

# Susmita Sarkar

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## PROFESSIONAL APPOINTMENTS

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### North Carolina State University

(Incoming) Assistant Professor

Department of Mechanical and Aerospace Engineering

*Raleigh, NC, USA*

*Starting August 2024*

### Stanford University

Schmidt Science Postdoctoral Fellow

Department of Chemical Engineering

Adviser: Prof. Zhenan Bao

*Stanford, CA, USA*

*July 2023-Present*

## EDUCATION

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### Purdue University

Ph.D. in Mechanical Engineering

Adviser: Prof. Partha P. Mukherjee

Thesis: Kinetics and Chemo-mechanics in Sodium Metal and Alloy Electrodes.

*West Lafayette, IN, USA*

*August 2018 - June 2023*

### Missouri University of Science and Technology

M.S. in Mechanical Engineering

Adviser: Prof. Jonghyun Park

Thesis: Multiscale Approaches toward Advanced Lithium-ion Battery: From Nano to Mesoscale.

*Rolla, MO, USA*

*August 2015 - May 2018*

### National Institute of Technology

B.Tech. in Electronics and Communication Engineering

*Agartala, TR, India*

*August 2011 - May 2015*

## AWARDS, HONORS, AND RECOGNITIONS

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### 2023:

1. **Schmidt Science Fellowship:** Postdoctoral fellowship awarded to pursue a postdoctoral placement in a leading laboratory anywhere in the world at a disciplinary pivot from their PhD.
2. **Dimitris N. Chorafas Foundation Award:** The Foundation prizes the best doctoral student(s) in the Hard Science for outstanding achievements and impact in advanced studies and/or research during PhD program or shortly after graduation.
3. **CAS Future Leaders:** Selected from among hundreds of highly qualified applicants representing a wide array of scientific disciplines and organizations worldwide by the American Chemical Society.

### 2022:

1. **Bilsland Dissertation Fellowship, Purdue University:** Awarded to outstanding PhD candidates in the final year of doctoral degree completion from Purdue University.
2. **Ben M. Hillberry Graduate Scholarship, Purdue University:** Awarded for outstanding research in the area of materials, awarded by the Department of Mechanical Engineering.
3. **Electrochemical Society (ECS) Outstanding Student Chapter:** Received this award from the Electrochemical Society (ECS) Board of Directors, in recognition of the chapter's effort, where I served as the Executive Adviser of the Purdue ECS student chapter.

4. **Electrochemical Society (ECS) Travel Grant Award for 242<sup>nd</sup> ECS Meeting:** Awarded to attend and present at the ECS meeting at Atlanta, GA, USA.
5. **Electrochemical Society (ECS) Travel Grant Award for 241<sup>st</sup> ECS Meeting:** Awarded to attend and present in the ECS meeting at Vancouver, Canada.

#### 2021:

1. **Rising Stars in Mechanical Engineering, MIT:** Selected as one of the top 30 women graduate students and postdoctoral researchers in the USA.
2. **Hommert Engineering Excellence Fellowship, Purdue University:** Selected for contributing to diversity in engineering fields from School of Mechanical Engineering at Purdue University.
3. **IEEE Outstanding Graduate Student Member Award, St. Louis Section:** Awarded for outstanding academic performance, interest and dedication to the profession from the Institute of Electrical and Electronics Engineers (IEEE).
4. **Student Battery Slam Best Presentation Award Winner at 239<sup>th</sup> ECS Meeting, Digital Meeting:** Best research presentation.
5. **NSF Travel Grant Award to attend International Mechanical Engineering Congress & Exposition (IMECE), 2021:** Awarded to assist with the cost of attending the IMECE 2021.
6. **Electrochemical Society (ECS) Travel Grant Award for 240<sup>th</sup> ECS Meeting:** Awarded to attend and present in the ECS meeting.
7. **ECS Trivia Quiz Winner at 239<sup>th</sup> ECS Meeting, Digital Meeting:** Won the battery-related trivia session in the ECS meeting.
8. **Electrochemical Society (ECS) Travel Grant Award for 239<sup>th</sup> ECS Meeting, Digital Meeting:** Awarded to attend and present in the ECS meeting.
9. **Purdue University College of Engineering Outstanding Service Scholarship:** Recognized for outstanding service to the graduate student community, the School, the College, and the University.
10. **Electrochemical Society (ECS) Chapter of Excellence Award:** Received this award from the Electrochemical Society (ECS) Board of Directors, during my tenure as the President of the Purdue ECS student chapter, in recognition of the chapter's effort.

#### 2020:

1. **Electrochemical Society Travel Grant Award for PRiME 2020, Digital Meeting:** Awarded to attend the ECS meeting.
2. **NSF Travel Grant Award to attend International Mechanical Engineering Congress & Exposition (IMECE), 2020 at Virtual Conference:** Awarded to assist with the cost of attending the IMECE 2020.

#### 2019 and before:

1. **NSF Travel Grant Award to attend International Mechanical Engineering Congress & Exposition (IMECE), 2019 at Salt Lake City:** Awarded for traveling to Salt Lake City, UT to attend ASME IMECE.
2. **Travel Grant Award from Council of Graduate Students (CGS), Missouri S&T, 2017:** Awarded for traveling to New Orleans, LA to give 2 oral presentations at 231<sup>st</sup> ECS Meeting in New Orleans, LA.

3. **Second Place, Council of Graduate Students Graduate Research Showcase, Missouri S&T, 2017:** For presenting a poster showing the impact of Atomic Layer Deposition (ALD) coating on battery electrodes.
4. **Scholarship for Extraordinary Academic Performance, Ministry of Human Resource Development, Govt. of India, 2011-2015:** Awarded for excellent academic performance during bachelor's degree.
5. **Multiple Merit Scholarships, Govt. of Tripura, India, 2005-2009:** Awarded for excellent academic performance in high school.

## PROFESSIONAL EXPERIENCE AND CERTIFICATIONS

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1. **Visiting Researcher, SLAC National Accelerator Laboratory, Stanford University, 2022:** Trained on Beamline 6-2c at SLAC to perform experiment on x-ray transmission x-ray microscopy (TXM) and x-ray absorption spectroscopy (XAS) of novel sodium-ion battery materials.
2. **Visiting Researcher, Center for Integrated Nanotechnologies, Los Alamos and Sandia national laboratories, 2022:** Visited the facility to perform experiments on imaging of interfaces of Na metal using cryo-FIB, and cryo-TEM through a highly selected user proposal.
3. **23<sup>rd</sup> National School on Neutron and X-Ray Scattering, 2021:** Attended this highly selective U. S. Department of Energy, Office of Science, Basic Energy Sciences, and Materials Sciences and Engineering Division-funded program for graduate students, and received training in neutron and x-ray facilities in Argonne and Oak Ridge National Laboratory.
4. **Telluride School on Fundamentals for Electrochemical Energy Conversion and Storage, 2021:** Attended this highly selective Toyota-funded program, for getting trained in experimental and theoretical approaches for the design of advanced energy conversion & storage.
5. **INNOVATE, General Electric (GE) Research, 2021:** Selected to learn & network with other top academic talent and accomplished professionals in a realistic, industrial setting.
6. **Emerging Leader's Institute Honors Certificate, Missouri S&T, 2017:** Certificate for completing a semester-long holistic leadership development program to facilitate the empowerment, and development of emerging leaders.

## PUBLICATIONS

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**Google Scholar Profile:** <https://scholar.google.com/citations?hl=en&user=yzr3FBYAAAAJ>

**Number of Peer-reviewed journals:** 11

1. **Susmita Sarkar**, Matthew J Lefler, Bairav S Vishnugopi, R Blake Nuwayhid, Corey T Love, Rachel Carter, and Partha P Mukherjee, 'Fluorinated Ethylene Carbonate as Additive for Robust Sodium Solid Electrolyte Interface in Glyme Electrolytes', *Cell Reports Physical Science*, 4, 101356, 2023. [[Link](#)]
2. **Susmita Sarkar**, Debanjali Chatterjee, Navneet Goswami and Partha P. Mukherjee, 'Celebrating Women in Electrochemical Sciences and Engineering (WIESE)', *ACS Energy Letters*, 7, (6), 2105–2112, 2022. [[Link](#)]
3. **Susmita Sarkar**, Hernando J. Gonzalez Malabet, Megan Flannagin, Alex L'Antigua, P. Schevchenko, and George J. Nelson, and Partha P. Mukherjee, 'Multiscale Mechano-electrochemical Degradation Analytics of Sn Electrodes for Sodium-ion Batteries', *ACS Applied Materials & Interfaces*, 14, 26, 29711–29721, 2022. [[Link](#)]
4. **Susmita Sarkar** and Partha P. Mukherjee, 'Synergistic Voltage and Electrolyte Mediation Improves Sodiation Kinetics in  $\mu$ -Sn Alloy-anodes', *Energy Storage Materials*, 43, 305-316, 2021. [[Link](#)]

5. **Susmita Sarkar**, Ankit Verma and Partha P. Mukherjee, ‘Quantifying Sodiation Kinetics in Tin Anodes for Sustainable Sodium-Ion Batteries’, *Journal of the Electrochemical Society*, 168, (9), 0905502021, 2021. [[Link](#)]
6. **Susmita Sarkar**, John Hoffman and Jonghyun Park, ‘Micro-Macroscopic Modeling of a Lithium-Ion Cell by Considering Grain Boundaries of Active Materials’, *Electrochimica Acta*, 393, 139052, 2021. [[Link](#)]
7. **Susmita Sarkar**, Rajan Kumar Patel, Xinhua Liang and Jonghyun Park, ‘Unveiling the role of  $CeO_2$  atomic layer deposition coatings on  $LiMn_2O_4$  cathode materials’, *ACS Applied Materials & Interfaces*, 9, (36), 30599-30607, 2017. [[Link](#)]
8. Yuting Luo, Yang Bai, Aashutosh Mistry, Yuwei Zhang, Dexin Zhao, **Susmita Sarkar**, Joseph V. Handy, Shahed Rezaei, Andrew Chihpin Chuang, Luis Carrillo, Kamila Wiaderek, Matt Pharr, Kelvin Xie, Partha P. Mukherjee, Bai-Xiang Xu, Sarbajit Banerjee, ‘How Crystallite Geometries Determine the Electrochemical Performance of Porous Electrodes: Insights from Multiscale Operando Studies of a Phase-Separating Intercalation Host’, *Nature Materials*, 2021. [[Link](#)]
9. Sobana P. Rangarajan, **Susmita Sarkar**, Yevgen Barsukov, and Partha P. Mukherjee, ‘3-electrode analytics: perspective on a versatile operando toolbox in energy storage’, *ACS Omega*, 6, 49, 33284–33292, 2021. [[Link](#)]
10. Xiaowei Yu, Yangtao Liu, Hiep Pham, **Susmita Sarkar**, Brandon Ludwig, I-Meng Chen, Wesley Everhart, Jonghyun Park, Yan Wang, and Heng Pan, ‘Customizable Nonplanar Printing of Lithium-Ion Batteries’, *Advanced Materials Technologies*, 4,11, 1900645, 2019. [[Link](#)]
11. Yufang He, Hiep Pham, Yan Gao, Rajan Kumar Patel, **Susmita Sarkar**, Xinhua Liang, and Jonghyun Park, ‘Discovery of an Unexpected Metal Dissolution of Thin-coated Cathode Particles and Its Theoretical Explanation’, *Advanced Theory and Simulations*, 144, 2000002, 2020. [[Link](#)]

#### Journals Under Review and In Preparation:

1. **Susmita Sarkar**, Bairav S. Vishnugopi, Rachel Carter, Corey T. Love, John Watt, and Partha P. Mukherjee, ‘The Heterogeneity of Solid Electrolyte Interphase on Na Metal Anode: A Structure-to-failure Relation’, 2023, [Under review].
2. **Susmita Sarkar**, Avijit Karmakar and Partha P. Mukherjee, ‘Thermal Stability of Sodium-ion Batteries: Unveiling the Cathode-Anode Interplay’, 2023, [In Preparation, advanced draft available].
3. **Susmita Sarkar**, Kaustubh Girish Naik and Partha P. Mukherjee, ‘Sodiation Induced Chemo-Mechanics in Non-porous Alloy Foil Anodes’, 2023, [In Preparation, advanced draft available].
4. **Susmita Sarkar**, Pooja Ranganathan, and Partha P. Mukherjee, ‘Probing the Influence of Multiscale Heterogeneity on  $Na_3V_2(PO_4)_3$  cathode for Sodium-ion Batteries’, 2023, [In Preparation].

#### Peer-Reviewed Conference Proceedings:

1. **Susmita Sarkar**, Rajan Kumar Patel, Xinhua Liang and Jonghyun Park, ‘A Comprehensive Understanding on How Ultrathin Coating Layers on Active Particles Enhance Battery Performance Significantly’, *ECS Transactions*, 77, (11), 425-436, 2017. [[Link](#)]
2. Xiaowei Yu, I-Meng Chen, **Susmita Sarkar**, Jonghyun Park, Heng Pan, Yangtao Liu, Yan Wang, and Wesley Everhart, ‘Direct Aerosol Printing of Lithium-ion Batteries’, *Proceedings of International Symposium on Microelectronics*, 1, 000391-000397, 2017. [[Link](#)]

#### Technical Reports:

1. **Susmita Sarkar**, Navneet Goswami, Partha Mukherjee, ‘Purdue University Student Chapter-Student News’, The Electrochemical Society *Interface*, 30, (1), 2021. [[Link](#)]

2. **Susmita Sarkar**, Navneet Goswami, Partha Mukherjee, ‘Purdue University Student Chapter-Student News’, The Electrochemical Society *Interface*, 29, (89), 2020. [[Link](#)]

#### Conference and Other Presentations:

1. **Susmita Sarkar**, Matthew J Lefler, Bairav S Vishnugopi, Corey T Love, Rachel Carter, and Partha P Mukherjee, ‘An Exploration of the Sodium Solid Electrolyte Interphase in Glyme Electrolytes with Carbonate Additives’, *243<sup>rd</sup> ECS Meeting*, May 28, 2023, Boston, Massachusetts.
2. **Susmita Sarkar** and Partha P. Mukherjee, ‘Probing the Role of SEI Heterogeneity on Sodium Plating and Stripping’, TMS Annual Meeting & Exhibition, March 19, 2023, San Diego, California.
3. Rachel E. Carter, Cynthia Pyles, Michael Swift, Matthew Lefler, **Susmita Sarkar**, Adam Dunkelberger, and Partha Mukherjee, ‘Improved Alkali Metal Plating of Sodium Compared to Lithium via 2DIR characterization and MD Simulation of Weaker Solvation Behavior for High Energy Battery Systems’, TMS Annual Meeting & Exhibition, March 19, 2023, San Diego, California.
4. **Susmita Sarkar** and Partha P. Mukherjee, ‘Electrolytes and Interfaces Driven Thermal Stability of Sodium-Ion Batteries’, *242<sup>nd</sup> ECS Meeting*, October 9, 2022, Atlanta, Georgia.
5. Rachel Elizabeth Carter, Matthew Lefler, **Susmita Sarkar**, Adam Dunkelberger, Megan B. Sassin, Cynthia Pyles and Corey T. Love, ‘Enabling Ambient Sodium Sulfur Batteries’, *242<sup>nd</sup> ECS Meeting*, October 9, 2022, Atlanta, Georgia.
6. **Susmita Sarkar** and Partha P. Mukherjee, ‘Electrochemical Instability in Sodium-metal Electrodes: Evolution and Elimination’, *Gordon Research Conference*, June 5, 2022, Ventura, California.
7. **Susmita Sarkar** and Partha P. Mukherjee, ‘Elucidating Electrolyte-Induced Performance Decay in Sodium-Tin Batteries’, *241<sup>st</sup> ECS Meeting*, May 29, 2022, Vancouver, BC, Canada.
8. **Susmita Sarkar** and Partha P. Mukherjee, ‘Initiatory Plating and Stripping towards the Survival of Sodium Metal Electrodes’, *TMS Annual Meeting & Exhibition*, February 27, 2022, Anaheim, California.
9. **Susmita Sarkar**, Rachel Carter, Corey T. Love and Partha P. Mukherjee, ‘Electrolyte-Mediated Interfacial Dynamics in Na-S Battery’, *MRS Fall Meeting*, November 29, 2021, Boston, Massachusetts.
10. **Susmita Sarkar**, Navneet Goswami and Partha P. Mukherjee, ‘Analysis of Thermal Stability of Sodium-ion Batteries’, *ASME-IMECE*, November 1, 2021, Virtual Conference.
11. **Susmita Sarkar**, Trent J Murray, Rachel Carter, Corey T. Love and Partha P. Mukherjee, ‘The Effect of Electrolyte Constituents on Sodium-Sulfur Batteries’, *240<sup>th</sup> ECS Meeting*, October 10, 2021, Virtual Conference.
12. **Susmita Sarkar** and Partha P. Mukherjee, ‘Electrochemical Complexations in Sodium-ion Batteries’, *Midwest Women in Science Conference (WISC)*, September 18-19, 2021, University of Chicago, Chicago .
13. **Susmita Sarkar** and Partha P. Mukherjee, ‘Regulating Interfacial Chemistry for Sustainable Sodium-Sulfur Batteries’, *Beyond Lithium-Ion XIII* , June 9, 2021, Virtual Conference.
14. **Susmita Sarkar**, Daniel Reed, Rachel Carter, Corey T. Love, and Partha P. Mukherjee, ‘Stripping and Plating Behavior of Sodium Metal in Carbonate and Ether Electrolytes’, *239<sup>th</sup> ECS Meeting*, May 30, 2021, Virtual Conference.
15. **Susmita Sarkar**, George J Nelson and Partha P. Mukherjee, ‘Sodiation Induced Chemo-Mechanics in Sn Electrodes’, *239<sup>th</sup> ECS Meeting*, May 30, 2021, Virtual Conference.
16. Tazdik Patwary Plateau, Hiep Pham, **Susmita Sarkar**, and Jonghyun Park, ‘Inter-Bonded Carbon Nanofibers Based Anode for High Areal Capacity Lithium-Ion Battery’, *239<sup>th</sup> ECS Meeting*, May 30, 2021, Virtual Conference.

17. Hiep Pham, Yufang He, Jie Li, **Susmita Sarkar**, and Jonghyun Park, 'A Facile in-Situ Electric Field Processing for Li-Ion Battery Electrodes', *239<sup>th</sup> ECS Meeting*, May 30, 2021, Virtual Conference.
18. **Susmita Sarkar** and Partha P. Mukherjee, 'Morphology Evolution and Interface Instability of Sodium Metal Electrodes', *TMS Annual Meeting and Exhibition*, March 15, 2021.
19. **Susmita Sarkar** and Partha P. Mukherjee, 'Limiting Factors in the Sodiation Kinetics of Sodium-ion Battery Anodes', *ASME-IMECE*, November 16, 2020, Virtual Conference.
20. **Susmita Sarkar** and Partha P. Mukherjee, 'Micro-textured Deposition in Sodium Metal Electrodes', *ASME-IMECE*, November 16, 2020, Virtual Conference.
21. **Susmita Sarkar** and Partha P. Mukherjee, 'Atypical High-Voltage Capacity loss in Tin based Sodium-Ion Battery Chemistry', *ASME-IMECE*, November 11, 2019, Salt Lake City, Utah, USA.
22. **Susmita Sarkar**, Ankit Verma and Partha P. Mukherjee, 'Sodiation Driven Mechano-Electrochemical Interaction in Alloy Electrodes', *236<sup>th</sup> ECS Meeting*, October 13, 2019, Atlanta, GA, USA.
23. **Susmita Sarkar** and Partha P. Mukherjee, 'Morphology Evolution in Sodium Metal Electrodes', *PRiME 2020 (ECS, ECSJ, and KECS Joint Meeting)*, October 4, 2020.
24. Hiep Pham, **Susmita Sarkar**, and Jonghyun Park, 'Lead-Carbon Nanofiber Based Anode for High Performance Li-ion Battery Lead-Carbon Nanofiber Based Anode for High Performance Li-ion Battery', *235<sup>th</sup> ECS Meeting*, May 28, 2019, Dallas, TX, USA.
25. Tazdik Patwary Plateau, **Susmita Sarkar**, Hiep Pham, and Jonghyun Park, 'Ni Wrapped-Carbon Nanofiber Based Anode for High Areal Capacity for Li-ion Battery', *235<sup>th</sup> ECS Meeting*, May 30, 2019, Dallas, TX, USA.
26. Yufang He, **Susmita Sarkar**, Xinhua Liang, and Jonghyun Park, 'A Discovery of an Unexpected Metal Dissolution of Thin-Coated Cathode Particles: Its Theoretical and Experimental Explanations', *235<sup>th</sup> ECS Meeting*, May 28, 2019, Dallas, TX, USA.
27. **Susmita Sarkar** and Jonghyun Park, 'Investigation into Degradation Mechanism of Lead Acid Batteries and Finding Its New Opportunities in Li ion Batteries', *Industry Day*, September 25, 2017, Missouri S&T, Rolla, USA.
28. **Susmita Sarkar** and Jonghyun Park, 'Impact of Ultrathin  $CeO_2$  coating on Lithium Ion Battery Cathode Particles', *231<sup>st</sup> ECS Meeting*, June 1, 2017, New Orleans, LA, USA.
29. **Susmita Sarkar** and Jonghyun Park, 'Impact of Ultrathin  $CeO_2$  coating on Lithium Ion Battery Cathode Particles', *Graduate Research Showcase - Council of Graduate Students*, Missouri S&T, April 10, 2017, MO, USA.
30. **Susmita Sarkar** and Jonghyun Park, 'Understanding Degradation Mechanism of Lead Acid Batteries and Their Hybrid Systems', *Microgrid Industrial Consortium*, January 12, 2017, Missouri S&T, Rolla, USA.
31. Alex Leong, **Susmita Sarkar**, and Jonghyun Park, 'Electrospun Nanofiber Membranes for Use in Flow Batteries', *Annual International Solid Freeform Fabrication Symposium - An Additive Manufacturing Conference*, August 8, 2016, Austin, TX, USA.
32. Daniel Yoon, **Susmita Sarkar**, and Jonghyun Park, 'High Performance Li ion batteries using Lithium Nickel Manganese Oxide Nanofibers', *Summer Research Program*, July 21, 2016, Missouri S&T, Rolla, USA.

## INVITED TALKS

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1. **Susmita Sarkar**, 'Mechanistic Interactions in Energy Storage Materials and Architectures', *North Carolina State University*, March, 2023, Raliegh, NC, USA.

2. **Susmita Sarkar**, ‘Mechanistic Interactions in Sustainable Energy Storage Materials and Architectures’, *Washington University in St. Louis*, February, 2023, St. Louis, MO, USA.
3. **Susmita Sarkar**, ‘Mechanistic Interactions in Sustainable Energy Storage Materials and Architectures’, *University of Cincinnati*, February, 2023, Cincinnati, OH, USA.
4. **Susmita Sarkar**, ‘Mechanistic Complexations in Sodium-ion Battery Electrodes’, Modeling, Characterization & Analytics in Electrochemical Sciences Engineering Symposium, Purdue University, February, 2023.
5. **Susmita Sarkar**, ‘Mechanistic Complexations in Sodium-ion Battery Electrodes’, *University of California, Berkeley*, March, 2022, Berkeley, CA, USA.
6. **Susmita Sarkar**, ‘Mechanistic Complexations in Sodium-ion Battery Electrodes’, *Arizona State University*, February, 2022, Tempe, AZ, USA.
7. **Susmita Sarkar**, ‘Mechanistic Complexations in Sodium-ion Battery Electrodes’, *University of Texas at Austin*, February, 2022, Austin, TX, USA.
8. **Susmita Sarkar**, Debanjali Chatterjee and Partha P. Mukherjee, ‘Lithium-ion Batteries & Beyond: A Sustainable Solution for Next-Gen Energy Storage & Conversion’, Purdue Student Union Board, November 17, 2021.
9. **Susmita Sarkar**, Navneet Goswami and Partha P. Mukherjee, ‘Probing the Thermal Stability of Sodium-Ion Batteries’, Purdue Engineering Virtual Graduate Showcase, October 4, 2021.
10. **Susmita Sarkar**, ‘Electric Vehicles and Batteries’, Tripura Institute of Technology, 2019, India.
11. **Susmita Sarkar**, ‘Electrochemical Analytics’, Invited lecture series for ME 597, Purdue University, USA, 2022.

## PROPOSALS

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### Beam-time Proposals at National Laboratories:

1. **Susmita Sarkar**, Johanna Nelson Weker, and Partha P. Mukherjee, ‘Probing the Influence of Electrolyte and Electrochemical Window on Interfacial Stability and Sodiation Kinetics in Tin (Sn) Electrodes’, *Stanford Synchrotron Radiation Lightsource, SLAC National Accelerator Laboratory*, 2021 (Awarded).
2. **Susmita Sarkar**, Katherine Jungjohann, Katherine Harrison, and Partha P. Mukherjee, ‘Electrochemical Instability in Sodium-metal Electrodes: Evolution and Elimination’, *Center for Integrated Nanotechnologies (CINT), Sandia National Laboratories*, 2021 (Awarded).

## TEACHING EXPERIENCES

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- **Graduate Teaching Assistant, Purdue University**

1. ME 200 : Thermodynamics I  
Total Enrollment: 90  
Instructor: Dr. Riley B Barta

*Jan 2020 - May 2020  
West Lafayette, IN*

- **Graduate Teaching Assistant, Missouri University of Science and Technology**

1. ME 1720 : Introduction to Engineering Design  
Total Enrollment: 60  
Instructor: Prof. Jillian B. Schmidt
2. ME 1720 : Introduction to Engineering Design  
Total Enrollment: 50  
Instructor: Prof. Jillian B. Schmidt

*Jan 2016 - May 2016  
Rolla, MO*

*Aug 2016 - Dec 2016  
Rolla, MO*

## STUDENT MENTORING

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- **Graduate/ Undergraduate / High-school Students at Purdue University:**

Mentored the research of the graduate, undergraduate, and high-school students in Energy and Transport Sciences Laboratory (ETSL). The goal of the program is to give research experience to top Purdue students.

- **August 2022 - May 2023**

*Project: Insights on the Performance of Hard Carbon-Tin Composite Electrode in Sodium-ion Batteries.*

1. Alaina Heetderks, BS, Purdue University.
2. Srikeerthan Annepu, BS, Purdue University.

- **January 2021 - December 2022**

*Project: Understanding of Sodium-Sulfur Batteries in Ether-electrolytes.*

1. Trent James Murray, MS, Purdue University.

- **August 2021 - December 2021**

*Project: Design of Energy Storage Devices.*

1. Roberto Saito, BS, Purdue University.
2. Rithwik Raghuram, BS, Purdue University.
3. Aakar Jain, BS, Purdue University.
4. Jaiveer Singh Sohi, BS, Purdue University.

- **January - May 2021**

*Project: Development of Composite Polymer Electrolytes (CPEs) for Fast Charging Solid State Batteries.*

1. Shanya Dey, BS, Purdue University.
2. Mohammed Lafizul Hoque, BS, Purdue University.
3. Devendra Nikhil Sarnaik, BS, Purdue University.

- **August - December 2020**

*Project: Thermal runaway modeling of Li-ion cells.*

1. Lauren Nicole Slater, BS, Purdue University.
2. Devendra Nikhil Sarnaik, BS, Purdue University.

- **May - August 2020**

*Project: Effect of Thermal Inputs in Fast-Charging of Lithium-ion Batteries at Low Temperatures.*

1. Gaurav Ramesh Dadlani, BS, Purdue University.
2. Devendra Nikhil Sarnaik, BS, Purdue University.
3. Nithean K Pal Vannan, BS, Purdue University.

- **August 2020 - August 2021**

*Project: Thermal Stability of Tin Electrode in Sodium-ion Batteries.*



1. Aniket Biswal, High School Student, Carmel High School, Carmel, IN.
  2. Arka Chattaraj, High School Student, Mira Loma High School, Sacramento, CA.
  3. Ishan Chattaraj, High School Student, Mira Loma High School, Sacramento, CA.
- **Purdue Undergraduate Research Experience (PURE), Purdue University, 2019:** Mentored the research of one undergraduate students as a part of a nine-week summer program in partnership with Indian Institutes of Technology (IIT). The goal of the program was to raise interest in Purdue graduate programs among high-students from IITs and foster collaborations in research and education by strengthening institutional partnerships, while providing substantive research experience to top Indian undergraduates.
    - **Summer 2019**

*Project: Electro-mechanical Study of Microstructural Evolution in Tin Nanoparticles during Sodium Intercalation/de-intercalation.*

      1. Varad Mahajani, BS-MS, IIT Bombay.
  - **NSF Research Experience for Undergraduates (REU), Missouri S&T, 2016:** Mentored the research of one undergraduate student as a part of a NSF program, which resulted in 1 poster presentations in a symposium (Annual International Solid Freeform Fabrication Symposium – An Additive Manufacturing Conference) in Austin, TX. The goal of the program was to provide rigorous training in additive manufacturing for under-represented students, to ensure diversity and help USA maintain a competitive advantage in critical manufacturing technologies.
    - **Summer 2016**

*Project: Electrospun Nanofiber Membranes for Use in Flow Batteries.*

      1. Alexander Leong, BS, Case Western Reserve University.
  - **Research Experience for High School Students, Summer Research Academy, Missouri S&T, 2016:** Mentored the research of one high-school student as a part of the summer research program, which resulted in 1 poster presentation in a symposium in Missouri S&T, Rolla.
    - **Summer 2016**

*Project: High Performance Lithium Ion Batteries Using Lithium Nickel Manganese Oxide Nanofibers.*

      1. Daniel Yoon, Hickman High School, Columbia, MO.

## SYNERGISTIC ACTIVITIES

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- **Reviewer for Journal**
  1. *Electrochimica Acta*
  2. *Journal of Electrochemical Energy Conversion and Storage (ASME)*
  3. *The Journal of The Minerals, Metals & Materials Society (TMS)*
  4. *IEEE Transactions on Components, Packaging and Manufacturing Technology*
- **The Electrochemical Society (ECS), Purdue University Chapter [Link]**
  - **Founding President** *Aug 2019 - Present*
    - \* Established the ECS chapter at Purdue University and recruited all the officers.

- \* Activities of the chapter highlighted on Energy Focus Issue of the ACS Energy Letters.
- \* Designed and maintained the Purdue University- ECS student chapter website.
- \* Used social media platforms (LinkedIn, Twitter) to increase engagement and get updates on the latest research and developments in the scientific community.
- \* Planned, organized and managed all events for the last two calendar years.
- \* Established networking between Purdue students and ECS.
- \* Compiled yearly reports and published regularly in the ECS *Interfaces*.
- \* Initiated a successful **Virtual Webinar series** during COVID-19 Pandemic (comprised of nine webinars with speakers from industry, national labs and academia speaking on a wide range of electrochemistry aspects and sharing their perspectives) in Fall 2020.
- \* Initiated a successful **Women in Electrochemical Science and Engineering (WIESE)** virtual webinar (comprised of weekly talks by fourteen women electrochemists from industry, national labs and academia, based in the US and Europe, this series is dedicated to highlighting the work and research journey of coveted women researchers with expertise pertaining to topical areas of energy storage and conversion) series in Spring 2021.
- \* Organized a symposium on the theme of “**Prospects and Translation of Electrochemistry Research in Materials, Processes, and Systems in Energy Storage & Conversion**” with a panel of three distinguished speakers from industries (Prieto Battery, GE Research and Underwriters Laboratories.)
- \* Continued a successful Virtual Webinar series with the theme, “**Understanding the Evolution of Materials and Interfaces in Solid-State Batteries**” in Fall 2021.
- **Official Mechanical Engineering Graduate Association (OMEGA), Purdue University**
  - **Graduate Women in Engineering Representative** *July 2021 - June 2022*
    - \* Planned and organized all events for this calendar year.
    - \* Established networking between Purdue Students and Industries.
    - \* Promoted diversity and organization activities through advertisement booths and forums.
- **The Electrochemical Society, Missouri S&T Chapter**
  - **Secretary** *Oct 2017 - May 2018*
    - \* Organized info sessions, talks, and coordinated seminars.
    - \* Established networking between Missouri S&T Students and ECS.

## OUTREACH

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- **Student Ambassador, 242nd Electrochemical Society Meeting, 2022**
  - Worked closely with the ECS staff and met fellow ECS members and meeting attendees, helped with ECS Exhibit Booth, Exhibit Floor and foot-traffic flow management.
- **Introduce a Girl to Engineering Day, Purdue University, 2020**
  - Volunteered to assist with implementing the hands-on engineering activities with 9th and 10th-grade students from across the Midwest, in Introduce a Girl to Engineering Day events organized by the Purdue Women in Engineering Program.
- **Student Volunteer, 236th Electrochemical Society Meeting, 2019**

- Worked closely with the ECS staff and met fellow ECS members and meeting attendees, helped with meeting registration and foot-traffic flow management.
- **Purdue University School of Mechanical Engineering Recruitment Student Panel, 2021, 2022**
  - Invited to be in the student panel for the ME Recruitment event to show the prospective students why Purdue is such a great place for grad school.

## **PROFESSIONAL SOCIETIES**

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Awarded Student Member, **The Electrochemical Society (ECS)**.

Awarded Student Member, **American Chemical Society (ACS)**.

Student Member, **American Society of Mechanical Engineers (ASME)**.

Student Member, **Institute of Electrical and Electronics Engineers (IEEE)**.

Student Member, **The Minerals, Metals & Materials Society (TMS)**.

Student Member, **Materials Research Society (MRS)**.

Student Member, **Society of Women Engineers (SWE)**.