Materials Science and Engineering Department

Winter Seminar Series

Designing and Probing Photovoltaic and Optoelectronic Materials

Prof. Jason Baxter
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11AM-12PM | Hill Seminar Room (LeBow 240)

Large-scale deployment of low-cost, low-carbon renewable electricity is likely the most important piece of a multifaceted plan for a sustainable, climate-friendly future. My research group at Drexel has investigated renewable energy systems since I arrived in 2007, with particular focus on processing-structure-property-performance relationships for solar energy materials and solar cells. In this talk, I will present selected work to highlight my group's expertise and capabilities. Early work focused on solution deposition of nanostructures and thin films, with emphasis on revealing how nanostructured architecture and composition impacted solar photovoltaics and solar water splitting. In 2011, our group added capabilities for ultrafast spectroscopy with sub-picosecond time resolution and spectral range from ultraviolet to terahertz frequencies. We have used these tools to investigate fundamental optoelectronic phenomena in materials including oxide perovskites and quantum dots. We have also applied these tools to quantify performance-limiting recombination in photovoltaic absorbers such as kesterites and CdTe. Since 2017, we have also engaged in sustainability modeling of renewable energy systems, with particular interest in applying life cycle assessment to supply chain and end-of-life considerations for photovoltaics and wind turbine blades. After describing my group's expertise and capabilities, I will highlight some past and potential future research collaborations with Drexel MSE faculty.

Jason Baxter is a Professor in the Department of Chemical and Biological Engineering at Drexel University, where he began in 2007. His research group focuses on solar energy conversion, ultrafast photophysics of optoelectronic materials, and sustainability of renewable energy systems. He is a recipient of the NSF CAREER Award and Drexel's College of Engineering Outstanding Career Research Award and Outstanding Teacher Award. He received his BS at University of Delaware and PhD at University of California Santa Barbara, both in chemical engineering, and was a postdoctoral fellow in physical chemistry at Yale University.

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