

Niladri Talukder

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EXPERTISE:

- ✓ Synthesis and optimization of graphene-, MOF-, MXene-, and composite-based materials using ball milling, ultrasonication, thermal treatment, and chemical processing, with relevance to lithium-ion battery anode architectures and scalable product design.
- ✓ Structural, chemical, thermal, and electrochemical evaluation using SEM, TEM, EDS, XPS, FTIR, Raman, XRD, EIS, DSC, and TGA to assess particle structure, surface chemistry, stability, and performance-relevant degradation behavior of carbon and electrode materials.
- ✓ Design and validation of composite materials with targeted electrochemical and thermal functionalities, including long-term cycling stability, degradation mechanism identification, and mitigation strategies relevant to battery and energy-storage environments.
- ✓ Independent execution of controlled experiments, statistical data analysis, and reproducibility assessment supporting prototype validation, and pilot-scale translation.
- ✓ Experience with milling-assisted material preparation and heat-treatment-driven structural evolution of carbon materials, informing relationships among particle morphology, graphitization, and electrochemical behavior.
- ✓ Knowledge of lithium-ion battery components, electrode processes, interfacial stability, and degradation mechanisms derived from research on electrochemical nanomaterials and energy systems.
- ✓ Cross-functional research coordination, technical reporting, publication and patent preparation, and contribution to innovation pipelines supporting competitive product and technology development.

EXPERIENCES:

New Jersey Institute of Technology (NJIT), NJ, USA.

Research/Teaching Assistant, and Research Associate

Sep 2020 – Current

- Lead research on carbon-based materials for electrochemical energy storage, focusing on electrode performance, interfacial stability, and degradation behavior.
- Direct development of carbon-enhanced composite materials, optimizing synthesis, thermal processing, and durability for scalable energy applications.
- Maintain safe laboratory operations, including equipment management and raw-material procurement, supporting reliable prototype validation.
- Mentor undergraduate and graduate researchers in materials synthesis, electrochemical testing, and data analysis while coordinating concurrent experimental activities and ensuring timely technical outcomes.
- Develop research concepts supported by theoretical framework and experimental validation, contributing to funded proposals, technical documentation, and collaborative technology-development initiatives.
- Serve as Teaching Assistant for undergraduate and graduate engineering courses, strengthening technical communication and laboratory instruction skills.

Center for Functional Nanomaterials (CFN), Brookhaven National Laboratory, NY, USA.

Visiting Researcher (Through User Proposal Grant).

May 2021 – Dec 2025

- Lead experimental research on the development of functional nanomaterials with strong emphasis on structure-function relationships relevant to electrochemical energy conversion and storage. [Wrote 4 successful user grant proposals.]
- Establish and maintain collaborations with scientists at the Center for Functional Nanomaterials (CFN), enabling advanced characterization and high-impact studies of electrode materials and degradation mechanisms.

Andong National University, South Korea.

Graduate Research Assistant.

Sep 2015 — Oct 2017

- Led a three-member team in designing and operating a constant-volume combustion chamber with Schlieren and shadowgraph diagnostics for high-precision combustion studies.
- Measured laminar flame speed and Markstein length of alternative fuels, including n-butanol and fatty acid methyl esters (FAME), to support combustion modeling and clean-fuel performance evaluation.
- Supported South Korea government-funded projects through industrial flue-gas pollutant analysis and technology development for large-scale liquefied natural gas (LNG) systems.

EDUCATION:

Degree	Institution	Duration
Ph.D. in Mechanical Engineering	New Jersey Institute of Technology, NJ, USA	Sep 2020 — Dec 2025
M.Sc. in Mechanical Engineering	Andong National University, South Korea	Sep 2015 — Aug 2017
B.Sc. in Mechanical Engineering	Khulna University of Eng. & Tech., Bangladesh	Jan 2009 — Sep 2013

PUBLICATIONS, PATENT, and AWARDS:

- Published 17 research articles in reputed scientific journals, international conferences ([Google Scholar Link](#)).
- Authored 1 book on N-doped Graphene Nanocatalysts (to be published in 2026).
- Deliver oral presentations and invited talks at 12+ Conferences and Expositions.
- Submitted 1 non-provisional Patent application through NJIT on nanomaterials supported Phase Change Materials.
- 5 National Science Foundation (NSF) grant awards for research and technology commercialization.