

# Syed Mubeen Research Group

The research group exploits the unique properties of nanomaterials, in conjunction with electrochemistry, in technologies designed for use in several areas. Through material synthesis and material characterization, the lab develops novel systems that operate under conditions with real world benefits. Applications center on energy conversion and storage, biomedical devices, and water treatment.

## Research Applications:

- Solar fuels and chemicals
- Carbon dioxide conversion
- Water treatment
- Electrocatalysis
- Grid-scale Energy Storage
- Biomedical Devices

## Who We Work With

- National Science Foundation
- National Institutes of Health
- Department of Energy
- U.S. Department of Agriculture
- SunHydrogen Inc.
- CDTi Advanced Materials

## Lab Expertise



### Director: Syed Mubeen

- PhD: Chemical and Environmental Engineering, University of California, Riverside
- ME: Chemical Engineering, Birla Institute of Technology and Science

# RESEARCH FOCUS & HIGHLIGHTS

- **Water treatment and energy storage technology:** Developing electrodeposition techniques to control the size and dispersion of nanoparticles and nanowires for these applications.
- **Machine learning techniques:** Identifying promising catalyst materials for electrochemical applications such as water splitting for hydrogen and oxygen production and carbon dioxide reduction.
- **Techno-economic analyses:** Studying emerging technologies related to chemical synthesis, energy conversion, and energy storage. The analyses serve to identify a system's key parameters which must be optimized to advance their profitability and viability.
- **Direct solar-to-chemical conversion units:** The lab designs coatings to protect embedded PV devices submerged in caustic electrolytes which can be applied using scalable techniques.

## LEARN MORE



### SCHEDULE A VISIT

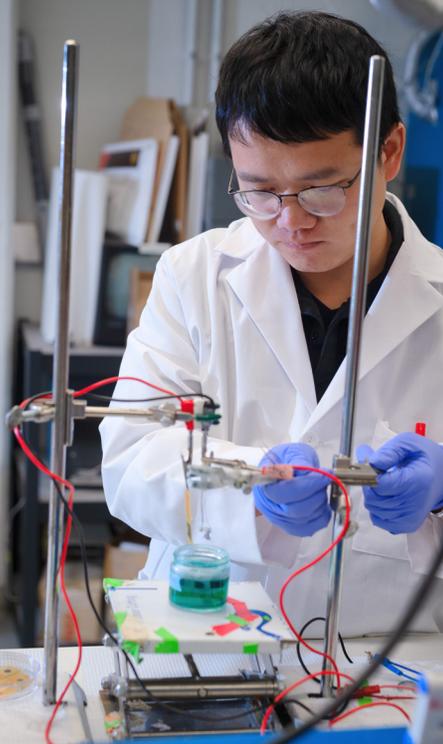
by contacting Syed Mubeen at [syed-mubeen@uiowa.edu](mailto:syed-mubeen@uiowa.edu) or 319-335-5813



### CONNECT WITH US

on our website [smubeen.lab.uiowa.edu](http://smubeen.lab.uiowa.edu)

Electrodeposition for water splitting testing



Pressure reactor for CO2 experiments



Micromanipulator for fine adjustments

