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 Noureddini, 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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2007/08 Energy Research Grants

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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 Sebora, 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