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# NCESR Research Grant Program

## 2006/07 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.

[More background information](#)

The 2006/07 Energy Research Grants selected include (in no particular order):

### **Category 1a: Bioenergy Conversion Processes -- genomics, biochemistry, catalytic chemistry**

1. ***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(s): Paul Blum, School of Biological Sciences

[Slides](#)

[Abstract](#)

### **Category 1b: Bioenergy Conversion Processes -- chemical and industrial engineering**

2. ***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

[Slides](#)

[Abstract](#)

3. ***Ethanol: Utilization of By-Products***

Principal Investigator: Hossein Nouredini, Chemistry & Biomolecular Engineering

[Slides](#)

[Abstract](#)

4. ***Technical and Economical Analyses of Combined Heat and Power Generation for Distillers Grains***

Principal Investigator: Lijun Wang, Biological Systems Engineering

Co-Investigator(s): Milford A. Hanna, Biological Systems Engineering, Curtis L. Weller, Biological Systems Engineering, David D. Jones, Biological Systems Engineering

[Abstract](#)

### **Category 2: Physics; electrical, mechanical engineering**

5. ***A Prototype Series Hybrid Drive Train Using New Permanent Magnet Electric Machine Designs***

Principal Investigator: Dean J. Patterson, Electrical Engineering - visiting professor

Co-Investigator(s): Jerry L. Hudgins, Electrical Engineering

[Slides](#)

[Abstract](#)

6. ***Rapid Screening Micro Fuel Cells for Portable Electronics***

Principal Investigator: Li Tan, Engineering Mechanics

Co-Investigator(s): Zhaoyan Zhang, Mechanical Engineering

[Slides](#)

[Abstract](#)

7. ***Magnetic Nanostructures for Energy-Efficient Cooling***

Principal Investigator: Christian Binek, Physics & Astronomy

Co-Investigator(s): Ralph Skomski, Nebraska Center for Materials & Nanoscience, David J. Sellmyer, Physics & Astronomy

[Abstract](#)

8. ***Flow Measurement of Power Plant Water Resources and Discharges Using Thermal Imaging***

Principal Investigator: David M. Admiraal, Civil Engineering

Co-Investigator(s): John Stansbury, Civil Engineering - Omaha, David Rundquist, School of Natural Resources, Dennis Alexander, Electrical Engineering, Junke Guo, Civil Engineering - Omaha

[Slides](#)

[Abstract](#)

9. ***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

[Slides](#)

[Abstract](#)

### **Category 3: Architecture; architectural engineering**

10. ***Development, Implementation and Deployment of 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

Co-Investigator(s): Song Ci, Computer & Electronics Engineering - Omaha, Hamid Sharif, Computer & Electronics Engineering - Omaha

[Slides](#)

[Abstract](#)

### **Category 4: Agriculture, agronomy, animal science, agriculture meteorology**

11. ***Exploiting the Synergy between Ethanol and Distillers Grains***

Principal Investigator: Galen Erickson, Animal Science

Co-Investigator(s): Terry Klopfenstein, Animal Science

[Slides](#)

[Abstract](#)

12. ***Coupling Field Demonstrations and Simulation Model to Increase Energy and Crop Water Use Efficiency for Corn Production***

Principal Investigator: Suat Irmak, Biological Systems Engineering

Co-Investigator(s): Haishun Yang, Agronomy & Horticulture, Achim Dobermann, Agronomy & Horticulture, Daniel Walters, Agronomy & Horticulture

[Slides](#)

[Abstract](#)

13. ***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

Co-Investigator(s): Andrea S. Cupp, Animal Science, Rick J. Rasby, Animal Science

[Slides](#)

[Abstract](#)

### **Category 5: Economics, policy feasibility studies**

14. ***An Economic Analysis of Enterprise Options for the Bio-based Economy Initiative in Central and North Central Nebraska***

Principal Investigator: Alan E. Baquet, Agricultural Economics

[Abstract](#)

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# NCESR Research Grant Program

## 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

[Abstract](#)

- ***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

[Abstract](#)

- ***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

[Abstract](#)

- ***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

[Abstract](#)

- ***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

[Abstract](#)