



WELCOME

**Students and Parents
to the**

Energy Laboratory Tours!

Sponsored by:

A University Research Center at the University of Notre Dame

ND Energy



**CENTER FOR SUSTAINABLE ENERGY
AT NOTRE DAME**

Creating a more sustainable energy future for all!

WE ARE ...

A UNIVERSITY RESEARCH CENTER

WHOSE MISSION IS TO:

- Grow and develop research in energy towards sustainable and affordable solutions.**
- Support education and outreach for the Notre Dame and surrounding communities.**
- Influence energy policy discussions at the national and global levels.**

SUSTAINABLE AFFORDABLE TRANSFORMATIONAL



UNIVERSITY OF
NOTRE DAME

RESEARCH
ND Energy

Research Focus Areas



Energy Conversion and Efficiency



Smart Distribution and Storage



Sustainable Bio/Fossil Fuels



Sustainable and Secure Nuclear



Transformative Solar



Transformative Wind

Energy Conversion and Efficiency



- Building Energy
- Catalysis
- Conversion of Energy
- Fuel Cells
- Hydrogen
- Solar to Fuels/Chemicals



Smart Distribution and Storage

- Hydrogen Storage
- Smart Grid Technology
- Storage of Energy



Sustainable Bio/Fossil Fuels

- Biofuels
- Carbon Sequestration
- Fossil Fuels

Sustainable and Secure Nuclear



- Actinide Materials
- Nuclear Forensics
- Nuclear Physics
- Nuclear Structures

Transformative Solar



- Light Harvesting
- Solar-to-Fuels Conversion
- Photovoltaics

Transformative Wind



- Structures
- Turbines
- Wind Engineering

Core Research Services

MATERIALS CHARACTERIZATION FACILITY

- State-of-the-art Equipment
- Consulting
- Surface Analysis
- Thermal Analysis
- General Material Analysis

mcf.nd.edu



Education & Outreach



Energy Studies Minor

University of Notre Dame



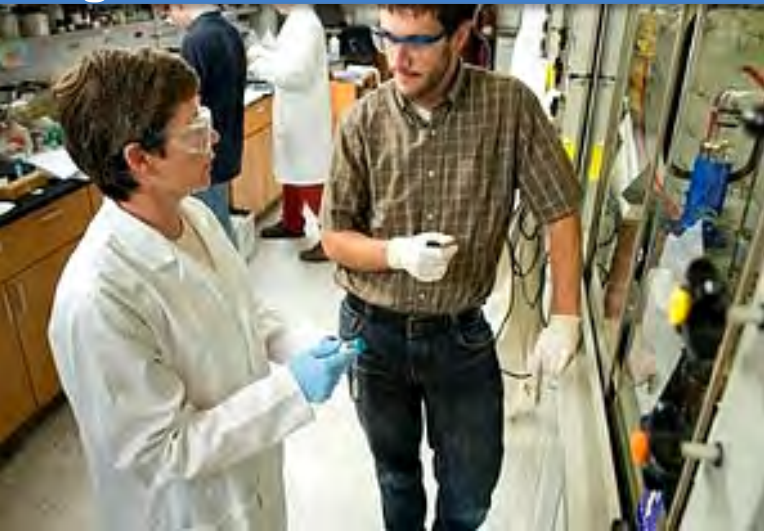
**ENERGY
STUDIES
MINOR**

- A minor for undergraduate students in all majors and colleges at Notre Dame
- Prepares students to become successful leaders who understand the complexities of our global energy challenges

Research Experiences for Teachers ND Energy



Research Experiences for
High School Teachers



- Focuses on engineering a more sustainable energy future
- Laboratory experience provides teachers the means to develop new curriculum for their classrooms

Research Internships

Research Internship for High School Students

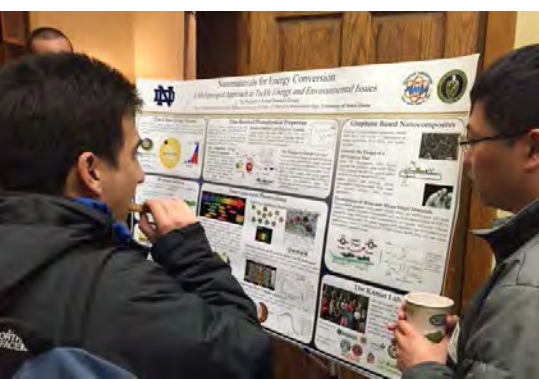


- Partnership with Mishawaka High School
- Engages young scientists with graduate students to experience research and scientific methods first-hand

Research Expo

UNDERGRADUATE SUSTAINABILITY RESEARCH EXPO

- Students learn about research opportunities and education programs in energy, the environment, and other sustainability topics
- Matches student research interests with faculty who have openings within their labs



Community Outreach



- Community-wide annual event at the downtown South Bend library
- Interactive demonstrations and activities for school-age children and their families



The Energy Bike, sponsored by American Electric Power, demonstrates the amount of energy needed to power electricity as shown here with three types of light bulbs: incandescent, fluorescent, and LED.



Dr. David Go's research group uses a plasma globe to demonstrate the flow of electricity, enough to power a light bulb!

Notre Dame Energy Week



- Week-long event filled with activities to create awareness and teach students about the most critical energy issues and topics facing us today
- Program for Notre Dame and surrounding communities

Distinguished Lectures



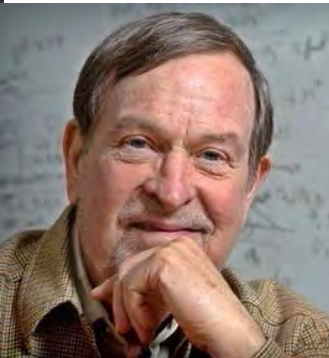
"Physics of Sustainability"

Dr. Peter Littlewood, Director, Argonne National Laboratory



"Environmental Protection Agency: Clean Power Plan"

Dr. Bruce Huber, Professor of Law, University of Notre Dame



"Making Oxygen from Sunlight and Water"

Dr. Thomas J. Meyer, Arey Professor of
Chemistry, University of North Carolina at Chapel
Hill, Director of the Center on Solar Fuels



"Can We Save the World With Nuclear Energy"

Gwyneth Cravens, American Novelist
and Journalist

Slatt Research Fellowships



Undergraduate students attend the annual Undergraduate Research Symposium (above). Summer undergraduate researchers discuss the Indiana Dunes Lakeshore Project with advisor, Dr. Joan Brennecke (below).



Chemical and Biomolecular Engineering

- **Irene Kurtz** (Dr. Joan F. Brennecke) *Liquid-Liquid Equilibria of Ternary Systems of Alkanes, Xylenes, and Ionic Liquids*
- **Andrew Lehmer** (Dr. William Schneider) *Computational Models for "Natural Gas Liquids" Catalysis*
- **Hannah Fitch** (Dr. Peter Kilpatrick) *The Impact of Petroporphyrins on Asphaltene Self Assembly and Water-in-oil Emulsion Stabilization*
- **Benjamin Schultz** (Dr. William Phillip) *Global Applications of Renewable Energy and Sustainability*
- **Brian Keene** (Dr. Edward Maginn) *Developing Capabilities for Porous Solid Monte Carlo Simulation in Cassandra*

Civil and Environmental Engineering and Earth Sciences

- **Sara Boukdad** (Dr. Peter C. Burns) *The Formation of Uranyl Peroxide Nanoclusters from Uranyl Phosphate Minerals*
- **Monica McFadden** (Dr. Robert Nerenberg) *Bench and Pilot Studies of the Membrane-Aerated Biofilm Reactor (MABR) for Energy-Efficient Wastewater Treatment*
- **Margaret Tucker** (Dr. Ian Lightcap) *Polymer-Templated, Quantum Dot Rainbow Solar Cells*

ENERGY Laboratory Tours

Sponsored by the Center for Sustainable Energy at Notre Dame (ND Energy)



- **Notre Dame Nanofabrication Facility/Cleanroom (Dr. Patrick Fay)**
 - Facilitates a wide range of cutting-edge research in fields that include high performance electronic devices, optical electronic processes, microelectromechanical systems, nanomagnetism, microfluidics, and bioengineering.
- **ND Energy Laboratories (Dr. Ian Lightcap)**
 - Facilitates energy-related research projects, providing unique opportunities for Notre Dame researchers to collaborate and build community.
- **Materials Science of Actinides, EFRC (Dr. Peter Burns)**
 - Specializes in highly complex actinide materials, such as materials for fuels, waste forms, or separations, with an emphasis on the nanoscale.

Visit Us At ...

ND Energy 

energy.nd.edu

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Facebook: **CenterForSustainableEnergy**

Thank you for joining us today!



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Dr. Ginger Sigmon
Managing Director



Dr. Ian Lightcap
Senior Scientist



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Program Manager



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