

2007/08 Energy Research Grants

NCESR. The Nebraska Center for Energy Sciences Research (NCESR), a collaboration between the Nebraska Public Power District (NPPD) and the University of Nebraska-Lincoln (UNL), was established in April 2006 to conduct research on renewable energy sources, energy efficiency and energy conservation; and to expand economic opportunities and improve quality of life for Nebraska and the nation.

Goal. The overall goal of the NCESR is to foster research and education in energy sciences by providing funding to support innovative research and collaboration among University of Nebraska-Lincoln faculty and other public- and private-sector organizations and businesses working in energy sciences.

RFP. The NCESR released the Request for Proposals (RFP) for its second competitive rounds of Energy Research Grants on July 16, 2007. Thirty-two UNL faculty teams submitted proposals totaling more than \$1.62 million in requested funding.

Cycle 2 – Selections. The External Advisory Committee (EAC) met on October 9, 2007 and made funding selections in the Cycle 2 of Energy Research Grants offered to faculty at UNL. A total of \$234,233 was awarded for the following new energy research projects:

- ***Viability of Wind Generation for Farm & Rural Communities***
Principal Investigator: Jerry Hudgins, Electrical Engineering
Co-Investigator(s): Terrence Sebor, Center for Entrepreneurship
Ronald Yoder, Biological Systems Engineering
- ***Enzymes for Enhancing Ethanol Production from Lignocellulose***
Principal Investigator: James Van Etten, Plant Pathology
Co-Investigator(s): Vicki Schlegel, Food Science and Technology
Kenneth Nickerson, Biological Sciences
- ***Improved Controls for Biomass Heating and Impact on Greenhouse Profitability***
Principal Investigator: George Meyer, Biological Systems Engineering
Co-Investigator(s): John Hay, Assistant Extension Educator
- ***Passive Solar Powered Earth Contact Heat Exchangers for Cooling Buildings***
Principal Investigator: Bing Chen, Computer Science & Engineering
Co-Investigator(s): Gang Wang, Architectural Engineering
Mingsheng Liu, Architectural Engineering
- ***Barriers to Adoption of Energy-Efficient Practices and Technology by Small Businesses***
Principal Investigator: Shirley Niemeyer, Housing & Environment Research/Extension
Co-Investigator(s): Jerry Deichert, Center for Public Affairs Research, UNO

Cycle 1 – Additional Funds. Based on the progress reports, the EAC also authorized \$644,823 for second year funding for 12 of the 14 projects in Cycle 1. The remaining two projects were proposed and funded for only one year and all work was completed. The 12 projects include:

- ***Ethanol as an Energy Source and Terminal Reductant: Exploitation of Thermophilic Redox Enzymes in Catalyst Development and Screening***
Principal Investigator: David Berkowitz, Chemistry
Co-Investigator: Paul Blum, School of Biological Sciences
- ***Improving Ethanol Production Efficiency: Optimization of Corn-based Feedstock Energy Conversions***
Principal Investigator: David Jackson, Food Science & Technology
Co-Investigator(s): Wajira S. Ratnayake, Food Science & Technology
Rolando A. Flores, Food Science & Technology
Galen Erickson, Animal Science
- ***Ethanol: Utilization of By-Products***
Principal Investigator: Hossein Nouredini, Chemistry & Biomolecular Engineering
- ***A Prototype Series Hybrid Drive Train Using New Permanent Magnet Electric Machine Designs***
Principal Investigator: Dean J. Patterson, Electrical Engineering
Co-Investigator: Jerry L. Hudgins, Electrical Engineering
- ***Rapid Screening Micro Fuel Cells for Portable Electronics***
Principal Investigator: Li Tan, Engineering Mechanics
- ***Magnetic Nanostructures for Energy-Efficient Cooling***
Principal Investigator: Christian Binek, Physics & Astronomy
- ***Flow Measurement of Power Plant Water Resources and Discharges Using Thermal Imaging***
Principal Investigator: David M. Admiraal, Civil Engineering
- ***Hydrogen Production and Storage Using Wind and Nuclear Sources***
Principal Investigator: Jerry L. Hudgins, Electrical Engineering
Co-Investigator(s): Sohrab Asgarpoo, Electrical Engineering
Dean Patterson, Electrical Engineering
- ***Smart Building Energy Systems Monitoring, Controls and Diagnostics Using a Wireless Sensor Network for Energy Efficiency and Conservation***
Principal Investigator: Haorong Li, Architectural Engineering - Omaha
- ***Exploiting the Synergy between Ethanol and Distillers Grains***
Principal Investigator: Galen Erickson, Animal Science
- ***Coupling Field Demonstrations and Simulation Model to Increase Energy and Crop Water Use Efficiency for Corn Production***
Principal Investigator: Suat Irmak, Biological Systems Engineering
- ***Dried Distillers Grains as a Source of Supplemental Energy and Protein for Developing Replacement Heifers***
Principal Investigator: Rick N. Funston, West Central Research and Extension Center