

CHEMISTRY DEPARTMENT  
ART & SCIENCE

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: 03/01/2018

PROJECT TITLE: Jumping Crystals

Anna Gudmundsdottir  
College of Art & Science  
Department of Chemistry  
821 Rieveschl  
Cincinnati OH 45221  
513-556-3380

**Project Description**

One of the greatest challenges of the 21st century is developing sustainable energy to maintain the needs of society. One of the major thrusts has been to harness solar energy as a clean, renewable energy source. Thus, the development of solid-state photodevices is vital for developing sustainable energy, and it requires advanced understanding of the fundamentals of solid-state photophysics and photochemistry. My research group is studying the fundamentals of solid state photochemistry and currently we are investigating the release of N<sub>2</sub> and CO<sub>2</sub> molecules from crystalline derivatives of azido and peroxide compounds. Upon exposure to light azido crystals dance around, shatter or delaminate, and release N<sub>2</sub> atoms, whereas peroxide crystals, bend or twist, and release CO<sub>2</sub>. With the aid of digital microscope and X-ray crystal structure analysis, we are working towards correlate the crystal packing of the starting material and the bulk movement of the crystals upon exposure to light.

A WISE student would spend her summer being trained to synthesize starting materials and study the mechanism for their photoreactivity using, digital microscopy, transient spectroscopy and by carrying out product studies. The proposed research would allow the student to become familiar with using various spectroscopic methods, such as NMR, IR and UV absorption.