Harnessing Light's Energy

Niels Damrauer
Associate Professor, Chemistry and Biochemistry

CURRENT RESEARCH

Establishing design principles for complex function of molecules and materials in solar energy conversion

Due to the dire ramifications of climate change, there is a strong need for massive amounts of renewable, carbon-free energy. Dr. Niels Damrauer of the University of Colorado Boulder believes that sunlight is the key to safely creating this energy supply on a scale that is large enough to accommodate the world's future needs as populations grow and societies modernize. He is developing experimental tools and molecular systems to understand and control photochemical transformations (chemistry occurring after light is absorbed), thereby creating the foundation for new solar conversion technologies that follow advancements in basic knowledge.

Dr. Damrauer studies how complex motions in molecules (movements of atoms relative to each other) impact the flow of electrons and energy needed to implement solar energy conversion strategies (fuels or electricity). Ultimately, his goal is to design experiments that illuminate which motions and forces in molecules control function and to design new molecules and materials that incorporate these ideas.

- By developing and using unique laser-based spectroscopic tools, Dr. Damrauer explores how light fields (derived from pulsed lasers that mimic sunlight) can adapt to the complex needs of molecular systems to achieve efficient photochemistry. This can illuminate what factors - such as complex motions - control a function of interest.
- The research that is being explored now at a fundamental level helps to provide the next generation of ideas to be used to create advanced, highly efficient, and inexpensive solar cells and solar-fuel producing devices.
- The program is very unique in its breadth. Few groups combine...

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AFFILIATION

University of Colorado, Boulder

EDUCATION

- Ph.D., in Department of Chemistry, 2000 , University of California, Berkeley
- NIH Postdoctoral Fellow, in Chemistry, 2003 , MIT
- NIH Postdoctoral Fellow, in Chemistry, 2001 , University of Wurzburg, Wurzburg, Germany
- B.S., in Chemistry, 1994 , University of Pennsylvania

AWARDS

- Alfred P. Sloan Research Fellowship, 2009
- National Science Foundation Faculty Early Career Development Award (CAREER), 2009
- Honda Initiation Grant Award, 2008
- National Institutes of Health Postdoctoral Research Fellowship, MIT, 2002-2003
- Alexander von Humboldt Postdoctoral Research Fellowship - Germany, 2000-2001

RESEARCH AREAS

Environment, Clean Energy, Chemistry, Clean Energy

FUNDING REQUEST

As climate change threatens the environment, your contributions will provide Dr. Damrauer with additional resources to expand his research rapidly, in a larger scope. He will increase the experiments in place, hire associates with outside expertise to grow his group's knowledge base, add new technologies to rejuvenate the experimental infrastructure, and expand upon the kinds of molecular and material systems that are interrogated and the kinds of photochemical transformations that are explored.