

Kara D. Fong

✉ karafong@caltech.edu

Professional Appointments

California Institute of Technology

ASSISTANT PROFESSOR OF CHEMICAL ENGINEERING

Pasadena, CA

2025-Present

University of Cambridge

SCHMIDT SCIENCE FELLOW

JUNIOR RESEARCH FELLOW IN TRINITY COLLEGE

Advisors: Clare Grey, Angelos Michaelides

Cambridge, UK

2022 - 2024

2022 - 2025

Education

University of California, Berkeley

PH.D. CHEMICAL ENGINEERING, GPA 4.00/4.00

Advisors: Kristin Persson, Bryan McCloskey

Thesis: "Ion Correlations and Transport in Li-Ion Battery Electrolytes"

Berkeley, CA

2017 - 2022

University of Cambridge

M.PHIL. MATERIALS SCIENCE AND METALLURGY

Advisor: Stoyan Smoukov

Thesis: "Interpenetrated Electron/Ion Conducting Polymer Networks for Enhanced Supercapacitor Electrodes"

Cambridge, UK

2016-2017

Stanford University

B.S. CHEMICAL ENGINEERING WITH HONORS AND DISTINCTION, GPA 4.18/4.00

Advisor: Thomas Jaramillo

Thesis: "Improving Intrinsic Activity Measurements for Hydrogen Evolution Electrocatalysts with Application to Transition Metal Phosphides"

Stanford, CA

2012-2016

Awards & Honors

RESEARCH

2025 Scialog Fellow | Sustainable Minerals, Metals, and Materials
2024 Early Career Researcher Travel Award | Supergen Energy Networks Hub
2022 – 2024 Schmidt Science Fellowship
2022 – 2026 Junior Research Fellowship | Trinity College, University of Cambridge
2022 Junior Research Fellowship | Sidney Sussex College, University of Cambridge (*declined*)
2022 Stanford Science Fellowship (*declined*)
2021 Rising Star in Chemical Engineering | Massachusetts Institute of Technology
2020 – 2022 Berkeley Fellowship for Graduate Study | University of California, Berkeley
2019 First Place in Materials Engineering and Sciences Division Poster Competition | AIChE
2019 Women in Chemical Engineering (WIC) Travel Award | AIChE
2017 – 2020 National Science Foundation Graduate Research Fellowship
2016 – 2017 Churchill Scholarship
2016 Firestone Medal for Excellence in Undergraduate Research | Stanford University
2015 Merck Award for Student Research | Stanford University
2014 RISE Scholarship | Deutscher Akademischer Austausch Dienst
2013 Undergraduate Advising and Research (UAR) Major Grant | Stanford University

TEACHING

2019, 2020 Outstanding Graduate Student Instructor | University of California, Berkeley

ACADEMIC

2016 Henry Ford II Scholar | Stanford University (*highest GPA in the College of Engineering*)
2016 The Deans' Award for Academic Achievement | Stanford University
2016 Mason and Marsden Prize in Chemical Engineering | Stanford University
2016 Frederick Emmons Terman Engineering Scholastic Award | Stanford University

2015	The Channing Robertson Award in Chemical Engineering Stanford University
2015	Tau Beta Pi Engineering Honor Society
2015	Phi Beta Kappa Honor Society
2014	Barry Goldwater Scholarship in Mathematics, Science, and Engineering
2013	President's Award for Academic Excellence in the Freshman Year Stanford University
2013	Boothe Prize for Excellence in Writing, Honorable Mention Stanford University

Publications

Google Scholar

29. X.A. Advincula, **K.D. Fong**^{*}, A. Michaelides,^{*} C. Schran.^{*} "Protons accumulate at the graphene-water interface." *ACS Nano*, 2025.
28. Y. Wang, H. Luo, X.R. Advincula, Z. Zhao, A. Esfandiar, D. Wu, **K.D Fong**, L. Gao, A.S. Hazrah, T. Taniguchi, C. Schran, Y. Nagata, L. Bocquet, M.L. Bocquet, Y. Jiang, A. Michaelides, M. Bonn.^{*} "Spontaneous Surface Charging and Janus Nature of the Hexagonal Boron Nitride-Water Interface." *arXiv preprint*, 2025, arXiv:2504.01152.
27. **K.D. Fong**^{*}, C.P. Grey^{*} A. Michaelides.^{*} "On the physical origins of reduced ionic conductivity in nanoconfined electrolytes." *ACS Nano*, 2025, 19, 13: 13191-13201.
26. N. O'Neill, B.X. Shi, **K.D. Fong**, A. Michaelides,^{*} C. Schran.^{*} "To pair or not to pair? Machine-learned explicitly-correlated electronic structure for NaCl in water." *The Journal of Physical Chemistry Letters*, 2024, 15: 6081-6091.
25. **K.D. Fong**^{*}, B. Sumić, N. O'Neill, C. Schran, C.P. Grey,^{*} Angelos Michaelides.^{*} "The Interplay of Solvation and Polarization Effects on Ion Pairing in Nanoconfined Electrolytes." *Nano Letters*, 2024, 24, 16: 5024-5030.
24. O. A. Cohen, H. Macdermott-Opeskin, L. Lee, T. Hou, **K. D. Fong**, R. Kingsbury, J. Wang, K. A. Persson.^{*} "SolvationAnalysis: A Python Toolkit for Understanding Liquid Solvation Structure in Classical Molecular Dynamics Simulations." *The Journal of Open Source Software*, 2023, 8, 84: 5183.
23. H. K. Bergstrom, **K. D. Fong**, D. Halat, C. A. Karouta, H. C. Celik, J. A. Reimer, B. D. McCloskey.^{*} "Ion correlation and negative lithium transference in polyelectrolyte solutions." *Chemical Science*, 2023, 14, 24: 6546-6557.
22. P. K. Jones, **K. D. Fong**, K. A. Persson, A. A. Lee.^{*} "Inferring Global Dynamics from Local Structure in Liquid Electrolytes." *arXiv preprint*, 2022, arXiv:2208.03182.
21. J. Cheng, **K. D. Fong**, K. A. Persson.^{*} "Materials design principles of amorphous cathode coatings for lithium-ion battery applications." *Journal of Materials Chemistry A*, 2022, 10:22245-56.
20. J. Self, H. K. Bergstrom, **K. D. Fong**, B. D. McCloskey, K. A. Persson.^{*} "A Theoretical Model for Computing Freezing Point Depression of Lithium-Ion Battery Electrolytes." *Journal of the Electrochemical Society*, 2021, 168: 120532.
19. T. Hou, **K. D. Fong**, J. Wang, K. A. Persson.^{*} "The Solvation Structure, Transport Properties and Reduction Behavior of Carbonate-Based Electrolytes of Lithium-Ion Batteries." *Chemical Science*, 2021, 12, 44: 14740-14751.
18. A. J. Ringsby, **K. D. Fong**, J. Self, H. K. Bergstrom, B. D. McCloskey,^{*} K. A. Persson.^{*} "Transport Phenomena in Low Temperature Lithium-Ion Battery Electrolytes." *Journal of the Electrochemical Society*, 2021, 168: 080501.

IOP PUBLISHING TOP CITED PAPER AWARD NORTH AMERICA

17. H. K. Bergstrom, **K. D. Fong**, B. D. McCloskey.^{*} "Interfacial Effects on Transport Coefficient Measurements in Li-ion Battery Electrolytes." *Journal of the Electrochemical Society*, 2021, 168: 060543.
16. **K. D. Fong**, J. Self, B. D. McCloskey,^{*} K. A. Persson.^{*} "Ion Correlations and Their Impact on Transport in Polymer-Based Electrolytes." *Macromolecules*, 2021, 54, 6: 2575-2591.

SELECTED AS ACS EDITOR'S CHOICE

FEATURED ON FRONT COVER OF ISSUE

15. **K. D. Fong**, J. Self, B. D. McCloskey,^{*} K. A. Persson.^{*} "Onsager Transport Coefficients and Transference Numbers in Polyelectrolyte Solutions and Polymerized Ionic Liquids." *Macromolecules*, 2020, 53, 21: 9503-9512.
14. **K. D. Fong**, H. K. Bergstrom, B. D. McCloskey, K. K. Mandadapu.^{*} "Transport Phenomena in Electrolyte Solutions: Non-Equilibrium Thermodynamics and Statistical Mechanics." *AIChE Journal*, 2020, 66, 12: e17091.
13. J. Self, N. T. Hahn, **K. D. Fong**, S. A. McClary, K. R. Zavadil, and K. A. Persson.^{*} "Ion Pairing and Redissociation in Low-Permittivity Electrolytes for Multivalent Battery Applications." *J. Phys. Chem. Lett*, 2020, 11, 6: 2046-2052.
12. J. Self, **K. D. Fong**, and K. A. Persson.^{*} "Transport in Superconcentrated LiPF₆ and LiBF₄/Propylene Carbonate Electrolytes." *ACS Energy Letters*, 2019, 4: 2843-2849.
11. J. Self, **K. D. Fong**, E. R. Logan, and K. A. Persson.^{*} "Ion Association Constants for Lithium Ion Battery Electrolytes from First Principles Quantum Chemistry." *Journal of the Electrochemical Society*, 2019, 166: A3554-A3558.
10. **K. D. Fong**, J. Self, K. M. Diederichsen, B. M. Wood, B. D. McCloskey,^{*} and K. A. Persson.^{*} "Ion Transport and the True Transference Number in Nonaqueous Polyelectrolyte Solutions for Lithium-Ion Batteries." *ACS Central Science*, 2019, 5: 1250-1260.

9. K. M. Diederichsen, **K. D. Fong**, R. C. Terrell, K. A. Persson, and B. D. McCloskey.* "Investigation of Solvent Type and Salt Addition in High Transference Number Nonaqueous Polyelectrolyte Solutions for Lithium Ion Batteries." *Macromolecules*, 2018, 51: 8761-8771.
8. T. Wang, H.-K. Kim, Y. Liu, W. Li, J. T. Griffiths, Y. Wu, S. Laha, **K. D. Fong**, F. Podjaski, C. Yun, R. V. Kumar, B. V. Lotsch, A. K. Cheetham, and S. K. Smoukov.* "Bottom-up Formation of Carbon-Based Structures with Multilevel Hierarchy from MOF-Guest Polyhedra." *Journal of the American Chemical Society*, 2018, 140: 6130-6136.
7. **K. D. Fong**, T. Wang, and S. K. Smoukov.* "Mutli-Dimensional Performance Optimization of Conducting Polymer-Based Supercapacitor Electrodes." *Sustainable Energy and Fuels*, 2017, 1: 1857-1874.
6. **K. D. Fong**,[†] T. Wang,[†] H.-K. Kim, R. V. Kumar, and S. K. Smoukov.* "Semi-Interpenetrating Polymer Networks for Enhanced Supercapacitor Electrodes." *ACS Energy Letters*, 2017, 2: 2014-2020.
5. T. L. Sirich,* **K. D. Fong**, B. Larive, G. J. Beck, G. M. Chertow, N. W. Levin, A. S. Kliger, N. S. Plummer, and T. W. Meyer. "Limited Reduction in Uremic Solute Concentrations with Increased Dialysis Frequency and Time in the Frequent Hemodialysis Network Daily Trial." *Kidney International*, 2017, 91: 1186-1192.
4. J. W. F. To, J. W. D. Ng, S. Siahrostami, A. L. Koh, Y. Lee, Z. Chen, **K. D. Fong**, S. Chen, J. He, W.-G. Bae, J. Wilcox, H. Y. Jeong, K. Kim, F. Studt,* J. K. Nørskov,* T. F. Jaramillo,* and Z. Bao.* "High-performance Oxygen Reduction and Evolution Carbon Catalysis: From Mechanistic Studies to Device Integration." *Nano Research*, 2016, 10: 1163-1177.
3. F. J. O'Brien, **K. D. Fong**, T. L. Sirich, and T. W. Meyer.* "More Dialysis Has Not Proven Much Better." *Seminars in Dialysis*, 2016, 29: 481-490.
2. T.M. Meyer,* T.L. Sirich, **K. D. Fong**, N.S. Plummer, T. Shafi, S. Hwan, T. Banerjee, Y. Zhu, N.R. Powe, X. Hai, and T.H. Hostetter. "Kt/V_{urea} and Nonurea Small Solute Levels in the Hemodialysis Study." *Journal of the American Society of Nephrology*, 2016, 27: 3469-3478.
1. J.D. Benck, S.C. Lee, **K. D. Fong**, J. Kibsgaard, R. Sinclair, and T.F. Jaramillo.* "Designing Active and Stable Silicon Photocathodes for Solar Hydrogen Evolution Using Molybdenum Sulfide Nanomaterials." *Advanced Energy Materials*, 2014, 4: 1400739.

Presentations

Invited Presentations

2025 Apr	Energy Storage Research Alliance (virtual)
2024 Nov	School of Natural and Environmental Sciences, Newcastle University, Newcastle upon Tyne, UK
2024 May	Yusuf Hamied Department of Chemistry, University of Cambridge, Cambridge, UK
2023 Dec	INSTA QT Workshop on Technology Developments, University of Sussex (virtual)
2023 Mar	Oxford Battery Modelling Symposium, Oxford, UK
2023 Mar	Cambridge Zero Discovery Science Workshop, Cambridge, UK
2022 Mar	American Physical Society March Meeting (Padden Award Symposium), Chicago, IL
2022 Mar	University of Michigan, Department of Chemical Engineering, Ann Arbor, MI
2022 Feb	California Institute of Technology, Division of Chemistry and Chemical Engineering, Pasadena, CA
2022 Feb	Massachusetts Institute of Technology, Department of Chemical Engineering, Cambridge, MA
2022 Feb	University of Colorado, Boulder, Department of Chemical and Biological Engineering, Boulder, CO
2022 Jan	University of California, Santa Barbara, Department of Chemical Engineering, Santa Barbara, CA
2022 Jan	Princeton University, Department of Chemical and Biological Engineering (virtual)
2021 Nov	Lennard-Jones Centre, University of Cambridge (virtual)
2021 Nov	Young Investigator Lecture Series, Electrochemical Society San Francisco Section (virtual)
2021 Nov	Pitzer Center for Theoretical Chemistry, University of California, Berkeley, CA
2021 Aug	Stanford University, hosted by Tom Markland, Stanford, CA
2021 Jul	Drexel University, hosted by Maureen Tang (virtual)
2021 May	University of Cambridge, hosted by Clare Grey (virtual)
2021 Apr	Women Excelling in Computational Molecular Engineering Seminar Series (virtual)
2021 Mar	Lawrence Berkeley National Laboratory Electrochemistry Seminar (virtual)
2020 Oct	Battery Modeling Webinar Series (virtual)
2020 Apr	Lawrence Berkeley National Laboratory, hosted by Gerd Ceder (virtual)
2020 Jan	Berkeley Statistical Mechanics Meeting, Berkeley, CA

Contributed Presentations

2024 Oct	American Institute of Chemical Engineers Annual Meeting, San Diego, CA (oral)
2023 Sept	The Inaugural Lennard-Jones Centre Meeting, Cambridge, UK (poster)
2021 Nov	American Institute of Chemical Engineers Annual Meeting, Boston, MA (oral)

2021 Nov	American Institute of Chemical Engineers Annual Meeting, Boston, MA (poster)
2020 Nov	American Institute of Chemical Engineers Annual Meeting (oral, virtual)
2020 Jun	American Society for Engineering Education (oral, virtual)
2020 Feb	Gordon Research Conference on Batteries, Ventura, CA (poster)
2019 Nov	American Institute of Chemical Engineers Annual Meeting, Orlando, FL (poster)
FIRST PLACE IN MATERIALS ENGINEERING AND SCIENCES DIVISION POSTER COMPETITION	
2019 Mar	American Physical Society March Meeting, Boston, MA (oral)
2015 Aug	Stanford SUNCAT Summer Institute, Stanford, CA (poster)
2015 Mar	American Chemical Society Spring Meeting, Denver, CO (oral)
2015 Mar	American Chemical Society Spring Meeting, Denver, CO (poster)
2013 Nov	American Institute of Chemical Engineers Annual Meeting, San Francisco, CA (poster)

Teaching Experience

University of Cambridge

LECTURER, LENNARD-JONES CENTRE SUMMER SCHOOL

Cambridge, UK

Sept. 2024

University of California, Berkeley

CERTIFICATE IN TEACHING AND LEARNING IN HIGHER EDUCATION

Berkeley, CA

Apr. 2021

INSTRUCTIONAL IMPROVEMENT PROJECT GRADUATE STUDENT ASSISTANT

May 2019 - Dec. 2019

- Professional Preparation: Teaching Chemical Engineering (CBE 375, a pedagogy course for graduate students)
- Collaborated with course instructor to redesign class content with greater emphasis on inclusive teaching and active learning strategies

GRADUATE STUDENT INSTRUCTOR

Jan. 2019 - May 2020

- Transport Processes (CBE 150A; Spring 2019, 2020)
- Awards: Outstanding Graduate Student Instructor (2019, 2020)

GUEST LECTURER

Aug. 2019 - Apr. 2021

- Professional Preparation: Teaching Chemical Engineering (CBE 375; 2019, 2020)
- Principles of Electrochemical Processes (CBE 176; Spring 2021)

Stanford University

Stanford, CA

TEACHING ASSISTANT

Mar. 2015 - Jun. 2016

- Introduction to Chemical Engineering (ChemEng 20; Spring 2015, 2016)
- An Exploration of Art Materials: The Intersection of Art and Science (ChemEng 12SC; Sept 2015)

UNDERGRADUATE TUTOR

Sept. 2014 - Jun. 2015

- Organic chemistry tutor, Center for Teaching and Learning

Academic and Professional Service

Conference/Workshop Organization and Service

- Organizer: Inaugural Meeting of the Marcus Center for Theoretical Chemistry at Caltech Jul. 2025
- Steering Group Member: Schmidt Science Fellows Interdisciplinary Science Summit Jul. 2025
- Reviewer: Faraday Institution Conference Sept. 2024

Journal Reviewer

- *ACS Energy Letters, ACS Nano, Chemical Science, Chemistry of Materials, Energy & Environmental Materials, Journal of the American Chemical Society, Journal of The Electrochemical Society, Journal of Materials Chemistry A, Journal of Physical Chemistry Letters, Macromolecules, Materials Advances, Nature Communications, Wiley-VCH books*

Service at California Institute of Technology

- Graduate Admissions Committee | Chemical Engineering 2024-2025

Service at University of Cambridge

- Lennard-Jones Centre Council Nov. 2022 - May 2024

Service at University of California, Berkeley | Dept. of Chemical Engineering

- Graduate Student Advisory Committee May 2020 - May 2022
- Remote Teaching Committee Jun. 2020 - May 2021

Research Mentoring

California Institute of Technology

- Madeline Murphy, PhD student in Chemical Engineering
- Ryan Yu, Undergraduate in Chemical Engineering

Oct. 2024 - Present
Apr. 2025 - Present

University of Cambridge

- Mandy Hoffman, PhD Student in Chemistry
- Ioannis Karageorgiou, Undergraduate in Chemistry
- Barbara Sumić, Part III Student in Chemistry
- Dominic Thomas, Part III Student in Chemistry

Oct. 2024 - Present
Jun. 2024 - Aug. 2024
Oct. 2023 - May 2024
Jun. 2023 - May 2024

University of California, Berkeley

- Rachael Lee, Undergraduate in Materials Science and Engineering
- Alexandra Ringsby, Undergraduate in Chemical and Biomolecular Engineering

May 2021 - Aug. 2021
Aug. 2019 - May 2021

Outreach

- **Organizer**, Lennard-Jones Centre Gender Equality Network, University of Cambridge
- **Volunteer math tutor**, Community Education Partnerships
- **Mentor**, Society of Hispanic Professional Engineers, Bay Area Chapter
- **Facilitator**, Society of Women Engineers SWE++ Tech Day, UC Berkeley
- **Mentor**, Berkeley Energy & Resources Collaborative

Sept 2023 - Present
Dec 2020 - Dec 2021
Nov 2020 - May 2021
Nov 2020
Mar 2018 - Sept 2018