

Daniel V. Esposito

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EDUCATION

- Postdoctoral Fellowship** 2012-2014
National Institute of Standards and Technology, Gaithersburg, MD
National Research Council (NRC) Fellowship Program
- Ph.D., Chemical Engineering** Jan. 2012
University of Delaware, Newark DE
Solar Hydrogen NSF IGERT Program
- B.S., Chemical Engineering** May 2006
Lehigh University, Bethlehem PA
Graduated Tau Beta Pi, and with institutional honors

PROFESSIONAL EXPERIENCE

- Associate Professor** 2019-present
Department of Chemical Engineering, Columbia University, New York, NY
- Assistant Professor** 2014-2018
Department of Chemical Engineering, Columbia University, New York, NY

RESEARCH INTERESTS

- **Electrocatalytic and photocatalytic materials**
 - Oxide-encapsulated electrocatalysts and photocatalysts
 - Electrocatalysis and photocatalysis at buried interfaces
 - Electrocatalyst design, synthesis, and characterization
 - Electroanalytical techniques to study interfacial charge transfer phenomena
 - Metal-Insulator-Semiconductor (MIS) photoelectrodes
- **Electrolyzers and photoelectrochemical devices**
 - Membraneless electrochemical and photoelectrochemical cells
 - Photovoltaic (PV)-electrolysis reactors, including for seawater electrolysis
 - Polymer electrolyte membrane (PEM) and alkaline electrolyzers
 - Fuel cells
 - Understanding and controlling bubble dynamics in (photo)electrochemical reactors
- ***in-situ* imaging of PEC, PV, and catalytic materials and devices**
 - Scanning electrochemical microscopy (SECM)
 - Non-local scanning probes for high areal scan rates and high throughput screening of materials
 - Scanning photocurrent microscopy (SPCM)
 - High speed video analysis of operating electrochemical cells
 - Spectroelectrochemistry

PUBLICATIONS

Peer Reviewed Articles (since the start of nominee's independent research career in 2014)

Note: articles are listed in reverse chronological order, with (*) indicating corresponding author.

1. M.S. Beatty, A. Haley, E. Gillette, **D.V. Esposito** *, “Controlling Proton and Oxygen Fluxes to Electrocatalytic Buried Interfaces by Tuning the Composition of Ultrathin Silicon Oxide Overlayers.” *ACS Applied Energy Materials*, (Accepted). <https://dx.doi.org/10.1021/acsaem.0c02359>
2. A. Bhardwaj, J. Vos, M. Beatty, M. Koper, N. Y. Yip, **D.V. Esposito***, “Silicon Oxide-Encapsulated Electrocatalysts for Selective Oxygen Evolution in Chloride-Containing Electrolytes”. *ACS Catalysis*, (In Revision).
3. X. Pang, S. Das, J. Davis, A. Harvey, **D.V. Esposito***, “Framework for evaluating the performance limits of membraneless electrolyzers”. *Energy & Environmental Science*, vol. 13, 3663-3678, 2020. Download [here](#).
4. S. Ma, A. H. Akca, **D.V. Esposito**, S. Kawashima, “Influence of aqueous carbonate species on the hydration and carbonation behavior of reactive MgO cement”. *J. CO2 Utilization*, vol. 41, 101260, 2020. Download [here](#).
5. A. E. Dorfi, S. Zhou, A.C. West, J. Wright, **D.V. Esposito***, “Probing the Speed Limits of Scanning Electrochemical Microscopy with In situ Colorimetric Imaging”. *ChemElectroChem*, vol. 7, 2424-2432, 2020. Download [here](#).
6. Mark T. Spitler, et al., “Practical Challenges in the Development of Photoelectrochemical Solar Fuels Production”. *Sustainable Energy & Fuels* (2020). vol 4, 985-995, 2020. Download [here](#).
7. J.C. Bui, J.T. Davis, **D.V. Esposito***, “3D Printed Clickable Membraneless Electrode Assemblies for Water Electrolysis”. *Sustainable Energy & Fuels*, vol. 4, 213-225, 2020. Download [here](#).
8. Y. Liu, H. You, Y. Kimmel, **D.V. Esposito**, J.G. Chen, T.P. Moffat, “Self-terminating Electrodeposition of Pt on WC Electrocatalysts”. *Applied Surface Science*, vol. 28, 144472, 2020. Download [here](#).
9. X. Liu, B. Li, X. Li, A. Harutyunyan, J. Hone*, **D.V. Esposito***, “The Critical Role of Electrolyte Gating on the Performance of Monolayer MoS₂ Electrocatalysts”. *Nano Letters*, vol. 19, 11, 8118-8124, 2019. Download [here](#).
10. A. E. Dorfi, H. Kuo, V. Smirnova, J. Wright, **D.V. Esposito***, “Scanning Electrochemical Microscope for High Throughput Imaging with Continuous Line Probes”. *Review of Scientific Instruments*, vol. 90, pp 083702, 2019. NSF highlight. Download [here](#).
11. J. Davis, D. Brown, X. Pang **D.V. Esposito***, “High Speed Video Investigation of Bubble Dynamics and Current Density Distributions in Membraneless Electrolyzers”. *Journal of the Electrochemical Society*, vol. 166 (4), pp F312-F321, 2019. Download [here](#).
12. N. Labrador, J. Robinson, B. Xu, B. Sartor, **D.V. Esposito***, “Silicon Oxide-Encapsulated Platinum Thin Films as Highly Active Electrocatalysts for Carbon Monoxide and Methanol Oxidation”. *ACS Catalysis*, vol. 8, pp 11423–11434, 2018. Download [here](#).
13. M. Beatty, H. Chen, B. Lee, N. Labrador, **D.V. Esposito***, “Structure-Property Relationships Describing the Buried Interface Between Silicon Oxide Overlayers and Electrocatalytic Platinum Thin Films”. *Journal of Materials Chemistry A*, vol. 6, pp 22287-22300, 2018. Download [here](#). (**Emerging Investigators 2018 Issue**)
14. G.D. O’Neil, H. Kuo, D. Lomax, J. Wright*, **D.V. Esposito***, “Scanning Electrochemical Microscopy: Beyond the Point Probe”, *Analytical Chemistry*, vol. 90 (19), pp 11531–11537, 2018. Download [here](#).
15. A. M. Dadgar, D. Scullion, K. Kang, **D. Esposito**, E. H. Yang, I. P. Herman, M. A. Pimenta, E.-J. G. Santos, and A. N. Pasupathy, “Strain Engineering and Raman Spectroscopy of Monolayer Transition Metal Dichalcogenides”, *Chemistry of Materials*, vol. 30 (15) pp 5148-5155. Download [here](#).

16. N. Y. Labrador, E. L. Songcuan, C. De Silva, Han Chen, Sophia Kurdziel, Ranjith K. Ramachandran, Christophe Detavernier, **D.V. Esposito***, “Hydrogen Evolution at the Buried Interface between Pt Thin Films and Silicon Oxide Nanomembranes”. *ACS Catalysis*, vol. 8, pp 1767–1778, 2018. Download [here](#).
17. **D.V. Esposito***, “Membrane Coated Electrocatalysts—an Alternative Approach to Achieving Stable and Tunable Electrocatalysis”. *ACS Catalysis*, vol. 8, pp 457–465, (2018). Download [here](#).
18. J.T. Davis, J. Qi, X. Fan, J. Bui, **D.V. Esposito***, “Floating Membraneless PV-Electrolyzer Based on Buoyancy-Driven Product Separation”, *International Journal of Hydrogen Energy*, vol. 43 (3), pp 1224–1238, (2018). **Highlighted in Newsweek, Smithsonian.com, NBC News, Materials World, and more.**
19. A. E. Dorfi, A.C. West, **D.V. Esposito***, “Quantifying Losses in Photoelectrode Performance due to Single Hydrogen Bubbles”, *Journal Physical Chemistry C.*, vol. 121 (48), pp 26587–26597, (2017). Download [here](#).
20. **D.V. Esposito***, “Membraneless Electrolyzers for Low-Cost Hydrogen Production in a Renewable Energy Future”. *Joule*, 1, 1-8, (2017). Download [here](#). (Invited Perspective article)
21. O.O. Talabi, A.E. Dorfi, G.D. O’Neil, **D.V. Esposito***, “Membraneless Electrolyzers for the Simultaneous Production of Acid and Base”. *Chemical Communications*, **53**, 8006-8009 2017. Part of the **2017 Emerging Investigators Issue**. Download [here](#).
22. **D.V. Esposito***, Y. Lee, N.Y. Labrador, H. Yoon, P. Haney, A.A. Talin, V. Szalai, T.P. Moffat, “Deconvoluting the Influences of 3-D Structure on the Performance of Photoelectrodes for Solar-Driven Water Splitting”. *Sustainable Energy & Fuels*, 1, 154-173, (2017). Download [here](#).
23. J.T. Davis, **D.V. Esposito***, “Limiting Photocurrent Analysis of a Wide Channel Photoelectrochemical Flow Reactor”, *Journal of Physics D: Applied Physics.*, vol. 50, 8, 11 pp, (2017). (Special Issue on Solar Fuels). Download [here](#)
24. N. Y. Labrador, X. Li, Y. Liu, J. T. Koberstein, R. Wang, H. Tan, T. P. Moffat, **D. V. Esposito***, “Enhanced Performance of Si MIS Photocathodes Containing Oxide-Coated Nanoparticle Electrocatalysts”. *Nano Letters*, 16, 6452-6459, (2016).
25. G.D. O’Neil, C. Christian, D. Brown, J.T. Davis, D.E. Brown, **D.V. Esposito***, “A Simple and Scalable Membraneless Electrolyzer for Hydrogen Production from Water Electrolysis”. *J. Electrochemical Society*, vol. 163 (11) F3012-F3019 (2016). (JES Focus Issue on Electrolysis for Increased Renewable Energy Penetration).
26. **D.V. Esposito***, J.B. Baxter, J. John, N.S. Lewis, T.P. Moffat, T. Ogitsu, G.D. O’Neil, T.A. Pham, A.A. Talin, J.M. Velazquez, B.C. Wood. “Methods of Photoelectrode Characterization with High Spatial and Temporal Resolution.” *Energy & Environmental Science*. vol. 8, 2863-2885, (2015).
27. J. M. Velazquez, J. John, **D. V. Esposito**, A. Pieterick, R. A. Pala, G. Sun, X. Zhou, Z. Huang, S. Ardo, M. P. Soriaga, B. S. Brunshwig and N. Lewis. “A Scanning Probe Investigation of the Role of Surface Motifs in the Behavior of p-WSe₂ Photocathodes.” *Energy & Environmental Science*, 9, 164-175, (2015).

Peer Reviewed Articles from Postdoc and PhD Research:

28. **D.V. Esposito**, I. Levin, T.P. Moffat, and A.A. Talin. “Hydrogen Evolution at Si-based Metal-Insulator-Semiconductor Photoelectrodes Enhanced by Inversion Channel Charge Collection and Hydrogen Spillover.” *Nature Materials*, 12, 562-568 (2013).
29. **D.V. Esposito**, I. Levin, T.P. Moffat, and A.A. Talin. “Hydrogen Evolution at Si-based Metal-Insulator-Semiconductor Photoelectrodes Enhanced by Inversion Channel Charge Collection and Hydrogen Spillover.” *Nature Materials*, vol. 12, 562-568 (2013). **(Highlighted as a NIST tech beat item, in Clean Technica, and in EARTH Magazine)**
30. **D.V. Esposito**[^], R.V Forest[^], Y. Chang, N. Gaillard, B.E. McCandless, S. Hou, K.H. Lee, R.W. Birkmire, and J.G. Chen, “Photoelectrochemical Reforming of Glucose for Hydrogen Production using a WO₃-based Tandem Cell Device”. *Energy & Environmental Science*, vol. 5, 9091-9099, 2012. [^]shared first authorship.

31. **D.V. Esposito**, S.T. Hunt, Y. Kimmel, and J.G. Chen, “A New Class of Electrocatalysts for Hydrogen Production from Water Electrolysis: Metal Monolayers Supported on Low-Cost Transition Metal Carbides”. *Journal of the American Chemical Society*, vol. 134, 3025-3033, 2012. **(Highlighted in Chemical & Engineering News)**
32. M. C. Weidman, **D.V. Esposito**, Y.C. Hsu, and J.G. Chen, “Comparison of Electrochemical Stability of Transition Metal Carbides (WC, W₂C, Mo₂C) Over a Wide pH Range”. *Journal of Power Sources*, vol. 202, 11-17, 2012.
33. Y. Kimmel, **D.V. Esposito**, R.W. Birkmire, and J.G. Chen, “Effect of Surface Carbon on the Hydrogen Evolution Reactivity of Tungsten Carbide (WC) and Pt-modified WC Electrocatalysts”. *International Journal of Hydrogen Energy*, vol. 37, 3019-3024, 2012.
34. **D.V. Esposito** and J.G. Chen, “Monolayer Platinum Supported on Tungsten Carbides as Low-Cost Electrocatalysts: Opportunities and Limitations”. *Energy & Environmental Science*, vol. 4, 3900-3912, 2011. **(Invited Perspective, selected as a high impact review article on electrocatalysis research on EES website)**
35. I.J. Hsu, **D.V. Esposito**, E. Mahoney, A. Black, and J.G. Chen, “Particle Shape Control using Pulse Electrodeposition: Methanol Oxidation as a Probe Reaction on Pt Dendrites and Cubes”. *Journal of Power Sources*, vol. 196, 8307-8312, 2011.
36. **D.V. Esposito**, Y. Chang, J.G. Chen, R.W. Birkmire, and N. Gaillard, “Hydrogen Production from Photo-driven Electrolysis of Biomass-derived Oxygenates: A Case Study on Methanol using Pt-modified WO₃ Thin Film Electrodes”. *International Journal of Hydrogen Energy*, vol. 36, 9632-9644, 2011.
37. **D.V. Esposito**, S.T. Hunt, A.L. Stottlemeyer, K.D. Dobson, B.E. McCandless, R.W. Birkmire, and J.G. Chen, “Low-Cost Hydrogen Evolution Catalysts Based on Monolayer Platinum on Tungsten Monocarbide (WC) Substrates”. *Angewandte Chemie International Edition*, vol. 49, 9859-9862, 2010. **(Cover article and Angewandte Chemie press release)**
38. M. C. Weidman, **D.V. Esposito**, I.J. Hsu, and J.G. Chen, “Electrochemical Stability of Tungsten and Tungsten Monocarbide (WC) Over Wide pH and Potential Ranges”. *Journal of the Electrochemical Society*, vol. 157, F179-F188, 2010.
39. W. Y. Yin, **D.V. Esposito**, S. Yang, C. Ni, J. G. Chen, G. Zhao, Z. Zhang, C. Hu, M. Cao, and Bingqing Wei, “Controlling Novel Red-Light Emissions by Doping In₂O₃ Nano/Microstructures with Interstitial Nitrogen”. *J. Phys. Chem. C*, vol. 114, 13234-13240, 2010.
40. **D.V. Esposito**, O.Y. Goue, K.D. Dobson, B.E. McCandless, J.G. Chen, and R.W. Birkmire, “A New Photoelectrochemical Test Cell and Its Use for a Combined Two- and Three-Electrode Approach to Cell Testing”. *Review of Scientific Instruments*, vol. 80, 125107, 2009.
41. **D.V. Esposito**, K.D. Dobson, B.E. McCandless, R.W. Birkmire, and J.G. Chen, “Comparative Study of Tungsten Monocarbide and Platinum as Counter Electrodes in Polysulfide-Based Photoelectrochemical Solar Cells”. *Journal of the Electrochemical Society*, vol. 156, pp. B962-B969, 2009.
42. E.C. Weigert, **D.V. Esposito**, and J.G. Chen, “Cyclic Voltammetry and XPS studies of Electrochemical Stability of Clean and Pt-Modified Tungsten and Molybdenum Carbide (WC and Mo₂C) Films”. *Journal of Power Sources*, vol. 193, pp. 501-506, 2009.
43. J.M. Meacham, M.J. Varady, **D.V. Esposito**, F.L. Degertekin, and A.G. Fedorov, “Micromachined Ultrasonic Atomizer For Liquid Fuels”. *Atomization and Sprays*, vol. 18, pp. 163-190, 2008.

Other Publications and Products:

1. **D.V. Esposito**, V. Giulimondi, J. Vos, M. T. M. Koper, “Design Principles for Oxide-Encapsulated Electrocatalysts”, book chapter in Ultrathin Oxide Layers for Solar Fuels and Electrocatalytic Systems, Energy and Environment book series, Royal Society of Chemistry. Under review.

- Contributor to the 2019 DOE Basic Energy Sciences (BES) report “Research Opportunities for Liquid Solar Fuels” based on a BES-sponsored roundtable meeting on this topic that was held in August 2019. Download report [here](#).
- D.V. Esposito** and D. Steingart, “[Additive Manufacturing and Electrochemistry](#)” ECS Interface, Vol. 25, Editorial published in Spring 2016 Special Issue of ECS Interface.
- D. Steingart and **D.V. Esposito**, “Open Source Tools for Electrochemists”, website for online repository of 3D printer design files used for electrochemical science and applications. Available at: <http://echem.io/>
- D.V. Esposito** and V. Alt. “[Estimating solar energy requirements to meet U.S. energy needs: an outreach event](#)”, *NCSL International Workshop & Symposium Proceedings*, 2014.

Patents: 1 patent issued, 5 provisional patents filed

- D.V. Esposito**, Q. van Hinsberg, “Membraneless Electrolyzers for the Production of Alkaline and Acidic Effluent Streams”, (U.S. provisional patent applied for, filed Nov. 2020)
- D.V. Esposito**, S. Kawashima “Method for Harvesting Metal Hydroxides from Seawater”. (Invention disclosure filed with CTV)
- D.V. Esposito**, X. Pang, S. Kawashima, “Electrochemical Devices and Methods for Membrane-free Electrolysis of Brines“ (U.S. provisional patent applied for, Docket # 104328-100, filed March 2019)
- D.V. Esposito**, J. Wright, G.D. O’Neil, H. Kuo, “Continuous Multi-Dimensional Scanning Probes (CMDPs) for Scanning Probe Microscopy” (Provisional Patent # 62/661,823 filed with USPTO)
- D.V. Esposito**, G.D. O’Neil, “Membraneless Electrochemical Flow-Through Reactor”. (U.S. provisional patent applied for, Docket Number 103921-100, submitted October 2015)
- D.V. Esposito**, A.A. Talin, and T.P. Moffat, “Photoactive article, process for making, and use of same”. US Patent No. 9,562,292. (2017)

INVITED TALKS (Since joining Columbia; list excludes internal talks)

- University of Cantabria (Spain), Chemical Engineering Dept. November 2020.
- Rutgers University, Materials Science & Engineering Dept., October 2020.
- Lancaster University (UK) / Energy Lancaster, Virtual seminar, July 2020.
- Global Virtual Meeting on Solar Fuels, organized through MaterialsOceania, June 2020.
- Lablinks Carbon Capture and Conversion Workshop, Harvard, MA, October 2019.
- Korea Advanced Institute of Technology (KAIST), Materials Science Dept., Sept. 2019.
- Korea Institute of Technology (KIST), Clean Energy Research Center, Sept. 2019.
- 7th International Workshop on Nanotechnology, Renewable Energy & Sustainability, Xi’an Jiaotong University, China, September 2019.
- ACS national meeting, San Diego CA, August 2019.
- E-MRS meeting in Nice, France, May 2019
- Warwick University (UK), Chemistry department, May 2019.
- MRS national meeting, Boston MA, November 2018.
- Electricity-to-X workshop, Denver CO, Sept. 2018.
- ACS Fall Meeting, Boston MA, Aug. 2018.
- ECS Spring Meeting, Seattle WA, May 2018.
- Technical University in Delft (TUD), Chemical Engineering Dept. seminar, May 2018.
- KU Leuven (Belgium), Department of Microbial and Molecular Systems, May 2018.
- Leiden University (Netherlands), Chemistry Dept., May 2018.

19. City College of New York (CCNY), Chemical Engineering Dept. seminar, Feb. 2018.
20. New Jersey Institute of Technology, Chemical Engineering Dept. seminar, Oct. 2017.
21. NanoGe Meeting, Solar Fuels Symposium, Barcelona, Spain, September 2017.
22. New York Catalysis Society Symposium, Clinton, NJ, March 2017.
23. University of Delaware, Center for Catalytic Science and Technology, March 2017.
24. University of Missouri, Chemical Engineering Department seminar, March 2017.
25. International Conference on Catalysis and Chemical Engineering, Baltimore, MD, February 2017.
26. Closing the Carbon Cycle Conference, Arizona State University, AZ, October 2016.
27. ACS MARM conference, Riverdale, NY, June 2016.
28. Workshop on Photovoltaic Electrolysis, University of Delaware, March 2016.
29. St. John's University, Chemistry Department, February 2016.
30. City University of New York (CUNY) Queens, Chemistry Department, December 2015.
31. ECS Fall Meeting, Phoenix AZ, October 2015.
32. SPIE Optics and Photonics Conference, San Diego CA, August 2015.
33. ECS Spring Meeting, Chicago, IL, May 2015.
34. ACS Spring Meeting, Denver, CO, March 2015.
35. Rochester Institute of Technology (RIT), School of Chemistry and Materials Science, March 2015, Rochester NY.
36. Gordon Research Conference on Electrodeposition, Biddeford ME, July 2014.

TEACHING AND MENTORING

Courses taught

- CHEN E4330, Advanced Chemical Kinetics. (2014-2020)
Average instructor rating from student evaluations: 4.6 / 5.0
- CHEN E4231, Solar Fuels. (2016-present)
Average instructor rating from student evaluations: 4.7 / 5.0
- CHEN E9000, Chemical Engineering Colloquium. (2015-2017)
- CHEN E9500, Doctoral Research. (2015-present)
- CHEN E9400, Masters Research. (2014-present)
- CHEN E3900, Undergraduate Research. (2014-present)

Experience as a mentor for PhD, postdoc, MS, and undergraduate student research

- **Doctoral students (sponsored):** (3 Ph.D. students graduated to date)
 1. Natalie Labrador (Fall 2013-June 2018, defended thesis June 2018)
Thesis title: "*Oxide-Encapsulated Electrocatalysts for Solar Fuels Production*"
 2. Jonathan "Jack" Davis (Fall 2014-April 2019, defended thesis April 2019)
Thesis title: "*Membraneless Electrolyzers for Solar Fuels Production*"
 3. Anna Dorfi (Fall 2015-present, defended thesis February 2020)
Thesis title: "*In-situ Scanning Probe Techniques for Evaluation of Electrochemical Systems*"
 4. Marissa Beatty (Fall 2017-present)
 5. Xueqi Pang (Fall 2018-present)
 6. Robert Stinson (Fall 2019-present)
 7. Daniela Fraga Alvarez (Jan. 2020-present)
 8. William Stinson (Fall 2020-present)
- **Doctoral students (reader and committee member):** 27+
- **Postdoctoral researchers:**

1. Glen O’Neil (faculty member at Montclair State U.)
 2. Xiangye Liu (faculty member at Northwestern Polytechnic University, Xi’an)
 3. Amanda Baxter (2020-present)
- **MS researchers:** 30
 - **Undergraduate researchers:** 23
 - **Highschool researchers:** 8

AWARDS & HONORS

- 2018-NSF CAREER Award (CBET Catalysis program). See Columbia [press release](#).
- 2017- [Scialog Fellow](#) for a multi-year interdisciplinary initiative on “Advanced Energy Storage”.
- [NRC Postdoctoral Fellowship](#), National Institute of Standards and Technology National Research Council Postdoctoral Research Associateship Program-2011
- Fellowship, U. Delaware, [Bill N. Baron Fellowship Award](#)-2010
- Fellowship, U. Delaware, [NASA Delaware Space Grant College and Fellowship Program](#)-2008
- Fellowship, U. of Delaware, [Solar Hydrogen IGERT Program](#)-2006
- ACS Award for outstanding senior in Chemical Engineering at Lehigh University-2006
- Chandler Award for excellence in Chemical Engineering, Lehigh University – 2004

PROFESSIONAL AFFILIATIONS

American Institute of Chemical Engineers, Electrochemical Society, American Chemical Society (CATL division member), Materials Research Society, Tau Beta Pi Engineering Honor Society

PROFESSIONAL SERVICE

- **Proposal reviewer:** Served as a reviewer of grant proposals for the following funding agencies: DOE/EERE (3 times), NSF (8 times), NASA(1), AFOSR(1).
- **Peer reviewer, journals** (10-20 articles /year): Nature, Angewandte Chemie, Energy & Environmental Science, Joule, Nature Materials, PNAS, Nature Communications, PNAS, ACS Catalysis, J. American Chemical Society, Nature Catalysis, J. Physical Chemistry, J. Electrochemical Society, Electrochimica Acta, ACS Nano, Advanced Energy Materials, ChemPhysChem, J. Catalysis, Sustainable Energy & Fuels, Int. J. Hydrogen Energy, Applied Catalysis B, J. Power Sources, Rev. of Scientific Instruments, Scientific Reports, ACS Applied Materials & Interfaces, and more.
- Co-Editor and author chapter of book to be published through the Royal Society of Chemistry’s Energy and Environment Book Series, titled [Ultrathin Oxide Layers for Solar Fuels and Electrocatalytic Systems](#) (co-edited with Heinz Frei at Lawrence Berkeley National Lab). To be published in 2021.
- Reviewed standard operating procedure (SOP) documents associated with best-practice testing procedures for photoelectrochemical cells and low-temperature electrolyzers as a part of the DOE HydroGEN Benchmarking EMN2B Program. (2019)
- Participant in 3-day U.S.-German Workshop on “Artificial Photosynthesis” organized jointly by the US DOE (BES) and German Federal Ministry of Education and Research (BMBF). Workshop was attended by \approx 30 top researchers in the US and Germany active in solar fuels research. (Originally scheduled to be in Berlin, Germany but switched to virtual meeting, June 2020)
- Participant in DOE BES roundtable workshop on liquid solar fuels that was tasked with identifying priority research opportunities for the solar fuels field. Contributed 3-page write-up to pre-workshop

factual document and contributed written sections to the final workshop report. (Rockville MD, August 2019)

- Guest editor for special issue on 3D printing in ECS Interface Magazine. (2015-2016)
- **Conference & workshop organization:**
 - Lead organizer or Co-organizer for tutorial session on electrochemistry at annual AIChE meeting. (annually between 2014-2019, 2021-)
 - Lead organizer for new symposium on “Light-Driven Chemistry” to be held at ACS Spring meetings. 2017 symposium featured 6 sessions involving ~65 talks. We plan to hold this symposium biannually. (2017, 2019)
 - Co-organizer and participant in 2-day Gerischer Conference and workshop on Photocatalysis. Boulder, Colorado. (August 2018)
 - Co-organizer for Closing the Carbon Cycle Workshop at Columbia U., which included ~ 25 experts from university, industry, and national labs to discuss “Fuel Generation in Remote Locations”. Co-sponsored by the Lenfest Center, Arizona State University, Denmark Technical University (DTU). (October 2017)
 - Co-lead organizer for NSF- and ARL-funded workshop on solar fuels production by photovoltaic-electrolysis, hosted by the University of Delaware. Organized sessions, invited speakers, lead break-out sessions. (March 2016)

DEPARTMENTAL AND UNIVERSITY SERVICE

- Undergraduate committee. Conducted biannual student advising (20-40 students/semester), curated advising forms, curated senior theses, co-organized and participated in various recruitment events, student lunches & resume workshops. (2014-present)
- Masters committee. Assisted with recruiting and admissions process, including co-organization of MS Open House. (2020-present)
- Coordinated Chemical Engineering REU program. (Summer 2019)
- Represented ChemE department at the SEAS Open House for admitted high school seniors. (April 2019)
- Organizer for department seminar series and student colloquium (Spring 2015-2018)
- Served as internal reviewer for SEAS seed funding programs (RISE, SIRS) (7 times)
- Department liaison with the Societe de Chimie Industrielle (2016-2018)
- Scribe for departmental meetings. (Fall 2014-Fall 2016)
- Active participant in faculty candidate recruitment. (every year 2014-2019)
- Served on Panel: “Preparing for the Academic Search Process Panel”. (2017, 2019, 2020)

OUTREACH, PUBLIC ENGAGEMENT, AND ENTREPRENEURIAL ACTIVITIES

- Interviews and press releases related to solar fuels:
 - February 2019, Solar Fuels Engineering Lab selected for “[Research Lab Highlight](#)” feature article in newsletter for the International Association of Hydrogen Energy.
 - April 2018, “[Chemical Engineer Daniel Esposito Wins NSF CAREER Award](#)”, CU press release.
 - Dec. 2017, press releases related to publication in the International J. of Hydrogen Energy: “[Columbia Engineers Develop Floating Solar Fuels Rig for Seawater Electrolysis](#)”, press release written by Holly Evarts in Columbia Engineering. Additional articles or press releases written by Newsweek, [Smithsonian.com](#), ScienceDaily, NBC News, IEEE Spectrum, Materials World..

- Aug. 2016, “[Turning Sunlight into Fuel](#)” interview with Earth Institute blogger.
- Spring 2016, “[From All Corners of Engineering, Sustainable Energy Solutions in the Works](#)”. Article in the Columbia Engineering Magazine,
- Oct. 2014, “[Converting Sunlight into Storable Solar Fuels](#)”, write-up by CU SEAS.
- Educational or public outreach seminars and panels:
 - Seminar on finding, reading, and evaluating academic research articles to ~ 12 Bridge-to-PhD Summer@SEAS undergraduate researchers. (Summer 2019, summer 2020).
 - Invited speaker at the Sustainable Westchester Hydrogen Mini-Conference, White Plains, NY, December 2019.
 - Served on panel for Columbia Engineering Energy Club event on the future of energy, attended by 50+ students. (Oct. 2019)
 - Seminar on finding, reading, and evaluating academic research articles to ~ 30 Summer@SEAS undergraduate researchers. (Summer 2019, summer 2020).
 - Seminar on Solar Fuels to the Columbia Global Center for Energy Policy (GCEP), September 2018.
 - Served on AIChE /Chemist Club career panel event, April 2018.
 - Public seminar (“Master Class”) on solar energy as a part of the SEAS Preview Day for prospective undergrad students and their families (\approx 200 people), July 2018.
 - Public seminar on solar fuels as a part of Columbia Family Weekend, October 2017.
 - Seminar to high school students in Columbia’s “Upward Bound” summer program for 1st generation college students, July 2017.
 - Evening seminar & panel discussion, Columbia Energy Club, April 2017.
 - Lunch-time seminar to Columbia summer REU students, July 2016-2018.
 - Evening seminar to the Columbia University Undergraduate Energy Club, Nov. 2015.
- **K-12 outreach:** Lead lab tours and demos in coordination with Columbia SEAS outreach office for various programs and local high schools (SEAS Inside Engineering (4-6 times), SEAS SHAPE program, ELLIS school, Mott Hall middle school, CU Society of Hispanic Professional Engineers, GOALS for Girls, and more). (2016-present)
- **High school research:** Mentored 8 URM and/or female high school researchers for summer research through the SEAS Engineering the Next Generation (E.N.G.) Program. All 8 are pursuing or planning to pursue college degrees.
- Co-founder of early-stage start-up company, sHYp BV, which aims to develop electrolysis systems for maritime applications. Actively engaged with technology development, techno-economic analysis, pilot plant design, and fundraising. (2019-present)
- Lead PI and technical lead on a project funded through the NY State Powerbridge Accelerator Program, which sponsors university research projects aimed at translating clean technology into the market place. (2019-2020)
- Delivered annual lecture on technoeconomic analysis as a part of elective course on solar fuels (CHEN E4330), as well as a colleague’s class (EAEE E4305) on CO₂ utilization and conversion (2017-2020).
- Agreed to serve as a tutor and organizer as a part of a tutorial session on “setting up an electrochemistry start-up company” at the 2021 International Society of Electrochemistry meeting in South Korea.