

**Faculty Name:**

Daniel Esposito

**Faculty Email:**

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**Lab:**

Solar Fuels Engineering Lab

**Project Title:**

Scanning electrochemical microscopy studies of electrocatalytic materials.

**Description:**

This project is based on using scanning probe techniques to investigate the properties and performance of photocatalytic particles for hydrogen production from water splitting. Photocatalytic water splitting with suspension reactors is an attractive way to produce clean energy because they can be used to directly use sunlight to convert low energy reactant such as water into energy dense and storable chemical fuels such as hydrogen. This project will be primarily experimental in nature, focusing on the use of in situ scanning probe microscopy techniques including scanning electrochemical microscopy and scanning photocurrent microscopy to interrogate the properties and performance of individual photocatalyst particles, with a focus on understanding the role of defects in thin oxide-coatings on the performance of oxide-encapsulated (photo)electrocatalysts. The project requires a student with previous coursework in solar and electrochemical technologies.

**Location of Research:**

On-Site

**# of hrs/week:**

35

**Department/Program:**

Chemical Engineering

**Eligibility:**

MS

**To apply, please contact:**

de2300@columbia.edu