

A Lesson from Plants in Harvesting Energy



Kara Bren
Professor, Chemistry

CURRENT RESEARCH

Sunlight and hydrogen replace fossil fuels

Humankind relies greatly on fossil fuels which historically have been abundant and are energy-rich, but which also contribute to pollution, affecting our climate. Alternative energy sources that do not harm the planet are necessary for sustaining future generations. Dr. Kara Bren, Professor of Chemistry at the University of Rochester, uses biomolecules to help create inexpensive fuel and storing the sun's energy when the sun isn't shining. The systems Dr. Bren creates convert light energy into chemical energy by driving the synthesis of a fuel, similar to the process of photosynthesis in plants -- using sunlight and water to make hydrogen fuels. Termed "artificial photosynthesis," the energy produced and stored by Dr. Bren and her team is a convenient source of fuel that provides a clean, carbon-free fuel cycle.

Dr. Bren's use of nontoxic, environmentally friendly, and biodegradable molecules to convert solar energy into chemical energy offers a unique approach to the global energy problem. Specifically, she and her group are using proteins and metal-peptide complexes, which are some of the most efficient catalysts but have received less study than synthetic systems. Furthermore, her approach also allows her team to gain new insights into how nature performs similar reactions, and thus contributes to building fundamental knowledge. Dr. Bren's group has successfully made their first generation biomolecular catalysts, and expects to characterize them in the next few years. Therefore, this research has the potential to move out of the lab as it is scaled-up for energy solutions in the near future.

Current research includes:

- New Biological Pathways: Conducting artificial..

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AFFILIATION

 University of Rochester

EDUCATION

- B.A., in Chemistry, 1991, Carleton College
- Ph.D., in Chemistry, 1996, California Institute of Technology

AWARDS

- Guest Professor of Biochemistry, Lund University, Sweden, 2014
- American Chemical Society PROGRESS/Dreyfus Lectureship Award, 2006
- Alfred P. Sloan Research Fellow, 2003-2005
- Paul Saltman Memorial Lecturer, 2004
- NIH National Research Service Award, 1996-1997

RESEARCH AREAS

Environment, Clean Energy, Clean Energy, Space

FUNDING REQUEST

Your contributions will support the continued research of Dr. Kara Bren, of the University of Rochester, as she uses biomolecules to make fuel from water and sunlight. Donations will fund the necessary \$50K/year for graduate students and \$70K/year for postdocs. Additional equipment would help facilitate the growth of Dr. Bren's group, which will require about \$50K in funding. While large donations can help support future academics and Dr. Bren's growing team, smaller donations on the order of \$10K will facilitate the day-to-day necessities of impactful research.