

Srabani Karmakar

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SUMMARY

- Atmospheric science; air pollution transport and dispersion; nanomaterials and sensors for pollutant detection; aerosol–surface interactions; clean energy technologies (high-temperature electrolysis, hydrogen production); science-informed air quality policy.

EDUCATION

Ph.D. in Material Science & Engineering | *The University of Utah* Fall 2025-Aug 2019

- Thesis Title: Investigation of Electrophoretic Deposition of Silicon Nanoparticles to achieve different Nanofluidic applications in the field of Energy Storage and conservations

M.S. in Material Science & Engineering | *The University of Utah* 2021-2019

- *Key Courses:* Physical Metallurgy, Mechanical Metals, Alloy & Material Design, X-ray diffraction, Advanced Thermodynamics, Kinetics, Metal Processing, Powder Metallurgy, Experimental Solid Mechanics

B.Sc. in Mechanical Engineering | *Khulna University of Engineering & Technology* 2012-2008

PUBLICATIONS

Submitted/Prepared Journals

- Numerical Investigation of Optimal Buffer Layer and Performance Evaluation on CdTe Solar Cell (Submitted- ACS Applied Engineering Materials)
- Conductive Substrate-Assisted Electrodeposition of Silica Nanoparticles for Advanced Nanofluidic Device Fabrication (Prepared)

Journal Publications

- Md.Amzad Hossain, Prof.Dr.A.N.M.Mizanur Rahman, Md.Mahmudul Hasan, **Srabani Karmakar**, Md.Asaduz-zaman, Enhancement of Wood Preservation Technology by Pressure and No pressure Process and comparison of their properties. *IJSER*. Paper ID I027725.

Conference Publications

- **Srabani Karmakar**, Swomitra Kumar Mohanty, Optimizing silica nanoparticle dispersion and electrolyte tailoring for electrophoretic deposition in organic and aqueous solvents, ACS Fall 2024, Denver, CO.
- **Srabani Karmakar**, Swomitra Kumar Mohanty Optimizing the Electrophoretic Assembly of Silica Nanoparticles: The Role of NaCl Electrolyte and Process Parameters, 2024 AIChE Annual Meeting, San Diego, CA.
- Mohammad Mashud, **Srabani Karmakar**, Effect of Nominal Diameter and Nozzle to Throat Area Ratios on Suction Lift of water jet pump. *ICMIEE*.
- Mohammad Mashud, **Srabani Karmakar**, Effect of Reynolds Number on Aerodynamic Characteristics of an Airfoil with Flap.

LEADERSHIP EXPERIENCE

- **Senate** Associated Students of the University of Utah (**ASUU**)
- **Academic Student Senate**, Academic Senate, The University of Utah
- **Chair**, College Student Council (College of Mines and Earth Science)
- **Advisory Board Member**, The Office of the Dean of Students (**ODOS**), The University of Utah.
- **Cultural Secretary**, Bangladesh Students Association at the University of Utah (**BSAUU**).
- **Member (Faculty)**, Mechatronics Club, World University of Bangladesh, Bangladesh.

PROJECTS

Multi-scale Fluid-Solid Interactions in Architected and Natural Materials (MUSE), DOE

- Designed electrolytes for electrochemical deposition. Present-Oct 2022
- Surface analyzed of nanoparticles by SEM, AFM, TEM, EDS, & XRD.
- Patterned of deposited particles (Photoresist, Templating).

Advanced Research Projects Agency-Energy (ARPA-E)

- CALPHAD simulation of high-temperature Nb-alloys for predicting phase stability.
- Sintering alloys by spark plasma sintering (SPS) machine.
- Microstructural, Mechanical & Compositional analysis.

Designing of Ni-based Super Alloy (CMES)

Oct 2022- Aug 2019

- CALPHAD simulation of high-temperature Nb-alloys for predicting phase stability.
- Sintering alloys by spark plasma sintering (SPS) machine.

- Microstructural, Mechanical & Compositional analysis.

METSO, METSO: Outotec

Oct 2022- Aug 2019

- Specific energy measurement by universal testing machine,
- Data analysis is used to predict the desired energy consumption for mining ores.

TECHNICAL SKILLS

Experienced Working in Nano-fabrication Lab and Cleanroom

Experienced in working in nano-fabrication labs and cleanrooms, utilizing techniques such as spin coating and photolithography for precise Thin film deposition & characterizations.

Microscopy Techniques

Have an excellent understanding of Electron Microscopes, Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM), Atomic Force Microscopy (AFM), Laser 3D Optical Microscopy, and Raman Spectroscopy.

Data Analysis and Design of Experiment Skills

Proficient in data analysis and experiment design using Gamry Analytical software, Origin, and Excel to interpret electrochemical data, generate statistical insights, and optimize experimental procedures.

Material Characterization Skills

Have a good understanding of alloy characterization by XRD, analysis of elemental properties by CALPHAD software, energy dispersive X-ray spectroscopy (EDS or EDAX) analysis of elemental mapping, and nanopore analysis by ImageJ software.

Synthesis and Processing:

Experience with sol-gel processing, electrochemical deposition, and thin-film deposition techniques

Electrophoretic Deposition:

Knowledgeable in **designing electrolytes**, optimizing deposition processes, and characterizing deposited films.

Analytical Skills:

Strong problem-solving and critical thinking abilities, experience conducting literature reviews, writing research papers, managing intellectual property, analyzing, present, and documentation of data.

Software Skills

AutoCAD, SolidWorks, Microsoft Office Applications, Adobe Photoshop, Adobe Illustrator.

WORK EXPERIENCE

Graduate Research Assistant | *The University of Utah*

Present -2019

- Designed and developed electrochemical processes for nanoparticle deposition with vast, diverse applications.
- Simulated and designed alloy materials for high-temperature aero engine applications.

TA/TM | *The University of Utah*

2022-2021

- Worked as TA in class and lab, assisted students with analytical problems.
- Implemented projects relevant to the mechanical behaviors of metals to design alloys with desired applications.

Lecturer | *World University of Bangladesh*

Dec 2018 - Oct 2014

- Delivered lectures, creating and marking exam papers, and moderating exams. Served as an academic counselor. Conducted research for their undergraduate project. Participated in departmental, faculty, and University meetings for curriculum development and academic policy formulation.

References

- Dr. Heather A. Holmes, Associate Professor, Chemical Engineering, Metallurgical Engineering, The University of Utah- heather.holmes@chemeng.utah.edu
- Dr. Swomitra Kumar Mohanty, Associate Professor, Chemical Engineering, Metallurgical Engineering, The University of Utah- swomitra@chemeng.utah.edu, 801-587-7299
- Dr. Milind Deo, Professor, Chemical Engineering, Metallurgical Engineering, The University of Utah- milind.deo@utah.edu