-Peng Chuang, MIT
- Juliana Estradioto, MIT
- Alexis Jones, MIT **NSF GRFP**
- Benjamin Burke, MIT **NSF GRFP**
- Suhail Haque, MIT
- Juliet Okorie, MIT
- Chao-Chi Kuo, MIT
- Grace Anderson, MIT **NSF GRFP**
- Nadia Zaragoza, MIT **NSF GRFP**
- Barathkumar Baskaran, MIT
- Alec Agee, MIT **NSF GRFP**
- Xingcheng Zhou, MIT
- Akiva Gordon, MIT
- Erin Reynolds, MIT **NSF GRFP**
- Manuel Merz (visiting student), EPFL/MIT
- Laura Sofen, UC Berkeley
- Amanda Bischoff, UC Berkeley **NSF GRFP**
- Johnathan Maza, UC Berkeley
- Alex Ramsey, UC Berkeley

Undergraduate and High School Researchers Mentored

- 70 MIT undergraduates
- 6 Wellesley undergraduates
- 3 Imperial College undergraduates
- 9 MIT MSRP undergraduates
- 30 Malden Catholic High School students
- 15 Boston-area high school students
- 6 AEOP apprentices
- 8 previous undergraduates at Occidental College, Caltech, and UC Berkeley

- Graduate Admissions Committee (2019-present)
- Seminar Organizer (2022-24)
- Undergraduate Advisor (2022-present)
- Mentor, Rising Stars Program
- Mentor, ACCESS Program
- Organizer, Incoming Graduate Student Book Club (2020-23)
- Organizer, Undergraduate Book Club (2020-24)

External Service

Grant Reviewer

- Israel Science Foundation Reviewer
- DOE
- ARO
- NSF (14 panels)
- NIH (7 panels)
- Chan-Zuckerberg Center
- ACS PRF
- Novo Nordisk

Conference Organization

- Bioanalytical GRC, Vice Chair (Elected position for 2026 conference)
- CIFAR Accelerated Decarbonization Conference (Organizer, Fall 2024, Sao Paulo, Brazil)
- NSF-sponsored Convergence Accelerator Workshop, Session Moderator
- Chemical Tools for Complex Biological Systems, HHMI Janelia Farms, Session Chair

Science Outreach Work

- Established MIT-Malden Catholic Summer Research Collaboration
- MIT Campus Preview Weekend Demonstrations and Lab Tour (2022-present)
- MIT Sloan EMBA Science Demonstrator (2023-present)
- Bay Area Science Festival Discovery Day Demonstrator (2017)
- QB3 Postdoc Seminar (2016-2019)
- Women in STEM program (2015)
- Girl Scouts (2013-2015)
- Project Science Academy (2013)
- School on Wheels (2011-2013)

LEADERSHIP & EXTERNAL SERVICE to the SCIENTIFIC COMMUNITY

MIT

- MIT Program in Polymers and Soft Matter (PPSM) Seminar Organizer
- Martin Trust Center Delta V Board Member (2023)
- Judge for 2024, 2025 Solve MIT Competition
- Judge for 2023, 2024 MIT Energy Hackathon
- Internal Grant Reviewer
 - J-WAFS Fellowship
 - J-WAFS Grant
 - MISTI Grant

MIT Chemical Engineering Department

- Diversity, Equity, and Inclusion Committee (2021-23)
- Graduate Committee (2021-24)