## *ECS Toyota Young Investigator Award*

## *Curriculum Vitae of*

## JEFFREY EDWARD DICK

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1. **Full Name** Jeffrey Edward Dick
2. **Place and Date of Birth** Muncie, Indiana, United States of America

27 June 1990

1. **Educational Career** Ph.D, Chemistry, The University of Texas at Austin, 2017 (w/ Prof. Allen J. Bard)

B.S., Chemistry, Ball State University, 2013

1. **Professional Activities** Richard B. Wetherill Associate Professor of Chemistry, Purdue University, 2022 –

Assistant Professor, The University of North Carolina at Chapel Hill, 2018 – 2022

NIH CORE Postdoctoral Scholar, The University of Texas at Austin, 2017 – 2018

1. **List of publications**

*Independent Career:*

1. Krushinski, L. E.; Dick, J. E.\* Direct Electrochemical Evidence Suggests Aqueous Microdroplets Spontaneously Produce Hydrogen Peroxide, *Proceedings of the National Academy of Sciences USA*, **2024**, Accepted.
2. Roy, K.; Rana, A.; Ghosh, T.; Roy, S.; Heil, J. N.; Vannoy, K. J.; Tackett, B. M.; Chen, M.; Dick, J. E.\* How Solvation Energetics Dampen the Hydrogen Evolution Reaction to Maximize Zinc Anode Stability, *Advanced Energy Materials*, **2024**, Accepted.
3. Krushinski, L. E.; Vannoy, K. J.; Dick, J. E.\* Single Liquid Aerosol Microparticle Electrochemistry on a Suspended Ionic Liquid Film, *Small*, **2024**, Accepted.
4. Krushinski, L. E.; Qi, L.; Dick, J. E.\* Levitating Droplet Electroanalysis, *Analytical Chemistry*, **2024**, Accepted.
5. Rana, A.; Nguyen, J.; Renault, C.; Dick, J. E.\* Achieving Sub-Nanomolar Sensitivity in Voltammetry by Dissolving Microdroplet Electrochemistry, *Analytical Chemistry*, **2024**, Accepted.
6. Vannoy, K. J.; Renault, C.; Edwards, M. Q.; Dick, J. E. An Electrochemical Perspective on Reaction Acceleration in Droplets, *Annual Review of Analytical Chemistry*, **2024**, Accepted.
7. Voci, S.; Vannoy, K. J.; Dick, J. E.\* Femtoliter Oil Droplets Act as CO2 Micropumps for Uninterrupted Electrochemiluminescence at the Water|Oil Interface, *Journal of Colloid and Interface Science*, **2023**, Accepted. [Link](https://www.sciencedirect.com/science/article/pii/S0021979724001085)
8. Roy, K.; Rana, A.; Heil, J.; Tackett, B. M.; Dick, J. E.\* For Zinc Metal Batteries, How Many Electrons Go to Hydrogen Evolution? An Electrochemical Mass Spectrometry Study, *Angewandte Chemie International Edition*, **2024**, Accepted. [Link](https://onlinelibrary.wiley.com/doi/pdf/10.1002/anie.202319010)
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9. Krushinski, L. E.; Clarke, T. B.; Dick, J. E.\* A Hands-on Approach to Electrochemistry for Middle and High School Students, *Journal of Chemical Education*, **2024**, Accepted. [Link](https://pubs.acs.org/doi/10.1021/acs.jchemed.3c00939)
10. Layman, B. R.; Dick, J. E.\* Through-Space Electrochemiluminescence Reveals Bubble Forces at Remote Phase Boundaries, *Journal of the American Chemical Society*, **2024**, 146, 707 – 713. [Link](https://pubs.acs.org/doi/10.1021/jacs.3c10505)
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12. Clark, R. B.; Wagner, D. C.; Holden, D. T.; Roberts, J. T.; Goodnight, L.; Huynh, K.; Green, R.; Grove, J.; Dick, J. E.\* PFAS Electroanalysis in Low-Oxygen River Water Using Electrogenerated Dioxygen, *Environmental Science & Technology*, **2023**, *57*, 21815 – 21822. [Link](https://pubs.acs.org/doi/10.1021/acs.est.3c03967)
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38. Goines, S.; Dick, J. E.\* Investigating the Cytotoxic Redox Mechanism of PFOS within Hep G2 by Hyperspectral Assisted Scanning Electrochemical Microscopy, *Analyst*, **2022**, 147, 4356 – 4364. [Link](https://pubs.rsc.org/en/content/articlelanding/2022/an/d2an00904h)
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2. Clarke, T. B.; Dick, J. E.\* Preferential Electroreduction at the Oil|Water|Conductor Interface, *Journal of Physical Chemistry Letters*, **2022**, *13*, 3338 – 3341. [*Link*](https://pubs.acs.org/doi/full/10.1021/acs.jpclett.2c00545)
3. Reyes-Morales, J.; Vanderkwaak, B.#; Dick, J. E**.\*** Enabling Practical Nanoparticle Electrodeposition from Aqueous Nanodroplets, *Nanoscale*, **2022**, *14*, 2750 – 2757. [*Link*](https://pubs.rsc.org/en/content/articlelanding/2022/nr/d1nr08045h)
4. Takamatsu, S.; Lee, I.; Lee, J.; Asano, R.; Tsugawa, W.; Ikebukuro, K.; Dick, J. E.; Sode, K. Transient Potentiometry-based D-Serine Sensor using Engineered D-Amino Acid Oxidase Showing Quasi-Direct Electron Transfer Property, *Biosensors and Bioelectronics*, **2022**, *200*, 113927. [*Link*](https://www.sciencedirect.com/science/article/pii/S0956566321009647)
5. Walker, N. L.; Dick, J. E.\* Versatile Potentiometric Metabolite Sensing without Dioxygen Interference, *Biosensors and Bioelectronics*, **2022**, *201*, 113888. [*Link*](https://www.sciencedirect.com/science/article/pii/S0956566321009258)
6. Reyes-Morales, J.; Glasscott, M. W.; Pendergast, A. D.#; Goines, S.; Dick, J. E.\* The Oxidation of Ferrocene in Sessile Toluene Macro and Microdroplets: An Opto-electrochemical Study, *Journal of Electroanalytical Chemistry*, **2022**, *905*, 115922. [*Link*](https://www.sciencedirect.com/science/article/abs/pii/S1572665721009498)
7. Kauffmann, P. J.; Park, N. A.; Clark, R. B.; Glish, G. L.; Dick, J. E.\* Aerosol Electroanalysis by PILSNER: Particle-into-Liquid Sampling for Nanodroplet Electrochemical Reactions, *ACS Measurement Science Au*, **2022**, 2, 106 – 112. [*Link*](https://pubs.acs.org/doi/abs/10.1021/acsmeasuresciau.1c00024)
8. Tarolla, N. E.; Voci, S.; Reyes-Morales, J.; Pendergast, A. D.#; Dick, J. E.\* Electrodeposition of Ligand-Free Copper Nanoparticles from Aqueous Nanodroplets, *Journal of Materials Chemistry A*, **2021**, 9, 20048 – 20057. [*Link*](https://pubs.rsc.org/en/content/articlelanding/2021/ta/d1ta02369a)
9. Clarke, T. B.; Glasscott, M. W.; **Dick, J. E.\*** The Role of Oxygen in the Voltaic Pile, *Journal of Chemical Education*, **2021**, *98*, 2927 – 2936. [*Link*](https://pubs.acs.org/doi/abs/10.1021/acs.jchemed.1c00016)
10. Clark, R. B.; **Dick, J. E.\*** Towards Deployable Electrochemical Sensors for Per- and Polyfluoroalkyl Substances (PFAS), *Chemical Communications*, **2021**, 57, 8121 – 8130. [*Link*](https://pubs.rsc.org/en/Content/ArticleLanding/2021/CC/D1CC02641K#!divAbstract)
11. Vannoy, K. J.; Lee, I.; Sode, K.; Dick, J. E.\* Electrochemical Quantification of Accelerated FADGDH Rates in Aqueous Nanodroplets, *Proceedings of the National Academy of Sciences USA*, **2021**, *118*, e2025726118. [*Link*](https://www.pnas.org/content/118/25/e2025726118)
    * Highlighted in *C&E News*:[*Link*](https://cen.acs.org/analytical-chemistry/microfluidics/Electrochemistry-measures-enzyme-rate-acceleration/99/i23?utm_source=Biological&utm_medium=Biological&utm_campaign=CENRSS)
12. Walker, N. L.; Dick, J. E.\* Leakless, Bipolar Reference Electrodes: Fabrication, Performance, and Miniaturization, *Analytical Chemistry*, **2021**, *93*, 10065 – 10074. [*Link*](https://pubs.acs.org/doi/10.1021/acs.analchem.1c00675)
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19. Pendergast, A. D. #; Renault, C.; Dick, J. E.\* Correlated Optical-Electrochemical Measurements Reveal Bidirectional Current Steps for Graphene Nanoplatelet Collisions at Ultramicroelectrodes, *Analytical Chemistry*, **2021**, *93*, 2898 – 2906. [*Link*](https://pubs.acs.org/doi/abs/10.1021/acs.analchem.0c04409)
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*Pre-independent Career*

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24. **Honors, Awards, and Distinctions or Noteworthy Achievements**

* 2024 *Analyst* Emerging Investigator Lectureship Award Dec. 2023
* 2023 Elected Councilor for the Division of Analytical Chemistry (American Chemical Society) Aug. 2023
* 2023 American Chemical Society Division of Analytical Chemistry Arthur F. Findeis Aug. 2023

Award for Achievements by a Young Analytical Scientist

* 2023 Hach Distinguished Lecture, Colorado State University Apr. 2023
* 2023 Elected Member, Board of Directors, Society for Electroanalytical Chemistry Feb. 2023
* 2023 Pittcon Achievement Award March 2023
* 2023 Royce W. Murray Young Investigator Award (Society for Electroanalytical Chemistry) March 2023
* 2021 Alfred P. Sloan Research Fellow Feb. 2021
* 2021 NSF CAREER Award Jan. 2021
* 2020 NIH NIGMS MIRA R35 Outstanding Investigator Award Sept. 2020
* 2019 Forbes’ 30 Under 30 (Science Category) Nov. 2018
* Representative; US Delegation to Lindau Meeting for Nobel Laureates July 2015
* National Science Foundation Graduate Research Fellowship April 2014
* National Defense Science & Engineering Graduate Research Fellowship, declined for NSF April 2014
* US Fulbright Scholarship Recipient, declined to work with A. J. Bard Jan. 2013

1. **Grants**

**H. Funding (Total to Dick Group: $12,495,219; Total participation: $54,247,794)**

*1. Current Extramural Support*

1. Sloan Center for Systemic Change (chosen for funding), Sloan Foundation, **$250,000**, 12/23 – 12/26 (co-PI).
2. “Development of a GenX Sensor for Surface Water.” West Virginia Water Authority, Chosen for Funding, **$100,000**, 5/2023 – 5/2024 (Sole PI).
3. “Preparing PFAS Sensors for Field Deployability.’ United States Geological Survey (Grant No. G23AC00538), 9/29/23 – 9/29/28, **$1,500,000** (Sole PI).
4. “Deployable Electrochemical Sensors for Trace Metals, Munitions, and Emerging Micropollutants in Aerosols.” United States Army Corps of Engineers, 9/2021 – 9/2024, **$928,705** (Sole PI)
5. Alfred P. Sloan Research Fellowship (FG-2021-15486), 09/2021 – 09/2023, **$75,000** (sole-PI).
6. “CAREER: Electro-Shock Synthesis of High Entropy Alloy Nanoparticles from Sub-Femtoliter Reactors.” National Science Foundation (CHE2045672), 05/2021 – 05/2026, **$700,000** (Sole PI).
7. “Amphibious Unmanned Ground Vehicle Sensor System for Rapid Detection of PFAS in Water.” United States Army Corps of Engineers (W912HZ-19-BAA), 10/05/2020 – 10/04/2024, $1,600,797 (sub-contract with Mississippi State). Total to my group is **$359,925** of $2,500,000.
8. “Nanoelectrochemistry and Single Cell Metabolomics.” National Institute of General Medical Sciences Maximizing Investigators’ Research Award (MIRA, 1R35GM138133-01), 07/01/2020 – 06/30/2025, **$1,858,855** (Sole PI).
9. “Electrochemical Methodology for Single Molecule Enzymology.” National Science Foundation (CHE2003587), 07/01/2020 – 06/30/2024, **$462,508** (Sole PI).
10. “Molecularly Imprinted Polymer-Modified Microelectrode Arrays for Rapid In-Field Analysis of Trace Illicit Substances in Oral Fluid.” (2020-R2-CX-0036). US Department of Justice, 01/21/2021 – 12/31/2024. **$150,000** (Sole PI).
11. “Photogeneration of Polyaromatic Hydrocarbon Radicals and Reactivity with O2 and H2O by Evanescent Wave Scanning Electrochemical Microscopy.” Petroleum Research Fund (PRF#61283-DNI4), 07/01/2020 – 08/31/2024 (extension due to move to Purdue), **$110,000** (Sole PI).
    1. Highest Ranking among DNI4 applications.

*2. Previous Extramural Support*

1. “Development of a Sensor for PFAS Micropollutants.” MITRE Corporation, 08/15/2022 – 08/30/2023, $1,284,863 (Co-PI).
2. “Sensing Per- and Polyfluoroalkyl Substances (PFAS) in Complex Water Matrices using Molecularly-Imprinted Polymer Arrays of Gold Microelectrodes: Deployable Device Development.” United States Army Corps of Engineers (W912HZ-19-2-0018-BAA), 07/01/2019 – 06/30/2021, **$752,863** (Sole PI)
3. “Center for Hybrid Approaches in Solar Energy to Liquid Fuels (CHASE).” Department of Energy. 9/15/2020 – 7/01/2022, $40,000,000 (co-PI, lead PI: Prof. Gerald J. Meyer.) **$387,500**. Played a significant role with CHASE leadership at UNC to receive this grant and a significant role post-award.