From Photons to Fuels

We provide the basic research to enable a revolution in the conversion of sunlight into storable liquid fuels

Partner Institutions

UNC Chapel Hill

Yale University

Brookhaven National Laboratory

University of Pennsylvania

North Carolina State University

Emory University

CHASE

CENTER FOR HYBRID APPROACHES IN SOLAR ENERGY TO LIQUID FUELS

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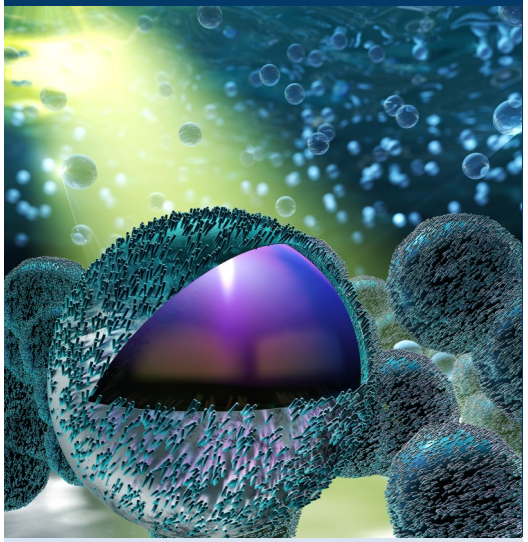
FUELS FROM SUNLIGHT

A Molecular Approach



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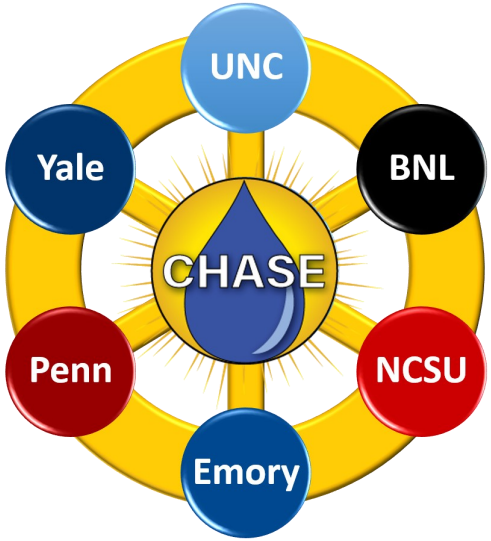

A DOE Fuels from Sunlight Energy Innovation Hub

Supported by the US Department of Energy, Office of Basic Energy Sciences, the Center for Hybrid Approaches in Solar Energy to Liquid Fuels, CHASE, is conducting fundamental research on capturing sunlight to drive solar fuel reactions.

CHASE efforts focus on fundamental science, utilizing a broad multidisciplinary approach in a highly collaborative setting drawing on expertise across a broad range of disciplines in chemistry, physics, and materials science.

Pairing light-absorbing properties of semiconductor materials with selective fuel-producing reactivity of molecular catalysts, CHASE will advance a new paradigm of liquid solar fuels generation. This vast, mostly unexplored space at the intersection between molecular catalysts and heterogeneous materials presents unique opportunities for breakthroughs in photocatalyst durability and access to high-octane liquid fuels.

CHASE

A Collaborative, Integrated, Multi-disciplinary, Inter-Institutional, Team-Based Hub

The Center for Hybrid Approaches in Solar Energy to Liquid Fuels (CHASE) is headquartered at the University of North Carolina at Chapel Hill, one of the top five public research universities in the US, with research partners at Yale University, Brookhaven National Laboratory, the University of Pennsylvania, North Carolina State University and Emory University.

MISSION

To develop molecule/material hybrid photoelectrodes for cooperative sunlight-driven generation of liquid fuels from carbon dioxide, nitrogen, & water

SYNERGISTIC THRUSTS

1. Understand fundamental principles & design strategies that enable integration of durable semiconductor light absorbers with molecular catalysts to drive liquid fuel production (**INTEGRATION)**
2. Tailor local environment around catalyst on a molecular scale to direct reactivity along desired pathways (**MICROENVIRONMENTS**)
3. Develop design principles that enable cooperative integrated photosynthesis of liquid fuels through multi-catalyst cascades (**CASCADES**)

WORLD-CLASS CAPABILITIES

- Catalyst Benchmarking & Databases
- Spectroscopy & Photoelectrochemistry
- Synthesis
- Solar Fuels Product Analysis
- Materials Fabrication & Characterization
- Surface & Materials Analysis
- Theory, Computation & Informatics