

– KARTHISH MANTHIRAM –
THEODORE T. MILLER CAREER DEVELOPMENT CHAIR
ASSISTANT PROFESSOR, DEPARTMENT OF CHEMICAL ENGINEERING
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

CONTACT

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PROFESSIONAL APPOINTMENTS

2017 – present **Assistant Professor**
Massachusetts Institute of Technology
Department of Chemical Engineering
(2020 – *present*) Theodore T. Miller Career Development Chair
(2017 – 2019) Warren K. Lewis Career Development Professorship

2015 – 2016 **Postdoctoral Research Associate**
California Institute of Technology
Division of Chemistry and Chemical Engineering
Advisor: Robert. H. Grubbs

EDUCATION

2010 – 2015 **Ph.D. in Chemical Engineering**
University of California, Berkeley

Advisor: A. Paul Alivisatos, Department of Chemistry
Dissertation: Nanoscale metals and semiconductors for the storage of solar energy in
chemical bonds

2006 – 2010 **B.S. in Chemical Engineering with Honors and Distinction**
Minor in Materials Science and Engineering
Stanford University

Advisors: Yi Cui, Materials Science and Engineering
Jim Swartz, Chemical Engineering
Honors Thesis: Progress Towards Developing a Red-Shifted Mutant of the Gaussia
Luciferase

HONORS AND AWARDS

2020	DOE Early Career Award
2020	NSF CAREER Award
2020	American Institute of Chemical Engineers 35 Under 35 Award
2020	MIT Teaching with Digital Technology Award
2020	C. Michael Mohr Outstanding Undergraduate Teaching Award
2020	ACS Catalysis Early Career Advisory Board
2019	American Chemical Society Petroleum Research Fund Doctoral New Investigator Award
2019	3M Nontenured Faculty Award
2019	MIT Chemical Engineering Outstanding Graduate Teaching Award
2019	Young Innovator Award in NanoEnergy
2018	C. Michael Mohr Outstanding Undergraduate Teaching Award
2017	Forbes 30 Under 30 in Science
2016	Outstanding Postdoctoral Researcher Poster at Gordon Research Conference on Catalysis
2015	Materials Research Society Outstanding Student Presentation Award
2015	Electrochemical Society Dan Cubicciotti Award
2014	Poster Prize at Gordon Research Conference on Noble Metal Nanoparticles
2013	Selected to Attend Lindau Nobel Laureates Meeting, Lindau, Germany
2012	Dow Excellence in Teaching Award, University of California, Berkeley
2012	Chemical Engineering Departmental Teaching Award, University of California, Berkeley
2012	3rd Place Poster Prize, NaNaX 5 Meeting, Malaga, Spain
2010 – 2013	Department of Energy Office of Science Graduate Fellowship
2010 – 2011	Tau Beta Pi Fellowship
2010	National Science Foundation Graduate Fellowship (Declined)
2010	Mason and Marsden Prize in Chemical Engineering, Stanford University
2010	Faculty Award for Outstanding Honors Research, Chemical Engineering, Stanford University
2010	Frederick E. Terman Award for Scholastic Achievement in Engineering, Stanford University
2010	Award for Academic Achievement in Chemical Engineering, Stanford University
2009	Barry M. Goldwater Scholarship
2009	Channing Robertson Award in Chemical Engineering, Stanford University
2009	Merck Engineering and Technology Fellowship (Declined)
2009	Science and Technology at the Nanoscale Research Award, Materials Science and Engineering, Stanford University
2008	Vice Provost for Undergraduate Education Research Award, Chemical Engineering, Stanford University
2007	President's Award for Academic Excellence in the Freshman Year, Stanford University
2006	Valedictorian, Liberal Arts and Science Academy, Austin, Texas
2006	National Merit Scholarship

PUBLICATIONS

1. J. P. Welsh, K. G. Patel, **K. Manthiram**, and J. R. Swartz, "Multiply Mutated Gaussia Luciferases Provide Prolonged and Intense Bioluminescence," *Biochemical and Biophysical Research Communications* **389**, 563-568 (2009).
2. J. Bonomo, J. P. Welsh, **K. Manthiram**, and J. R. Swartz, "Comparing the functional properties of the Hsp70 chaperones, DnaK and BiP," *Biophysical Chemistry* **149**, 58-66 (2010).
3. **K. Manthiram** and A. P. Alivisatos, "Tunable Localized Surface Plasmon Resonances in Tungsten Oxide Nanocrystals," *Journal of the American Chemical Society* **134**, 3995-3998 (2012).
4. **K. Manthiram**,* B. J. Beberwyck,* D. V. Talapin, and A. P. Alivisatos, "Seeded Synthesis of CdSe/CdS Rod and Tetrapod Nanocrystals," *Journal of Visualized Experiments* **82**, 50731 (2013).
5. P. K. Jain, **K. Manthiram**, J. Engel, S. L. White, J. A. Faucheaux, and A. P. Alivisatos, "Doped semiconductor nanocrystals as plasmonic probes of redox chemistry," *Angewandte Chemie International Edition* **52**, 13671-13675 (2013).
6. **K. Manthiram**, Y. Surendranath, and A. P. Alivisatos, "Dendritic assembly of gold nanoparticles during fuel-forming electrocatalysis," *Journal of the American Chemical Society* **136**, 7237-7240 (2014).
7. **K. Manthiram**, B. J. Beberwyck, and A. P. Alivisatos, "Enhanced electrochemical methanation of carbon dioxide with a dispersible nanoscale copper catalyst," *Journal of the American Chemical Society* **136**, 13319-13325 (2014).
8. D. Hellebusch, **K. Manthiram**, B. J. Beberwyck, and A. P. Alivisatos, "In-situ TEM Imaging of Cadmium Selenide Nanorod Sublimation," *Journal of Physical Chemistry Letters* **6**, 605-611 (2015).
9. Q. Chen, H. Cho, **K. Manthiram**, M. Yoshida, X. Ye, and A. P. Alivisatos, "Interaction potentials of anisotropic nanocrystals from the trajectory sampling of particle motion in *in-situ* liquid phase transmission electron microscopy," *ACS Central Science* **1**, 33-39 (2015).
10. T. M. Mattox, X. Ye, **K. Manthiram**, A. P. Alivisatos, and J. J. Urban, "Chemical Controls of Plasmons in Metal Chalcogenide and Metal Oxide Nanostructures," *Advanced Materials* **27**, 5830-5837 (2015).
11. S. Nguyen, Q. Zhang, **K. Manthiram**, X. Ye, J. P. Lomont, C. B. Harris, H. Weller, and A. P. Alivisatos, "Study of Heat Transfer Dynamics from Gold Nanorods to the Environment via Time-Resolved Infrared Spectroscopy," *ACS Nano* **10**, 2144-2151 (2016).
12. Z. J. Schiffer and **K. Manthiram**, "Electrification and Decarbonization of the Chemical Industry," *Joule* **1**, 10-14 (2017).
13. M. Zhu, R. Ye, K. Jin, N. Lazouski, and **K. Manthiram**, "Elucidating the Reactivity and Mechanism of CO₂ Electroreduction at Highly Dispersed Cobalt Phthalocyanine," *ACS Energy Letters* **3**, 1381-1386 (2018).
14. N. Lazouski, Z. J. Schiffer, K. Williams, **K. Manthiram**, "Understanding Continuous Lithium-Mediated Electrochemical Nitrogen Reduction," *Joule* **3**, 1-13 (2019).
15. M. Zhu, D. Yang, R. Ye, J. Zeng, N. Corbin, **K. Manthiram**, "Inductive and electrostatic effects on immobilized cobalt porphyrins for electrocatalytic CO₂ reduction," *Catalysis Science and Technology* **9**, 974-980 (2019).

16. N. Lazouski and **K. Manthiram**, "Ambient lithium-mediated ammonia synthesis," *Trends in Chemistry* **1**, 1 (2019).
17. K. Williams, N. Corbin, J. Zeng, N. Lazouski, D. Yang, and **K. Manthiram**, "Protecting Effect of Mass Transport during Electrochemical Reduction of Oxygenated Carbon Dioxide Feedstocks," *Sustainable Energy and Fuels* **3**, 1225-1232 (2019).
18. Z. Schiffer, N. Lazouski, N. Corbin, and **K. Manthiram**, "Nature of the first electron transfer in electrochemical ammonia activation in a non-aqueous medium," *Journal of Physical Chemistry C* **123**, 9713-9720 (2019).
19. K. Jin, J. H. Maalouf, N. Lazouski, N. Corbin, D. Yang, and **K. Manthiram**, "Epoxidation of Cyclooctene Using Water as the Oxygen-Atom Source at Manganese Oxide Electrocatalysts," *Journal of the American Chemical Society* **141**, 6413-6418 (2019).
20. D. Yang, M. Zhu, Z. Schiffer, K. Williams, X. Song, X. Liu, and **K. Manthiram**, "Direct electrochemical carboxylation of benzylic C-N bonds with carbon dioxide," *ACS Catalysis* **9**, 4699-4705 (2019).
21. N. Corbin, J. Zeng, K. Williams, and **K. Manthiram**, "Heterogeneous molecular catalysts for electrocatalytic CO₂ reduction," *Nano Research*, **12**, 2093–2125 (2019).
22. J. S. Zeng, N. Corbin, K. Williams, and **K. Manthiram**, "Kinetic analysis of the role of bicarbonate in carbon dioxide electro-reduction at immobilized cobalt phthalocyanine," *ACS Catalysis* **10**, 4326-4336 (2020).
23. N. Lazouski, M. Chung, K. Williams, M. Gala, and **K. Manthiram**, "Nonaqueous gas diffusion electrodes for rapid ammonia synthesis from nitrogen and water," *Nature Catalysis* **3**, 463-469 (2020).
24. J. H. Maalouf, K. Jin, D. Yang, A. Limaye, **K. Manthiram**, "Kinetic analysis of electrochemical lactonization of ketones using water as the oxygen-atom source," *ACS Catalysis* **10**, 5750-5756 (2020).
25. J. Park, K. Jin, A. Sahasrabudhe, P. Chiang, J. H. Maalouf, S. Rao, D. Rosenfeld, T. Khudiyev, Y. Fink, **K. Manthiram**, P. Anikeeva, "In situ Electrochemical Generation of Nitric Oxide for Spatiotemporally Precise Neuronal Modulation," *Nature Nanotechnology* **15** (2020).
26. M. Chung, K. Jin, J. Zeng, and **K. Manthiram**, "Selective Electrochemical Ethylene Oxidation in Saline Water," (submitted).
27. Z. J. Schiffer, A. M. Limaye, and **K. Manthiram**, "Thermodynamic Discrimination between Energy Sources for Chemical Reactions," (submitted).
28. A. M. Limaye, J. S. Zeng, A. Willard, and **K. Manthiram**, "Bayesian data analysis reveals no preference for cardinal Tafel slopes in CO₂ reduction electrocatalysis," (submitted).

INVITED TALKS

1. **K. Manthiram** and A. P. Alivisatos, "Tunable Localized Surface Plasmon Resonances in Tungsten Oxide Nanocrystals," NaNaX 5 Meeting, May 9, 2012, Malaga, Spain.
2. **K. Manthiram** and A. P. Alivisatos, "Tunable Localized Surface Plasmon Resonances in Tungsten Oxide Nanocrystals," University of Hamburg, May 11, 2012, Hamburg, Germany.
3. **K. Manthiram**, B. J. Beberwyck, and A. P. Alivisatos, "Electrochemical methanation of carbon dioxide with a highly dispersed copper nanocatalyst," Gordon Research Conference on Noble Metal Nanoparticles, June 19, 2014, South Hadley, Massachusetts.
4. **K. Manthiram**, "Electrochemical reduction of carbon dioxide with highly-dispersed metal nanoparticles," UC Santa Barbara Chemical Engineering Seminar Series, January 15, 2015, Santa Barbara, California. (Junior Faculty Candidate Seminar)
5. **K. Manthiram**, "Electrochemical reduction of carbon dioxide with highly-dispersed metal nanoparticles," Stanford Chemical Engineering Seminar, January 20, 2015, Stanford, California. (Junior Faculty Candidate Seminar)
6. **K. Manthiram**, "Electrochemical reduction of carbon dioxide with highly-dispersed metal nanoparticles," California Institute of Technology Chemical Engineering Seminar, January 30, 2015, Pasadena, California. (Junior Faculty Candidate Seminar)
7. **K. Manthiram**, "Electrochemical reduction of carbon dioxide with highly-dispersed metal nanoparticles," Berkeley Chemical and Biological Engineering Special Seminar, February 2, 2015, Berkeley, California. (Junior Faculty Candidate Seminar)
8. **K. Manthiram**, "Electrochemical reduction of carbon dioxide with highly-dispersed metal nanoparticles," Princeton Chemical and Biological Engineering Seminar, February 4, 2015, Princeton, New Jersey. (Junior Faculty Candidate Seminar)
9. **K. Manthiram**, "Electrochemical reduction of carbon dioxide with highly-dispersed metal nanoparticles," Minnesota Chemical Engineering and Materials Science Seminar, February 10, 2015, Minneapolis, MN. (Junior Faculty Candidate Seminar)
10. **K. Manthiram**, "Electrochemical reduction of carbon dioxide with highly-dispersed metal nanoparticles," University of Illinois at Urbana-Champaign Chemical and Biomolecular Engineering, February 17, 2015, Urbana, IL. (Junior Faculty Candidate Seminar)
11. **K. Manthiram**, "Electrochemical reduction of carbon dioxide with highly-dispersed metal nanoparticles," Massachusetts Institute of Technology Chemical Engineering Seminar Series, February 27, 2015, Cambridge, MA. (Junior Faculty Candidate Seminar)
12. **K. Manthiram**, "Putting carbon to work: Leapfrogs for carbon capture, utilization, and storage," CERAWEEK Meeting Panel, March 7, 2017, Houston, TX.
13. **K. Manthiram**, "Mechanistic Insights into Highly Active Metal Phthalocyanine Catalysts for Electrochemical Carbon Dioxide Reduction," Electrochemical Society Meeting, May 16, 2018, Seattle, WA.
14. **K. Manthiram**, "Point-of-need synthesis of critical chemicals, fuels, and materials," Aberdeen Proving Ground, Army Research Laboratory, May 23, 2018, Aberdeen, MD.

15. **K. Manthiram**, "Point-of-need synthesis of critical chemicals, fuels, and materials," Adelphi Laboratory Center, Army Research Laboratory, May 24, 2018, Adelphi, MD.
16. **K. Manthiram**, "Mechanism of carbon dioxide reduction at metal tetrapyrrole macrocycles," Telluride Science Research Center Workshop on Molecular Chemistry in Electrochemical Energy Storage, July 12, 2018, Telluride, CO.
17. **K. Manthiram**, "Reactivity and mechanism of carbon dioxide reduction at supported metal phthalocyanines," Catalysis East Workshop, August 14, 2018, Hancock, MA.
18. **K. Manthiram**, "Molecular-level insights into electrocatalytic carbon dioxide reduction by cobalt macrocycles," American Chemical Society Meeting, August 19, 2018, Boston, MA.
19. **K. Manthiram**, "Tailoring electrocatalytic surfaces for selective alcohol functionalization," American Chemical Society Meeting, August 22, 2018, Boston, MA.
20. **K. Manthiram**, "Modular electrochemical synthesis through molecular-level tuning of catalytic interfaces," 3M, September 25, 2018, Maplewood, MN.
21. **K. Manthiram**, "Direct oxidative functionalization of alcohols at electrode surfaces," American Institute of Chemical Engineers Meeting, November 1, 2018, Pittsburgh, PA.
22. **K. Manthiram**, "Modular ammonia synthesis," Mitsui Interbusiness Research Institute Meeting, November 7, 2018, Cambridge, MA.
23. **K. Manthiram**, "Making Fuels and Fertilizers Out of Thin Air," Da Vinci Lecture, Massachusetts Institute of Technology, November 9, 2018, Cambridge, MA.
24. **K. Manthiram**, "Synthetic electrocatalysis: molecular-level insights into controlling charge transfers at interfaces," Oklahoma State University, February 19, 2019, Stillwater, OK.
25. **K. Manthiram**, "Electrochemically forming and breaking the N-H bond in ammonia," American Chemical Society, April 2, 2019, Orlando, FL.
26. **K. Manthiram**, "Electrochemistry of the N-H bond: synthesis and oxidation of ammonia," Electrochemical Society, May 28, 2019, Dallas, TX.
27. **K. Manthiram**, "Synthetic Electrocatalysis for Modular Chemical Production," National Renewable Energy Laboratory, August 15, 2019, Golden, CO.
28. **K. Manthiram**, "Electrochemical Epoxidation of Olefins Using Water as Oxygen-atom Source," American Chemical Society, August 27, 2019, San Diego, CA.
29. **K. Manthiram**, "Understanding Lithium-Mediated Ammonia Synthesis," American Chemical Society, August 27, 2019, San Diego, CA.
30. **K. Manthiram**, "Electrification and Decarbonization of Chemical Synthesis," Tufts University, September 9, 2019, Medford, MA.
31. **K. Manthiram**, "Chemical Energy Storage," National Rural Utilities Boston100 Meeting, September 20, 2019, Cambridge, MA.

32. **K. Manthiram**, “Electrifying Chemical Synthesis,” Chemical Engineering Undergraduate Student Seminar, MIT, September 16, 2019, Cambridge, MA.
33. **K. Manthiram**, “Sustainable Chemical Manufacturing Using Renewable Energy,” Madurai Kamraj University, September 23, 2019, Madurai, India.
34. **K. Manthiram**, “Sustainable Chemical Manufacturing Using Renewable Energy,” Manonmaniam Sundaranar University, September 24, 2019, Tirunelveli, India.
35. **K. Manthiram**, “Carbon dioxide as a sustainable one-carbon synthon,” CellPress Lablinks on Carbon Dioxide Capture and Utilization, Harvard University, October, 14, 2019, Cambridge, MA.
36. **K. Manthiram**, “Electrification of Chemical Manufacturing,” Annual Research Conference, Energy Initiative, MIT, November 6, 2019, Cambridge, MA.
37. **K. Manthiram**, “Manthiram Lab: Electrification and decarbonization of chemical transformations,” Annual Research Conference, Energy Initiative, MIT, November 7, 2019, Cambridge, MA.
38. **K. Manthiram**, “New strategies for scalable production of hydrogen and hydrogen-carriers,” Hydrogen Workshop, Industrial Liaison Program, MIT, November 12, 2019, Cambridge, MA.
39. **K. Manthiram**, “Continuous Lithium-Mediated Ammonia Synthesis at Ambient Conditions,” American Institute of Chemical Engineers Annual Meeting, November 13, 2019, Orlando, FL.
40. **K. Manthiram**, “Electrification and Decarbonization of Chemical Synthesis,” Advances, Challenges, and Long-Term Opportunities of Electrochemistry: Addressing Societal Needs, Chemical Sciences Roundtable, National Academies, November 19, 2019, Washington, D.C.
41. **K. Manthiram**, “Lithium-Mediated Nitrogen Reduction to Ammonia at Ambient Conditions,” Materials Research Society, December 5, 2019, Boston, MA.
42. **K. Manthiram**, “Electrification and decarbonization of chemical manufacturing,” Industry Technologies for a Stable Climate, Climateworks, December 12, 2019, Cambridge, MA.
43. **K. Manthiram**, “Lithium-mediated Ammonia Synthesis at Ambient Conditions,” Telluride Science Research Center Workshop on Platinum Group Metal-free Electrocatalysts: Small Molecules Activation and Conversion, January 22, 2020, Telluride, CO.
44. **K. Manthiram**, “Electrification and Decarbonization of Chemical Synthesis,” Technical University of Munich, February 3, 2020, Munich, Germany.
45. **K. Manthiram**, “Electrochemical Ammonia Synthesis for Modular Electrical Energy Storage,” MITEI Seed Fund Awardees Program Review, May 18, 2020, Cambridge, MA.
46. **K. Manthiram**, “Electrification and Decarbonization of Chemical Synthesis,” University of Toronto, May 19, 2020, Toronto, Canada.
47. **K. Manthiram**, “Electrification and Decarbonization of Chemical Synthesis,” Center for Molecular Electrocatalysis, Pacific Northwest National Laboratory, June 24, 2020, Richland, WA.
48. **K. Manthiram**, “C-H Activation with O-atom transfer in non-ideal blended electrolytes,” Center for Molecular Electrocatalysis, Annual Review Meeting, August 12, 2020, Richland, WA.

49. **K. Manthiram**, “Electrochemical oxygen-atom transfer reactions at nanoscale metal oxides,” ACS Colloids Division, Live Stream Program, August 18, 2020, San Francisco, CA.
50. **K. Manthiram**, “Electrochemical oxygen-atom transfer reactions at nanoscale metal oxides,” American Chemical Society National Meeting, August 19, 2020, San Francisco, CA.
51. **K. Manthiram**, “Rapid lithium-mediated ammonia synthesis in non-aqueous solvents,” American Chemical Society National Meeting, August 20, 2020, San Francisco, CA.
52. **K. Manthiram**, “Modular synthesis of ammonia from air, water, and sunlight,” OCP Group, August 24, 2020, Casablanca, Morocco.
53. **K. Manthiram**, “Fertilizers from air, water, and sunlight for urban farming,” Singapore National Research Foundation, CREATE Food Workshop, August 27, 2020, Singapore, SG.
54. **K. Manthiram**, “Non-aqueous gas diffusion electrodes for ammonia synthesis at ambient conditions,” MIT Electrochemical Energy Laboratory, September 9, 2020, Cambridge, MA.
55. **K. Manthiram**, “Controlling interfacial electron and atom transfer reactions for chemical synthesis,” Technical University of Denmark, September 17, 2020, Lyngby, Denmark.
55. **K. Manthiram**, “Electrification and Decarbonization of Chemical Synthesis,” Texas Tech University, September 25, 2020, Lubbock, Texas.

OTHER CONFERENCE PRESENTATIONS

1. T. Chen, S. J. Bless, and **K. Manthiram**, “High-Velocity Impact Damage on Glass Laminates,” 2007 ASME Applied Mechanics and Materials Conference (McMAT 2007), June 3, 2007, Austin, Texas.
2. R. Russell, S. J. Bless, C. Persad, and **K. Manthiram**, “Reaction of Projectiles with Targets during Hypervelocity Impact,” 16th American Physical Society Topical Conference on Shock Compression of Condensed Matter, June 30, 2009, Nashville, Tennessee.
3. J. P. Welsh, K. G. Patel, **K. Manthiram**, and J. R. Swartz, “A Modified Gaussia Luciferase Demonstrates Prolonged and Intense Glow Kinetic,” American Institute of Chemical Engineers Annual Meeting, November 13, 2009, Nashville, Tennessee.
4. **K. Manthiram** and A. P. Alivisatos, “Tunable Localized Surface Plasmon Resonances in Tungsten Oxide Nanocrystals,” American Chemical Society Meeting, March 29, 2012, San Diego, California.
5. **K. Manthiram** and A. P. Alivisatos, “Tunable Localized Surface Plasmon Resonances in Tungsten Oxide Nanocrystals,” American Institute of Chemical Engineers Meeting, November 1, 2012, Pittsburgh, PA.
6. **K. Manthiram**, Y. Surendranath, and A. P. Alivisatos, “Assembly of gold nanoparticle electrocatalysts into high surface area dendrites during CO₂ reduction,” American Chemical Society Meeting, March 20, 2014, Dallas, Texas.
7. **K. Manthiram**, Y. Surendranath, and A. P. Alivisatos, “Morphological evolution of gold nanoparticles during electrochemical CO₂ reduction,” Materials Research Society Meeting, April 25, 2014, San Francisco, CA.

8. **K. Manthiram**, B. Beberwyck, and A. P. Alivisatos, “Electrochemical methanation of CO₂ with a highly dispersed copper nanocatalyst,” American Chemical Society Meeting, August 13, 2014, San Francisco, CA.
9. **K. Manthiram** and A. P. Alivisatos, “Activity and Stability of Gold and Copper Nanoparticles for Electrochemical Carbon Dioxide Reduction,” American Institute of Chemical Engineers Meeting, November 17, 2014, Atlanta, GA.
10. **K. Manthiram**, B. Beberwyck, and A. P. Alivisatos, “Activity and Stability of Gold and Copper Nanoparticles for Electrochemical Carbon Dioxide Reduction,” Materials Research Society Meeting, April 9, 2015, San Francisco, CA.
11. **K. Manthiram**, A. Q. Fenwick, J. P. Edwards, R. H. Grubbs, “Influence of Anion-Exchange Ionomers on Electrocatalysts for Carbon Dioxide Reduction,” Electrochemical Society Meeting, October 4, 2016, Honolulu, HI.
12. **K. Manthiram**, A. Q. Fenwick, J. P. Edwards, R. H. Grubbs, “Interaction of Anion-Exchange Ionomers with Carbon Dioxide Reduction Electrocatalysts,” American Institute of Chemical Engineers Meeting, November 14, 2016, San Francisco, CA.
13. **K. Manthiram**, M. Zhu, R. Ye, and K. Jin, “High turnover frequencies and mechanism of carbon dioxide reduction at metal phthalocyanines,” Gordon Research Conference on Electrochemistry, January 11, 2018, Ventura, CA.
14. **K. Manthiram**, M. Zhu, R. Ye, K. Jin, and N. Lazouski, “Supported Metal Phthalocyanines with High Turnover Frequencies for Electrochemical Carbon Dioxide Reduction,” Materials Research Society Meeting, April 4, 2018, Phoenix, AZ.
15. **K. Manthiram**, “Molecular-level insights into electrocatalytic carbon dioxide reduction at cobalt macrocycles,” American Institute of Chemical Engineers Meeting, October 29, 2018, Pittsburgh, PA.
16. **K. Manthiram**, “Inductive and electrostatic promotion of carbon dioxide reduction at metal macrocycles,” Materials Research Society Meeting, November 26, 2018, Boston, MA.
17. **K. Manthiram**, “Electrochemical Epoxidation of Olefin Substrates using Water as the Oxygen Atom Source,” American Institute of Chemical Engineers Annual Meeting, November 15, 2019, Orlando, FL.

CONFERENCE ORGANIZATION, CHAIRING, AND MODERATION

Moderator, Expert Workshop on Climate Change, Agriculture, Water, and Food Security, Jameel Water and Food Systems Lab, May 9, 2018, Dedham, MA.

Co-chair, Symposium on “Electrosynthesis of Fuels,” Electrochemical Society Annual Meeting, May 13, 2018, Seattle, WA.

Organizer and Co-Chair, “Electrocatalysis,” Catalysis and Reaction Engineering Division, AIChE Annual Meeting, October 29, 2018, Pittsburgh, PA.

Organizer and Co-Chair, “Application of Nanoscale Phenomena and Materials to Practical Electrochemical Energy Storage and Conversion,” Materials Research Society Fall Meeting, November 25, 2018, Boston, MA.

Organizer and Host, New England Catalysis Society Meeting, Massachusetts Institute of Technology, December 7, 2018, Cambridge, MA.

Organizer and Co-Chair, “Electrocatalysis for Energy Conversion and Storage,” American Chemical Society Fall Meeting, August 25, 2019, San Diego, CA.

Organizer and Co-Chair, “Electrochemistry for Applications in Sustainability,” Engineering Sciences and Fundamentals Program, AIChE Annual Meeting, November 11, 2019, Orlando, FL.

Organizer and Co-Chair, “Electrocatalysis and Photoelectrocatalysis V,” Catalysis and Reaction Engineering Division, AIChE Annual Meeting, November 15, 2019, Orlando, FL.

SELECTED WORKSHOPS

Speaker at National Academies Workshop, “Electrification and Decarbonization of Chemical Synthesis,” Workshop on Advances, Challenges, and Long-Term Opportunities of Electrochemistry: Addressing Societal Needs, Chemical Sciences Roundtable, November 19, 2019, Washington, D.C.

Writer for Department of Energy Basic Research Needs Document, “Transformative Manufacturing,” March 9, 2020, Rockville, MD.

SELECTED OUTREACH

Lecture on “Mastering the Job Talk,” Rising Stars Program for Early Career Women Pursuing Academic Careers, Department of Chemical Engineering, Massachusetts Institute of Technology, October 4, 2018, Cambridge, MA.

Panelist for ACCESS Program for Underrepresented Minority Students, Department of Chemical Engineering, Massachusetts Institute of Technology, October 12, 2018, Cambridge, MA.

Speaker at MIT Tech Reunions, “Electrifying Chemical Synthesis,” Massachusetts Institute of Technology, June 8, 2019, Cambridge, MA.

Panelist for “Life as Junior Faculty,” Rising Stars Program for Early Career Women Pursuing Academic Careers, Department of Chemical Engineering, Massachusetts Institute of Technology, October 11, 2019, Cambridge, MA.

Speaker at Freshman Pre-Orientation Programs, “Electrifying Chemical Synthesis,” Massachusetts Institute of Technology, August, 21, 2019, Cambridge, MA.

Speaker at TEDxMIT, “Electrification and decarbonization of chemical manufacturing,” Massachusetts Institute of Technology, December 6, 2019, Cambridge, MA.

Speaker at New Engineering Education Transformation, “Electrification and Decarbonization of Chemical Synthesis,” Renewable Energy Machines Thread, April 28, 2020, Cambridge, MA.

EDITORIAL BOARDS

2020 – present	Member, Early Career Advisory Board, <i>ACS Catalysis</i>
2020 – present	Member, Advisory Board, <i>MIT Science Policy Review</i>
2020 – present	Member, Advisory Board, <i>Chem Catalysis</i>
2018 – present	Member, Advisory Editorial Board, <i>Trends in Chemistry</i>

MEMBERSHIP IN PROFESSIONAL SOCIETIES

2015 – present	Electrochemical Society
2012 – present	American Chemical Society
2010 – present	Materials Research Society
2008 – present	Tau Beta Pi, Engineering Honor Society
2008 – present	American Institute of Chemical Engineers

TEACHING

2017 - 2020

Instructor for Transport Phenomena

Massachusetts Institute of Technology

Rating: 6.7/7

Awards: C. Michael Mohr Outstanding Undergraduate Teaching Award

Student Feedback:

- “Karthish cares so much. He is really great and I think he's going to do great things for future 10.302 classes. He is the single most caring and attentive teacher that I have ever seen in the Chemical Engineering department.”
- “Karthish is the best professor I've had at MIT - he is clearly very dedicated to helping the students learn and is willing to make time to meet outside of class both for 10.302 and anything else we need.”
- “Hands down one of the best professors I've had at MIT. Explained the content with contagious enthusiasm. Consistently related the class content to real-life applications, which made me even more sure that I made the right decision choosing Chemical Engineering.”

2017 - 2020

Instructor for Electrochemical Energy Systems

Massachusetts Institute of Technology

Rating: 6.7/7

Awards: MIT ChemE Outstanding Graduate Teaching Award

Student Feedback:

- “Without a doubt the best professor I've had at MIT. Pacing of lectures was excellent, and he responded to student's questions thoroughly and thoughtfully. Excellent work at creating a positive learning environment for the students.”
- “Teaching was absolutely fantastic. Loved the way how Karthish gave physical interpretations to equations to help us give more intuitive feel for the subject. Overall, enjoyed the teaching very much.
- “Karthish was a very good professor! His Socratic method of teaching really enabled me to learn the material deeply. He was also very personable with the students, which made for a comfortable class atmosphere.”

2013

Head Graduate Student Instructor

UC Berkeley

Course: Chemical Engineering Laboratory, CBE 154

2012

Graduate Student Instructor

UC Berkeley

Course: Chemical Engineering Laboratory, CBE 154

Awards: Dow Excellence in Teaching Award
Chemical Engineering Departmental Teaching Award

RECENT PRESS AND OPINIONS

“Will the artificial leaf sprout to combat climate change,” *Chemical & Engineering News*, November 21, 2016. ([link](#))

“MIT brainpower highlighted in Forbes’ 30 Under 30 lists for 2018,” *MIT News*, November 21, 2017. ([link](#))

“Shrinking the carbon footprint of a chemical in everyday objects,” *MIT News*, April 9, 2019. ([link](#))

“Kinetics of Li-mediated N₂ Electroreduction,” *Joule*, April 17, 2019. ([link](#))

“Epoxide synthesis goes green thanks to electrochemistry,” *Chemical & Engineering News*, May 2, 2019. ([link](#))

“Novel epoxide synthesis,” *The Chemical Engineer*, May 17, 2019. ([link](#))

“Industrial ammonia production emits more CO₂ than any other chemical-making reaction. Chemists want to change that,” *Chemical & Engineering News*, June 15, 2019. ([link](#))

“The Nano Research Young Innovators (NR45) Awards in nanoenergy,” *Nano Research*, August 31, 2019. ([link](#))

“Pulsed electrosynthesis plus machine learning equals bigger yields of adiponitrile,” *Chemical & Engineering News*, September 6, 2019. ([link](#))

“New reactor could halve carbon dioxide emissions from ammonia production,” *Science*, November 6, 2019. ([link](#))

“Electrochemical Haber-Bosch cuts energy demand and CO₂ emissions,” *Chemical & Engineering News*, November 7, 2019. ([link](#))

“Manufacturing Consumer Products,” *Energy Futures*, November 22, 2019. ([link](#))

“C&EN’s Year in Chemistry 2019,” *Chemical & Engineering News*, December 9, 2019. ([link](#))

“The 2020 Early Career Advisory Board of ACS Catalysis,” *ACS Catalysis*, April 17, 2020. ([link](#))

“Making commodity chemicals requires fossil fuels. New devices could do it with renewables,” *Science*, May 4, 2020. ([link](#))

“Technique could enable cheaper fertilizer production,” *MIT News*, May 4, 2020. ([link](#))

“Record amounts of ammonia produced from nitrogen and water,” *Chemistry World*, May 7, 2020 ([link](#))

“Electrode design for ammonia synthesis,” *Nature Catalysis*, May 20, 2020. ([link](#))

“Producing ammonia with small-scale electrochemical reactors,” *The Chemical Engineer*, June 9, 2020. ([link](#))

“Electrochemistry cuts CO₂ footprint of synthesizing ethylene oxide,” *Chemical & Engineering News*, June 11, 2020. ([link](#))

“Electrochemical cell in the brain,” *Nature Nanotechnology*, June 29, 2020. ([link](#))

“Producing a gaseous messenger molecule inside the body, on demand,” *MIT News*, June 29, 2020. ([link](#))

“Announcement of 2020 Awards for the Early Career Research Program,” *DOE Office of Science*, June 24, 2020. ([link](#))

“Four MIT faculty members receive U.S. Department of Energy early career awards,” *MIT News*, July 15, 2020. ([link](#))

“What is ammonium nitrate, the chemical in the deadly Beirut explosion?” *NBC News*, August 6, 2020. ([link](#))

“Ammonia synthesis goes electric,” *Chemistry World*, August 17, 2020. ([link](#))

“AIChE 35 Under 35 Award Winners,” *AIChE Chemical Engineering Progress*, September 1, 2020. ([link](#))

“Winners of 2020 Teaching With Digital Technology Award recognized for their innovations,” *MIT News*, September 9, 2020. ([link](#))

“On Socratic Dialogue and adapting to students’ needs,” *MIT Open Learning*, September 16, 2020. ([link](#))