



2019/2020 Energy Research Grants – Cycle 13

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.

Request for Proposals. The NCESR released the Request for Proposals (RFP) for its thirteenth competitive round of Energy Research Grants on April 2, 2015.

Selections. The External Advisory Committee (EAC) met on November 26, 2018 and selected the following six energy research projects:

- Theoretical/Experimental Investigations at the Molecular Level for Making Anti-Icing Utility Power Lines – Dennis Alexander, Professor, Department of Electrical and Computer Engineering
- Reducing Energy Needs for Hazardous Air Treatment Emitted During Ethanol Production – Ashraf Aly Hassan, Professor, Department of Civil Engineering
- Understanding Real-Time Irrigation Behavior to Improve Energy Efficiency in Agriculture – Nicholas Brozovic, Professor, Department of Agricultural Economics
- Conversion of Carbon Dioxide to Oxygenates by Plasma Catalysis – Barry Cheung, Professor, Department of Biochemistry
- Novel High-Entropy Ceramic materials for Extreme Environments – Bai Cui, Associate Professor, Department of Mechanical and Materials Engineering
- Probing Localized Nanomechanical Properties of Energy-Harvesting Polymers – Stephen Ducharme, Professor, Department of Physics and Astronomy
- Doping Metal-Chalcogenide Quantum Dot Solar Cells for Enhanced Device Performance – Takashi Komesu, Associate Professor, Department of Physics and Astronomy
- Conversion of Lignin from Lignocellulosics Biomass into Biodegradable Plastic – Rajib Saha, Professor, Department of Chemical and Biomolecular Engineering
- Electronic and Mechanical Properties of MXene-Modified Carbon-Based Composites – Alexander Sinitskii, Professor, Department of Chemistry

- Heat Pump Grain Storage System Development and Demonstration
- David Yuill, Associate Professor, Department of Architectural Engineering

Project Period. Each project is intended to cover the two-year period of January 1, 2019 through December 31, 2020. Funding was provided for the first year. Funding for the second year is provisional and based on project performance.

January 2019