University of Nebraska Lincoln

DEVELOPMENT OF A MINOR IN RENEWABLE ENERGY

A proposal submitted to the Nebraska Center for Energy Sciences Research

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Agricultural Economics Dept., College of Agricultural Sciences and Natural Resources

Galen E. Erickson, Associate Professor
Animal Science Department, College of Agricultural Sciences and Natural Resources

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Food Science & Tech. Dept., College of Agricultural Sciences and Natural Resources

Ron E. Yoder — Date: 12-8-06

Jerry L. Hudgins — Date: 12/8/06

Dennis Conley — Date: 12-8-06

Galen E. Erickson — Date: 12-8-06

Rolando Flores — Date: 12-8-6

Alan Baquet, Head of Agricultural Econ. Dept. — Date: 12-8-06

Don Beermann, Head of Animal Science Department — Date: 12-08-06

Steve Waller, Dean of Agricultural Sciences and Natural Resources — Date: 12-8-06

David H. Allen, Dean of Engineering — Date: 12/6/06

Jack L. Schinstock, Associate Dean of Agricultural Sciences and Natural Resources — Date: 12/11/06

DEVELOPMENT OF A MINOR IN RENEWABLE ENERGY

PIs: R.E. Yoder, J.L. Hudgins, D. Conley, G. Erickson, and R. Flores

Abstract:

The Principle Investigators propose to develop an eighteen credit-hour minor with three required core courses, each worth three credit-hours. Nine of the remaining credit-hours will be taken from one, or more, of four topic area lists. These topic areas are:

- Biotechnology/Food Systems
- Renewable Energy Production from Biological Sources – Biomass and Biogas (Agronomy, Animal Science, Biological Systems, Natural Resources)
- Renewable Energy Engineering – Wind, Solar, Hydrogen, Hydro, Wave and Tidal, and Geothermal (Energy Systems Designs, Production, and Power Processing)
- Energy Economics and Policy.

A one credit-hour Energy Seminar will be required to complete the minor. Additionally, an optional one credit-hour Nebraska Energy Tour, and an optional one credit-hour Independent Energy Study will be offered. The combination of the three one credit-hour courses may replace one three credit-hour course from the topical areas. The proposed minor will provide students at the University of Nebraska-Lincoln the opportunity to obtain a formal introduction into the science, technology, policy issues, and economics of renewable energy resources.

PROJECT DESCRIPTION

Goals and Objectives

An eighteen credit-hour minor (minimum hours) with three required core courses, each worth three credit-hours will be developed. Nine of the remaining credit-hours will be taken from one, or more, of four topic area lists (see attached diagram). Additionally, a one credit-hour Energy Seminar will be required, and an optional one credit-hour Nebraska Energy Tour, and an optional one credit-hour Independent Energy Study will be offered. Completing each of the one credit-hour courses will allow a student to use those three hours in place of a course from one of the four topical areas.

The primary objective of forming this minor is to offer an educational component to University of Nebraska students that, when completed, will prepare them with the knowledge, expertise, and background to successfully compete for positions with companies that are producing or developing renewable energy sources. This minor would be available to all University of Nebraska-Lincoln students though students in the colleges of Arts and Sciences, Business Administration, Agriculture and Natural Resources, and Engineering, are targeted.

Project Justification

There are many potential sources of renewable energy within our grasp in Nebraska, e.g.,

- Bioenergy
    - Biomass – annual crops, perennial plants, short-rotation woody plants
    - Biogas – from plant or animal waste
- Wind
- Solar
    - Photovoltaic
    - Concentrated thermal and PV
    - Passive
- Hydro
- Geothermal
- Conservation (by stretching the point just a bit)

As a state, Nebraska is well positioned to lead in many of these areas of the burgeoning renewable energy industry. A ready supply of graduates with expertise in renewable energy will be attractive to industries and investors considering Nebraska as a location for their operations, and will thereby support economic development in Nebraska, and provide opportunities for our best and brightest to remain in Nebraska. As an example, a few of the many opportunities exist in the incomplete list of topics:

- Economics of production and utilization
    - Policy issues
- Production and management of biomass crops/feedstocks
- Waste utilization for bioenergy production
- Harvesting, handling, and conversion (processing) of biomass or waste to produce energy

- Utilizing energy produced
    - Integrating to existing distribution systems
- Environmental/ecosystem impacts (e.g. water and fertilizer usage)
- Wind energy development
    - Isolated or grid-connected and associated metering issues
- Solar sources both in co-generation and passive designs for buildings
- Future hydrogen (H_2) production from renewable sources
- Large-scale electricity production source mix and economies

Description

A chart of the Renewable Energy Minor curriculum is shown in the diagram below. The courses that will comprise the core (all required) are:

Energy in Society

- This will be a "gateway course" that will be developed to encourage critical thinking by providing a broad survey of issues related to energy including sources, history/anthropology, sociology, economics, ecology, environment, and the future.
- This course may be made available for the Advanced Scholars program.

Introduction to Energy Systems

- This course will be developed with leadership from an Engineering Department and will have prerequisites of MATH 103, and a basic course in Biology, Chemistry, or Physics. The course will introduce students to essential principles needed to understand the production, storage (if appropriate), transport, marketing, and use of energy from the systems perspective. Discussions will focus on the technical aspects of renewable energy systems, though some environmental and economic trade-offs of renewable energy sources in the context of current energy production will be provided.
- This course is being considered for adoption as the introductory gateway engineering course also to be taught at Nebraska community colleges for a new engineering transfer program.

Energy, Economy and Environment

- This course will be developed with leadership from a CASNR Department, and will integrate the key principles of economics and environmental sustainability, and provide a depth of coverage of the pertinent issues.

Courses for the four topic-area lists will be solicited from participating departments and will be approved for the lists by the Renewable Energy Coordinating Committee (proposed initially as the PIs and Co-PIs for this project). The four proposed topic areas are:

- Biotechnology/Food Systems
- Renewable Energy Production from Biological Sources – Biomass and Biogas (Agronomy, Animal Science, Biological Systems, Natural Resources)
- Renewable Energy Engineering – Wind, Solar, Hydrogen, Hydro, Geothermal, and Wave and Tidal (Energy Systems Designs, Production, and Power Processing)
- Energy Economics and Policy.

Many of the courses to be offered in the topical areas already exist or only require minor modification from existing courses.

Expected Educational Outcomes

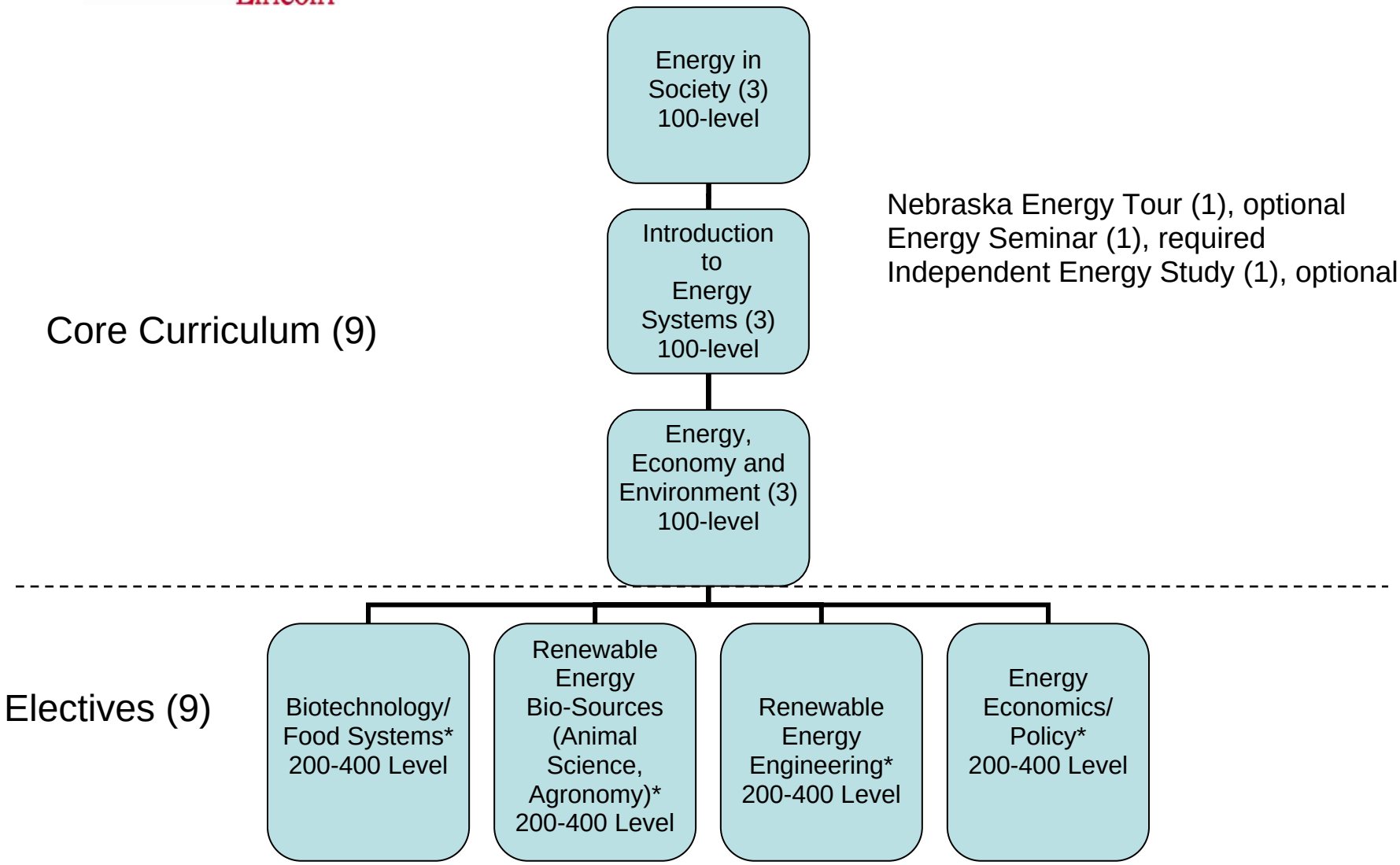
Students completing the Renewable Energy minor will have the knowledge and skills to assess resources for producing renewable energy, to assess environmental impacts (potentially positive or negative) related to producing renewable energy, to evaluate the economics of developing and producing renewable energy sources, and to confront the societal issues surrounding the adoption and use of new sources of energy.

The Introduction to Energy Systems course will serve as a general introductory engineering course planned to be offered at several Nebraska Community Colleges in Fall 2007. This course is also expected to be adopted for use by several engineering departments as one of their required freshman introductory courses (taught at UNL). This is expected to facilitate community college transfer students into engineering, excite on-campus engineering freshmen, and ease transfer of freshmen engineering students between majors. Overall, the undergraduate engineering enrollment is expected to grow by a significant fraction due to the emphasis on energy topics.

The increase in undergraduate Renewable Energy Minors will also likely increase the number of graduate students working on advanced degrees in energy-related areas and further enhance the availability of talent for the energy industry.

Timeline

	Starting Months											
Tasks	1	2	3	4	5	6	7	8	9	10	11	12
Development of Core Courses												
Delivery of Core Course Material												
Modification of Existing Topical Courses												
Creation of New Topical Courses												
Delivery of Topical Course Material												
Schedule of Course Offerings Created												
Workshop												



*Student chooses three courses from one, or more, of these lists

Credit-hours shown in parenthesis

University of Nebraska Lincoln

NCESR Research Grant Budget Request

Item	CY2007
Salaries	
Graduate Students (3 ea.) (each at 0.25 FTE for 3.5 mos.)	$ 7,350
Benefits	
Graduate Student (32% + Health)	3,102
Workshop	1,500
Total Request	$ 11,952

Budget Justification

One graduate student is needed to help with production of course material for each of the three core courses. The delivery of the core course material is expected prior to the Fall 2007 semester. The topical course materials are expected for delivery at the end of the project and thus require less modification and on a longer time-frame for delivery. The proposed equivalent monthly stipend for each is about $1,400 per month (at 0.25 FTE for 3.5 months) plus fringe benefits of 32% plus $250 for health benefits.

The workshop is to communicate the new minor content and receive feedback from the UNL community for final alterations.

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Education

Ph.D. Agricultural Engineering	Colorado State University	1988
M.S. Agricultural Engineering	Clemson University	1978
B.S. Civil Engineering	Drexel University	1976

Professional Experience

Professor & Head, Biological Systems Engineering Department, University of Nebraska, 2004 - present
Professor & Head, Biosystems Engineering & Environmental Science Department, UT, 2000 - 2004
Associate Professor, Agricultural and Biosystems Engineering Department, UT, 1996 - 2000
$ *Coordinator, Tennessee Agricultural Experiment Station Interdisciplinary Water Quality Research Team*
$ *Member of the Environmental Engineering Faculty*
Assistant Professor, Agricultural Engineering Department, University of Tennessee, 1992 - 1996
Research Agricultural Engineer, USDA-ARS, Prosser, Washington; 1989 - 1992
Agricultural Engineer, USDA-ARS, Grand Junction, Colorado; 1983 - 1989
Agricultural Engineer, University of Wyoming; 1979 – 1983

Registration, Professional Engineer, Wyoming 3505

Funded Research (past four years)

Nebraska AgrAbility. R.E. Yoder and A.E. Baquet**,** USDA, $800,000 (April 1, 2006 to March 31, 2010).

Center for Decentralized Wastewater Management. C. R. Mote and **R. E. Yoder**. US EPA, TDEC, TVA, and Tennessee Onsite Wastewater Association, $672,163 (July 15, 2002 to July 14, 2006).

Predicting Offsite Subsurface Migration of AgrochemicalsBNoninvasive Surveying. **R. E. Yoder**, R. S. Freeland, and J. T. Ammons. USDA-NRICGP; $245,000 (November 1, 1999 to October 31, 2002; extended to October 31, 2003)

Incorporation of Environmental Factors in Flexible Pavement Design: Phase II. E. C. Drumm, **R. E. Yoder**, N. R. Rainwater, M. E. Jackson, and R. W. Meier. Tennessee Department of Transportation, Design Division; $381,793 (September 1, 1998 to March 31, 2001) - No cost extension until March 31, 2002, and then extended for one year (April 1, 2002 to March 31, 2003) at $143,790

Refereed Publications (past four years)

Zuo, G., N.R. Rainwater, E.C. Drumm, W.C. Wright, **R.E. Yoder**, R.W. Meier, and C. Marshall. 2006. Environmental Effects on Flexible Pavements: Long-term Field Observations. ASCE J. of Trans. (in press)

Miranda, F. R., **R. E. Yoder**, and J. B. Wilkerson. 2005. An Autonomous Controller for Site-Specific Management of Fixed Irrigation Systems. Computers and Electronics in Agriculture 48:183-197.

Yoder, R. E., L. O. Odhiambo, and W. C. Wright. 2005. Effects of Vapor Pressure Deficit and Net-Irradiance Calculation Methods on the Accuracy of the Standardized Penman-Monteith Equation in a Humid Climate. ASCE J. of Irr. and Dr. 131(3):228-237.

Yoder, R. E., L. O. Odhiambo, and W. C. Wright. 2005. Evaluation of Methods for Estimating Daily Reference Crop Evapotranspiration at a Site in the Humid Southeast of USA. Appl Engrg in Agr 21(2):197-202.

Li, J., **R. E. Yoder**, L. O. Odhiambo, and J. Zhang. 2004. Simulation of Nitrate Distribution Under Drip Irrigation Using Artificial Neural Networks. Irrigation Science 23:29-37.

Odhiambo, L. O., R. S. Freeland, **R. E. Yoder**, and J. W. Hines. 2004. Investigation of a Fuzzy-Neural Network Application in Classification of Soils using Ground-Penetrating Radar Imagery. Appl Engrg in Agr, 20(1):1-9.

Wilson, R. C., R. S. Freeland, J. B. Wilkerson, and **R. E. Yoder**. 2003. Inferring Subsurface Morphological Transitions using Bulk Electrical Conductivity. TRANS of the ASAE 46(5):1435-1441.

Yoder, R. E. 2003. Irrigation Efficiency. Chapter in *Encyclopedia* of Agricultural, Food, and Biological Engineering, edited by Dennis R. Heldman. Marcel Dekker, Inc, New York, New York, pp. 543-545.

Freeland, R. S., M. L. Miller, **R. E. Yoder**, and S. K. Koppenjan. 2003. Forensic Application of FM-CW and Pulse Radar. Journal of Engineering and Environmental Geophysics 8(2):97-103.

Zobeck, T. M., T. W. Popham, E. L. Skidmore, J. A. Lamb, S. D. Merrill, M. J. Lindstrom, D. L. Mokma, and **R. E. Yoder**. 2003. Aggregate-Mean Diameter and Wind- Erodible Soil Predictions Using Dry Aggregate-Size Distributions. SSSAJ 67(2):425-436.

Freeland, R. S., **R. E. Yoder**, J. T. Ammons, and L. L. Leonard. 2002. Integration of Real-Time Global Positioning with Ground-Penetrating Radar Surveys. Applied Engineering in Agriculture 18(5):647-650.

Freeland, R. S., Inman, D.J., **R. E. Yoder**, and J.T. Ammons. 2002. Detecting Vertical Anomalies within Loessial Soils Using Ground-Penetrating Radar. Technical Note in Appl Engrg in Agr, 18(2):263-264.

Freeland, R. S., **R. E. Yoder**, J. T. Ammons, and L. L. Leonard. 2002. Mobilized Surveying of Soil Conductivity Using Electromagnetic Induction. Appl Engrg in Agr 18(1):121-126.

Zuo, G., W. C. Wright, N. R. Rainwater, E. C. Drumm, and **R. E. Yoder**. 2002. Factors Affecting Determination of Subgrade Water Content from Multi-Segment Time Domain Reflectometry Probes. Transportation Research Record, 1808:3-10.

Inman, D. J., R. S. Freeland, J. T. Ammons, and **R. E. Yoder**. 2002. Soil Investigations Using Electromagnetic Induction and Ground-Penetrating Radar in Southwest Tennessee. SSSAJ, 66:206-211.

Professional Activities

American Society of Agricultural and Biological Engineers
Board of Trustees, 2003 - 2005; ABET Program Evaluator, 2003 - present; Chair, Irrigation Management Committee (SW-244), 1998 - 2000; Chair, Engineering Licensure Committee (P-414), 1997 - 1999; Chair, Young Researcher Jury (M-114), 1998; Chair, 1998 Associate Editor, Soil and Water Division Publication Review (SW-05), 1995 - 2001; Co-chair of the Subcommittee to prepare the engineering standard **X505: Measurement and Reporting Practices for Automatic Agricultural Weather Stations**; Co-editor, *Proceedings*: International Conference on Evapotranspiration and Irrigation Scheduling, San Antonio, Texas, November 3 - 6, 1996
American Society of Civil Engineers (ASCE), member
American Society for Engineering Education (ASEE), member
Alpha Epsilon, member
Gamma Sigma Delta, member
Sigma Xi, member
Technical Reviewer: Transactions of the ASAE; Applied Engineering in Agriculture; Soil Science Society of America Journal; Irrigation Science; Soil Science; Journal of Irrigation and Drainage Engineering (ASCE); Geoderma;European Journal of Soil Science; Journal of Environmental Quality; Journal of Soil and Water Conservation; Water Resources Research; Journal of Hydrology; ENERGY - The International Journal;Idaho State Board of Education review for research proposals; MONTS; Review of research proposals for the State of Montana; USDA, CRSEES, Small Business Innovation Research (SBIR) Program; USDA, CSREES, National Research Initiative (NRI) Competitive Grants Program

Honors and Awards

W. F. and Golda Moss Outstanding Teaching Award (for under ten years of service), College of Agricultural Sciences and Natural Resources, 2001.

ASAE 1999 Superior Paper Award (top 2.5% of papers published by ASAE in 1998) -Yoder, D. C., J. B. Wilkerson, J. R. Buchanan, K. J. Hurley, and R. E. Yoder. Development and Evaluation of a Device to Generate Time-Varying Flow. Transactions of the ASAE 41(2):325-332.

ASAE 1999 Superior Paper Honorable Mention (second 2.5% of papers published by ASAE in 1998) - Yoder, R. E., D. L. Johnson, J. B. Wilkerson, and D. C. Yoder. Soil Water Sensor Performance. Applied Engineering in Agriculture 14(2):121-133.

Neal and Tacie Peacock Teaching/Learning Merit Certificate in recognition for implementing innovative teaching activities, 1997

Jerry L. Hudgins

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EDUCATION:

BSEE, Texas Tech University, Electrical Engineering, 1980
MSEE, Texas Tech University, Electrical Engineering, 1982
Ph.D., Texas Tech University, Electrical Engineering, 1985

PROFESSIONAL EXPERIENCE:

2004-Present, Professor and Chair of Electrical Engineering Department, University of Nebraska – Lincoln.

Aug. 1998 to Dec. 2003, Professor, Electrical Engineering Department (formerly ECE), University of South Carolina.

March 1998 to November 2000, Interim Chair of Electrical and Computer Engineering Department, University of South Carolina - Columbia.

January 1995 to February 1998, Associate Chair of Electrical and Computer Engineering Department, University of South Carolina - Columbia.

May 1991 to Aug. 1998, Associate Professor, Electrical and Computer Engineering Department, University of South Carolina - Columbia.

June 1985 to May 1991, Assistant Professor, Electrical and Computer Engineering Department, University of South Carolina - Columbia.

EXPERTISE AND RESEARCH INTERESTS:

Present work involves the use of specially designed thyristors, including SCRs, GTOs, and IGCTs, for high powered, low duty-cycle inverters. Other work involves photoconductive switches, GaN and SiC devices, transient heat-flow modeling in solid state switches, low temperature characterization and modeling of power electronic devices, and heat flow analysis of power electronic modules using different packaging technologies. A recent project was the Virtual Test Bed (VTB), a CAD tool being developed for US Navy surface ship power systems design.

PREVIOUS FUNDING

Virtual Test Bed (VTB) – sponsored by Office of Naval Research for $8,000,000, Hudgins as Co-PI (responsible for $100,000 to $150,000 per year over the period of the contract).

ARIES (Autonomous Robotic Inspection and Evaluation System) – sponsored by DoE for three years for $1,500,000, Hudgins as Co-PI (responsible for $60,000 per year expenditures).

Gateway Coalition – sponsored by NSF for $50,000 for two years to develop the ECE Writing Center, Hudgins as PI.

Characterization of MOSFETs and IGBTs for Space Applications – sponsored by CCDSP/NASA for $145,000 for two years, Hudgins as sole PI.

MEMBERSHIP INFORMATION:

Institute of Electrical and Electronics Engineers (IEEE) Electron Devices Society
Institute of Electrical and Electronics Engineers (IEEE) Industry Applications Society
Institute of Electrical and Electronics Engineers (IEEE) Power Electronics Society
Electrical and Computer Engineering Department Heads Association
Accreditation Board of Engineering and Technology (ABET) Program Evaluator

University of Nebraska Lincoln

PUBLICATIONS (SELECTION FROM 2003-2006):

- "Destruction-free parameter extraction for a physics-based circuit simulator IGCT model," X. Wang, J.L. Hudgins, E. Santi, and P.R. Palmer, *IEEE Trans. Industry Applications.*, pp., Nov./Dec. 2006. (accepted for publication)
- "Two-Step Parameter Extraction Procedure with Formal Optimization for Physics-Based Circuit Simulator IGBT and PIN diode Models," A.T. Bryant, X. Kang, E. Santi, P.R. Palmer, and J.L. Hudgins, *IEEE Trans. Power Electronics*, vol. 21, no. 2, pp. 295-309, March 2006.
- "Temperature effects on trench-gate punch through IGBTs," X. Kang, A. Caiafa, E. Santi, J.L. Hudgins, and P.R. Palmer, D.Q. Goodwine, and A. Monti, *IEEE Trans. Industry Applications*, vol. 40, no. 2, pp. 472-482, March/April 2004.
- "FPGA based sliding mode control for high frequency power converters," S. Lentijo, S.G. Pytel, A. Monti, J.L. Hudgins, E. Santi, and G. Simin, *IEEE PESC Rec.*, Aachen, Germany, pp. 3588-3592, June 2004.
- "Circuit simulator models for the diode and IGBT with full temperature dependent features," P.R. Palmer, E. Santi, J.L. Hudgins, X. Kang, J.C. Joyce, and P.Y. Eng, *IEEE Trans. Power Electronics*, vol. 18, no.5, pp. 1220-1229, Sept. 2003.
- "Characterization and modeling of high voltage field-stop IGBTs," X. Kang, A. Caiafa, E. Santi, J.L. Hudgins, and P.R.. Palmer, *IEEE Trans. Industry Applications*, vol. 39, no. 4, pp. 922-928, July 2003.
- "Wide and narrow bandgap semiconductors for power electronics," J.L. Hudgins, *IEEE/TMMS Journal Electronic Materials*, vol. 32, no. 6, pp. 471-477, June 2003.
- "Simulation of an ARCP converter with physics-based circuit simulator device models," X. Kang, A. Caiafa, E. Santi, J.L. Hudgins, and P.R. Palmer, *IEEE PESC Rec.*, Acapulco, Mexico, pp. 1904-1909, June 23, 2003.
- "Cryogenic study and modeling of IGBTs," A. Caiafa, X. Wang, J. Hudgins, and E. Santi, *IEEE PESC Rec.*, Acapulco, Mexico, pp. 15-19, June 23, 2003.
- "A new assessment of wide bandgap semiconductors for power devices," J.L Hudgins, G.S. Simin, E. Santi, and M.A. Khan, *IEEE Trans. Power Electronics*, vol. 18, no. 3, pp. 907-914, May 2003.

HONORS AND AWARDS INFORMATION:

- *Fellow of the IEEE*, elected 2004.
- *Texas Tech University Electrical Engineering Academy*, 2002, distinguished alumnus.
- *IEEE Third Millennium Medal*, 2000, recipient for Outstanding Contributions in the area of Power Electronics.
- *Prize Paper Award – Best Transactions Paper for 1997*, IEEE Power Electronics Society, "Thermal analysis of high-power modules," by C.V. Godbold, V.A. Sankaran, and J.L. Hudgins.
- *Samual Litman Distinguished Professor of Engineering* 1992, University of South Carolina.

PROFESSIONAL ACTIVITIES

- 2005-06, Member, IEEE Fellows Evaluation Committee
- 2004, Past-President of the IEEE Industry Applications Society
- 2003, President of the IEEE Industry Applications Society
- 2000 – 2005, ABET EE Program Evaluator selected by IEEE Education Activities Board
- 1997 - 1998, President of the IEEE Power Electronics Society.
- October 2002, General Conference Chair of the IEEE Industry Applications Society Annual Meeting (Conference), Pittsburgh, PA.
- 2001 – 2002, Senior Past-President of the IEEE Power Electronics Society
- 2001, Vice-President of the IEEE Industry Applications Society
- 1996, Technical Vice-President of the IEEE Power Electronics Society.

DENNIS M. CONLEY

Education

B.S. (69), M.S. (71), Ph.D. (73) Economics, Iowa State University

Employment

* Nebraska Cooperative Council Distinguished Professor, 2006 – present.
* Director, Graduate Program in Agribusiness, 2005 – present.
* Professor, Department of Agricultural Economics, 1996 – 2006.
* Associate Professor, Department of Agricultural Economics, University of Nebraska-Lincoln, 1988 – 95.
* Manager and Industry Analyst, Farmland Industries, Inc., Kansas City, MO, 1985-88.
* Vice President, Agricomp, Ltd., Decatur, IL, 1984.
* Assistant Professor, Department of Agricultural Economics, University of Illinois, Champaign-Urbana, IL, 1976-83.
* Agro-Industry, Marketing and Transportation Economist, Iowa State University, Bangkok, Thailand 1974-76.

Courses Taught at the University of Nebraska-Lincoln

* Finance 867, Futures, Options and Derivatives, Offutt AFB and on-line, 1999 to present.
* Agricultural Economics 416, Advanced Agribusiness Management, 1998 to present.
* Agricultural Economics 814, Commodity Demand and Price Analysis, 1989 to present.
* Agricultural Economics 316, Agribusiness Management, 1989 - 2005.

Current Research Program

* Economic Assessment of Changes in Trade Arrangements, Bio-terrorism Threats and Renewable Fuels Requirements. Multi-state research project NC-1016.

Date started: October 2004.

Current Grants and Contracts

* Distance Delivered MBA/AB, Office of Extended Education & Outreach, University of Nebraska-Lincoln. Date received: June 2005.

Memberships in Professional Organizations

* Board Member and Executive Committee, International Food & Agribusiness Management Association, 2002 – present. http://www.ifama.org/
* International Food & Agribusiness Management Association, 1989 – present.
* North American Association of College Teachers of Agriculture, 1990 – present.
* American Agricultural Economics Association, 1989 – 2002.

Major Professional Awards and Honors

* Fellow, International Food & Agribusiness Management Association, 2003.
* Outstanding Teaching Award, CASNR Week, 2002.
* Certificate of Appreciation, Student Agribusiness MBA (SAMBA) Club, 2002.
* UNL Parents Association, Recognition Award for Contribution to Students, 2002, 1990.
* Gamma Sigma Delta, Teaching Award of Merit, 1995.

* International Food & Agribusiness Management Association, Grateful Appreciation for Contributions, 1994, 1996, 2000 and 2005.

SELECTED PUBLICATIONS

Journal Articles

Almonte-Alvarez, J. and Conley, D. "U.S. - Mexico Food Systems and The Tomato Trade Dispute", *International Food and Agribusiness Management Review*, Vol. 5, Is. 3, 2003. The article was electronically published at *http://www.ifama.org/members/ifamr.htm*.

Conley, D. and Le Boulanger, O. "Agribusiness Management of Exchange Rate Risk", *International Food and Agribusiness Management Review*, Vol. 5, Is. 2, 2003. The article was electronically published at *http://www.ifama.org/members/ifamr.htm*.

Conley, D. When genius failed: The rise and fall of long-term capital management, book review for *Agribusiness: An International Journal*, published in Vol. 18(1), pp129-130 (2002).

Conley, Dennis M. and E. Wesley Peterson. "Exchange Rates and Agribusiness Trade: A Case Study of Nebraska Beef Exports to Japan." *Agribusiness: An International Journal*. Vol. 11, No. 5, September/October 1995, pp. 441-446. ARD, Journal Series No. 10435.

Conley, Dennis M. "Hedging Ratios and Effectiveness for Diesel Fuel and Gasoline in the Northern Plains." *Agribusiness: An International Journal*. Vol. 10, No. 4, July/August 1994. pp. 305-317. ARD Journal Series No. 10362.

Conley, Dennis M. "Internal Decision Making in an Agribusiness: A Case Study." *Agribusiness: An International Journal*. Vol. 8, No. 4, July 1992. pp. 387-397. ARD Journal Series No. 9846.

Conley, Dennis M. and Kevin B. Lewis. "The Relationship of Membership Voting Policies to Equity Redemption: Grain Cooperatives in Illinois." *North Central Journal of Agricultural Economics*. Vol. 2, No. 2, July 1980. pp. 151-158.

Conley, Dennis M. and Kevin B. Lewis. "Evaluating Financial Obstacles to Equity Redemption in Cooperatives: Program Compared to No-program Cooperatives." *Agricultural Finance Review*. Vol. 40, April 1980. pp. 51-60.

Congressional Testimony

Conley, Dennis M. and Richard P. Casey. "Grain Elevator Insolvencies and Bankruptcies." *Congressional Record* for March 1, 1983. Hearings before the Ad Hoc Subcommittee on Grain Elevator Bankruptcy of the Committee on Agriculture, House of Representatives. Serial No. 98-6, U.S. Government Printing Office, Washington, D.C., March 1, 1983, pp. 35-71.

Conley, Dennis M. "Waterway User Charges: Economic Impacts on Illinois Agriculture and Agribusiness." *Congressional Record* for March 23, 1982. Testimony before the House Subcommittee on Water Resources. Washington, D.C., March 1982, 3 p.

Galen E. Erickson

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Education:
B.Sc., Iowa State University, Iowa State University, Animal Science, 1995
M.Sc., University of Nebraska-Lincoln, University of Nebraska-Lincoln, Animal Science, 1997
Ph.D., University of Nebraska-Lincoln, University of Nebraska-Lincoln, Animal Science, 2001

Professional Experience:
University of Nebraska-Lincoln, College of Agriculture Sciences and Natural Resources, Animal Science, Assistant Professor

Publications:

- S. L. Jaeger, M. K. Luebbe, C. N. Macken, G. E. Erickson, T. J. Klopfenstein, W. A. Fithian, D. S. Jackson (2006) Influence of corn hybrid traits on digestibiltiy and the relationship to efficiency of feedlot cattle, J. Anim. Sci., 84:1790, Published
- T. B. Farran, G. E. Erickson, T. J. Klopfenstein, C. N. Macken, R. U. Lindquist (2006) Wet corn gluten feed and alfalfa hay levels in dry-rolled corn finishing diets: Effects on finishing performance and feedlot nitrogen balance, J. Anim. Sci., 84:1205, Published
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- K. J. Vander Pol, G. E. Erickson, N. D. Robbins, L. L. Berger, C. B. Wilson, T. J. Klopfenstein, E. P. Stanisiewski, G. F. Hartnell (2005) Effect of grazing residues or feeding corn from a corn rootworm protected hybrid (MON863) compared with reference hybrids on animal performance and carcass characteristics, J. Anim. Sci., 83:2798, Published
- H. C. Block, C. N. Macken, T. J. Klopfenstein, G. E. Erickson, R. A. Stock (2005) Optimal wet corn gluten and protein levels in steam-flaked corn-based finishing diets for steer cales., J. Anim. Sci., 82:2826, Published
- C. N. Macken, G. E. Erickson, T. J. Klopfenstein, C. T. Milton, R. A. Stock (2004) Effects of dry, wet, and rehydrated corn bran and corn processing method in beef finishing diets., J. Anim. Sci., 82:3543, Published

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- G. E. Erickson, N. D. Robbins, J. J. Simon, L. L. Berger, T. J. Klopfenstein, E. P. Stanisiewski, G. F. Hartnell (2003) Effect of feeding glyphosate-tolerant (Roundup-Ready events GA21 or nk603) corn compared with reference hybrids on feedlot steer performance and carcass characteristics., J. Anim. Sci., 81:2600, Published
- T. L. Scott, C. T. Milton, G. E. Erickson, T. K. Klopfenstein, R. A. Stock (2003) Corn processing method in finishing diets containing wet corn gluten feed., J. Anim. Sci., 81:3182, Published

Membership Information:

- American Registry of Professional Animal Scientists
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EDUCATION

1986-1989 KANSAS STATE UNIVERSITY, Ph.D. Grain Science
1979-1981 IOWA STATE UNIVERSITY, M.S. Agricultural Engineering
1970-1974 UNIVERSIDAD DE COSTA RICA, B.S. Mechanical Engineering

PROFESSIONAL EXPERIENCE

2006- date PROFESSOR AND HEAD DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY AND DIRECTOR OF THE FOOD PROCESSING CENTER, UNIVERSITY OF NEBRASKA-LINCOLN, Lincoln, Nebraska.

2003 - 2006 Research Agricultural Engineer - USDA-ARS EASTERN REGIONAL RESEARCH CENTER, CROP CONVERSION SCIENCE & ENGINEERING RESEARCH UNIT, Wyndmoor, Pennsylvania.

2001 - 2003 Research Food Technologist - USDA-ARS EASTERN REGIONAL RESEARCH CENTER, MICROBIAL FOOD SAFETY RESEARCH UNIT, Wyndmoor, Pennsylvania.

1996 - 2001 Associate Professor, G. M. Ross Professorship, Tenured - DEPARTMENT OF GRAIN SCIENCE AND INDUSTRY, Kansas State University, Manhattan, Kansas

1994 - 1996 Associate Professor, Bioprocess Engineer - DEPARTMENT OF AGRICULTURAL AND BIOSYSTEMS ENGINEERING, and DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION. Iowa State University, Ames, Iowa.

1990 - 1993 Assistant Professor - COOPERATIVE EXTENSION SERVICE, DEPARTMENT OF BIOLOGICAL AND AGRICULTURAL ENGINEERING, Kansas State University, Manhattan, Kansas

1986 - 1990 Assistant Professor, Research Assistant, Graduate Research Assistant - FOOD AND FEED GRAINS INSTITUTE and DEPARTMENT OF GRAIN SCIENCE AND INDUSTRY, Kansas State University, Manhattan, Kansas

1975 - 1986 Director of Administration Division, Head of Industrial Production, Head of Engineering Department, Mechanical Engineer - NATIONAL PRODUCTION BUREAU (Consejo Nacional de Producción), San José, Costa Rica

TEACHING EXPERIENCE

1996 - 2000 DEPARTMENT OF GRAIN SCIENCE AND INDUSTRY, Kansas State University, Manhattan, Kansas.
1994 - 1996 DEPARTMENT OF AGRICULTURAL AND BIOSYSTEMS ENGINEERING, and DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION. Iowa State University, Ames, Iowa.
1991-1993 DEPARTMENT OF GRAIN SCIENCE AND INDUSTRY, Kansas State University, Manhattan, Kansas.
1988-1990 FOOD AND FEED GRAINS INSTITUTE and INTERNATIONAL GRAINS PROGRAMS, Kansas State University, Manhattan, Kansas.
1974-1985 UNIVERSIDAD DE COSTA RICA, San José, Costa Rica. Instructor (Part-time). Mechanical Engineering
1981-1984 INSTITUTO TECNOLOGICO DE COSTA RICA, Cartago, Costa Rica

HONORS

USDA Certificate of Merit for outstanding performance in the Crop Conversion Science and Engineering Research Unit (2005)
USDA Certificate of Merit for superior performance in the Predictive Microbiology Project (2004)
USDA Certificate of Merit for productive relationship with food industry (2002)
ASAE Blue Ribbon Awards for Extension Publications (1991, 1992)
Gamma Sigma Delta, The Honor Society of Agriculture, KSU (1989)
Alpha Mu, Milling Honorary, KSU (1989)
American Association of Cereal Chemists Travel Award (1988, 1987)
Alpha-Epsilon in Agricultural Engineering, ISU (1981)
Full scholarship for Master's Studies from the National Production Bureau (1979-81)
Undergraduate Recognition at the Universidad de Costa Rica (1975)

CURRENT GRANTS

Project leader, Implementation of a Producer/Buyer Distribution System, Part II, $43,000, February 11, 2005, funding agency: USDA/CSREES – AMS/FSMIP.

Project leader, NMEP-Nebraska Manufacturing Extension Partnership, $145,000, March 30, 2006, funding agency: NE Department of Economic Development.
Project leader, Building an Innovative Regional Food Manufacturing Community to Enhance Markets for Family Farms, $50,000, August 7, 2006, funding agency: State of Nebraska.

PUBLICATIONS Over 65 publications in refereed journals, supervised 14 MS theses and PHD dissertations, 44 extension publications and special reports. Last four years:

1. Moreau, R. A., R. A. Flores, and K. B. Hicks. Composition of functional lipids in hulled and hulless barley in fractions obtained by scarification and in barley oil. Cereal Chemistry 84(1): 1-5.
2. Garcia, R. A., K. A. Rosentrater, and R. A. Flores. 2006. Characteristics of North American meat and bone meal relevant to the development of non-feed applications. Applied Engineering in Agriculture 22(5): 729-736.
3. Boateng, A. A., K. B. Hicks, R. A. Flores, and A. Gutsol. 2006. Pyrolysis of hull-enriched byproducts from the scarification of hulled barley (*Hordeum vulgare* L.). Journal of Analytical and Applied Pyrolysis ():.
4. Flores, R. A., M. L. Tamplin, B. S. Marmer, J. G. Phillips, and P. H. Cooke. 2006. Transfer Coefficient Models for *Escherichia coli* O157:H7 on Contacts between Beef Tissue and High Density Polyethylene Surfaces. Journal of Food Protection 69(6):1248-1255.
5. Flores, R. A., K. B. Hicks, D. W. Eustace, and J. Phillips. 2005. High-starch and high-beta-glucan barley fractions milled with experimental mills. Cereal Chemistry 82(6):727-733.
6. Rosentrater, K. A., T. L. Richard, C. J. Bern, and R. A. Flores. 2005. Small-scale extrusion of corn masa byproducts. Cereal Chemistry 82(4):436-446.
7. Garcia, R. A., R. A. Flores, and J. G. Phillips. 2005. Use of an aspirator to separate meat & bone meal into high ash and high protein streams. Transactions of the ASAE 48(2): 703-708.
8. Flores, R.A. and T. E. Stewart. 2004. Empirical distribution models for *Escherichia coli* O157:H7 in ground beef produced by a mid-size commercial grinder. Journal of Food Science 69(5):M121-6.
9. Flores, R. A. 2004. Distribution of *Escherichia coli* O157:H7 in beef processed in a table-top bowl-cutter. Journal of Food Protection 67(2): 246-251.
10. Kim, Y. S., R. A. Flores, O.K. Chung, and D.B. Bechtel. 2003. Physical and chemical characterization of wheat flour milling co-products. Journal of Food Process Engineering 26(5): 469-488.
11. Yuan, J., R. A. Flores, D. Eustace, and G. A. Milliken. 2003. A systematic analysis of the break subsystems of a wheat flour pilot mill. Institution of Chemical Engineers, Trans. IChemE 81 (Part C): 170-179.
12. Loza-Garay, M. and R. A. Flores. 2003. Moisture, ash and protein flow rate study in a wheat flour pilot mill using simulation models. Institution of Chemical Engineers, Trans. IChemE 81 (Part C): 180-188.
13. Rosentrater, K. A., T. L. Richard, C. J. Bern, and R. A. Flores. 2003. Economic simulation modeling of reprocessing alternatives for corn masa byproducts. Resources, Conservation and. Recycling 39(4):341-367.
14. Lam, D. and R. A. Flores. 2003. Viscosity Model for an Extruded Fish Feed as a Function of Particle Size. Cereal Chemistry 80(1): 20-24.
15. Higiro, J., R. A. Flores, and P. A. Seib. 2003. Starch Production from Sorghum Grits. Journal of Cereal Science 37(1): 101-109.
16. Flores, R. A. and M. L. Tamplin. 2002. Distribution Patterns of *Escherichia coli* O157:H7 in Ground Beef Produced by a Laboratory-Scale grinder. Journal of Food Protection 65(12): 1894–1902.
17. Mao, Y., R. A. Flores, and T. M. Loughin. 2002. Objective Texture Measurements of Commercial Wheat Flour Tortillas. Cereal Chemistry 79(5): 648-653.

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Business Address: Biological Systems Engineering
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Current Position:

Professor, Department of Biological Systems Engineering and Associate Dean, College of Agricultural Sciences and Natural Resources, University of Nebraska - Lincoln, 2000 to present. Also courtesy appointment in the Department of Agricultural Leadership, Education and Communications.

Educational Background:

Ed.D. Virginia Polytechnic Institute & State University, July 1977
Major: Vocational & Technical Education (Ag Ed)
Cognate: Agricultural Engineering

M. Ag. University of Florida, December 1974
Major: Mechanized Agriculture
Minor: Agriculture & Extension Education

B.A. State University of New York College at Brockport, August 1970
Major: Biology Education
Minor: Spanish

Professional Experience:

Professor, Department of Biological Systems Engineering and Assistant Dean, College of Agricultural Sciences and Natural Resources, University of Nebraska - Lincoln, 1991 through 2000. Also courtesy appointment in the Department of Agricultural Leadership, Education and Communications.

Professor, Department of Biological Systems Engineering, University of Nebraska - Lincoln, 1990 through 1991. Also courtesy appointment in Agricultural Education Department.

Associate Professor, Department of Agricultural Engineering, University of Nebraska - Lincoln, 1982 through 1990. Also courtesy appointment in Agricultural Education Department.

Assistant Professor, Department of Agricultural Engineering, University of Nebraska - Lincoln, 1977 through 1982. Also courtesy appointment in Agricultural Education Department.

Instructor (full-time), Peace Corps Volunteer, Department of Mathematics and Agricultural Engineering, National School of Agriculture, El Salvador, Central America, September, 1970 through June, 1973.

Professional Societies:

American Society of Agricultural and Biological engineers
North American Colleges and Teachers of Agriculture
American Association of Teacher Educators in Agriculture
Council on Agricultural Science and Technology

Languages: Speak and read Spanish

International Experience:

February 3 through February 9, 1991, Costa Rica, Central America. Purpose of the assignment was to offer assistance in the area of mechanized systems to instructors in agricultural mechanization at the Escuela de Agricultura de la Region Tropical Humeda (E.A.R.T.H.) as they developed courses and laboratories to meet the integrated curriculum needs of students in the humid tropics.

May 12 through May 26, 1990, Moscow, Russia. Purpose of the visit was to observe the academic structure and experience the curriculum process of the Moscow Institute of Agricultural Engineering.

September 1970 through May 1973, El Salvador, Central America. Worked as an instructor of agricultural mechanization at the National School of Agriculture and assisted with a World Bank/U.S. A.I.D. project to improve instruction in agriculture throughout the country.

Honors and Awards Received:

Alpha Zeta (1974)
Phi Kappa Phi (1974)
Alpha Tau Alpha (1975)
Phi Delta Kappa (1975)
Gamma Sigma Delta (1977)
Meritorious Teaching Certificate, National Association of College and Teachers of Agriculture (1984)
AMOCO Foundation Distinguished Teaching Award, University of Nebraska (1985)
Teacher Fellow, National Association of Colleges and Teachers of Agriculture (1986)
Honorary American Farmer, Future Farmers of America (1986)
Blue Ribbon Award from the American Society of Agricultural Engineers for bulletins and circular category entitled "Electrical Systems for Agricultural Buildings." (1988)
Recognition Award for "Contributions to Students," University of Nebraska - Lincoln Parents' Association and Teaching Council (eleven times since 1990)
L. K. Crowe Outstanding Advisor Award in the College of Agricultural Sciences and Natural Resources (1993)
John Deere Teaching Program Award in Power and Machinery, North American Teachers and Colleges of Agriculture (1996.)
Senior Holling Award for Meritorious Teaching, University of Nebraska - Lincoln College of Agricultural Sciences and Natural Resources (2003)
Recognition Award for "Valuable Contributions to Students in the Greek Community," University of Nebraska - Lincoln Panhellenic and Interfraternity Councils (2003)
Recognition Award for "People Who Inspire," University fo Nebraska - Lincoln Mortar Board (2006)

Current Professional Activities:

Teaching in the area of agricultural power (internal combustion engines, electricity, and hydraulics) and applied physics.
Curriculum development in agricultural sciences and agricultural systems technology.

Grants Funded:

Full-Range Advising: Transforming the Advisor/Advisee Experience.
Role: Co-Principal Investigator, *Grant Period:* 01/01/2006 - 01/01/2007 *Grant Type:* Teaching *Total Amount:* $22,000 *Granting Agency Name:* Initiative for Teaching and Learning Excellence *Grant Purpose Statement:* To develop and update skills needed to be an effective advisor *IANR/CEHS Associated Faculty:* John Barbuto Jr, Co-Principal Investigator; Susan Fritz, Co-Principal Investigator

Agricultural Mechanization Initiative, Great Plains Interactive Distance Education Alliance.
Role: Co-Principal Investigator, *Grant Period:* 01/01/2006 - 01/01/2007 *Grant Type:* Teaching *Total Amount:* $14,010 *Granting Agency Name:* U.S.D.A. Higher Education Challenge Grant *Grant Purpose Statement:* Off-campus outreach
Faculty Partners - Non-IANR/CEHS Associated Faculty: Leon Schumacher, UMC; Tom Bromm, ISU; John Slocombe, KSU;
IANR/CEHS Associated Faculty:
William Campbell, Co-Principal Investigator