

# James McKone



**Graduate Institution:** California Institute of Technology

**Graduate Discipline:** Inorganic/Materials Chemistry

**Hometown:** Mason City, IA

**Relevant SC Research:** Basic Energy Sciences

## Research Interest:

My graduate research is primarily focused on efficient solar energy conversion to storable fuels. Solar panels can already convert up to ~20% of incident sunlight to electricity, but solar electricity generation will not be able to scale beyond 30-50% of our total electrical power needs in the absence of large scale storage. We are working to develop functional components for large scale solar-driven electrolysis of water, based on semiconductor light absorbers and integrated catalysts. My specific research has been focused on developing non-noble catalyst for the hydrogen evolution component of water splitting, and also understanding how heterogeneous electrocatalysts can be appropriately coupled with semiconductors for efficient overall energy conversion.

Broadly, I am interested in electrochemistry and solid-state material synthesis/characterization. I am also very interested in teaching and science communication, and have been lucky to be involved in several successful outreach programs at Caltech.

## About Me:

I am about to enter my fifth year of graduate study at Caltech in the Chemistry Division, working jointly for Nate Lewis and Harry Gray. As a graduate student, I have been part of the NSF-funded Center for Chemical Innovation (CCI) based at Caltech. In addition to my research, I have helped to develop a novel chemistry lab

curriculum for Caltech undergraduates. I am also involved in the continuing development of the Solar Energy Materials Discovery Project, an outreach program for undergraduate and high-school age students focused on the discovery of promising new solar energy conversion materials. I have been fortunate to be able to present my research on a number of occasions, including several Caltech seminars, annual CCI research retreats, the Materials Research Society Conference, and a Gordon Research Seminar/Conference.

In my spare time, I enjoy exercise including biking, calisthenics, and playing in the Lewis Group intramural softball team, aptly named Cold Fusion. I also love to read books and articles online, primarily nonfiction. I also enjoy playing the saxophone in a jazz quartet composed of myself and several other Caltech researchers.

I am planning to graduate with a PhD in the Spring of 2013 and then pursue a postdoctoral position; soon thereafter, I hope to begin applying for faculty jobs in chemistry or materials science departments. I am very excited to see another round of DOE Fellows coming down the pipeline, and I would be happy to field and questions or concerns that younger Fellows have about being a DOE Fellow or about graduate school in general.



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