DEVELOPMENT OF A MINOR IN RENEWABLE ENERGY

A proposal submitted to the Nebraska Center for Energy Sciences Research

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Biological Systems Engineering, Colleges of Agricultural Sciences and Natural Resources & Engineering
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Lincoln, NE 68588
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Electrical Engineering Department, College of Engineering
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Co-P1s:
Dennis Conley, Professor
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

Rolando Flores, Professor and Department Head
Food Science & Tech. Dept., College of Agricultural Sciences and Natural Resources

Signature

Roni E. Yoder

Date

12-8-06

Jerry L. Hudgins

Date

12-8-06

Galen E. Erickson

Date

12-8-06

Alan Baquet

Date

12-8-06

Don Beermann, Head of Animal Science Department

Date

12-8-06

Steve Waller, Dean of Agricultural
Sciences and Natural Resources

Date

12-8-06

David H. Allen, Dean of Engineering

Date

12-8-06

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)

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 (H₂) 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)

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**

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Starting Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of Core Courses</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
</tr>
<tr>
<td>Delivery of Core Course Material</td>
<td></td>
</tr>
<tr>
<td>Modification of Existing Topical Courses</td>
<td></td>
</tr>
<tr>
<td>Creation of New Topical Courses</td>
<td></td>
</tr>
<tr>
<td>Delivery of Topical Course Material</td>
<td></td>
</tr>
<tr>
<td>Schedule of Course Offerings Created</td>
<td></td>
</tr>
<tr>
<td>Workshop</td>
<td></td>
</tr>
</tbody>
</table>
Core Curriculum (9)

- Energy in Society (3)
  - 100-level

- Introduction to Energy Systems (3)
  - 100-level

- Energy, Economy and Environment (3)
  - 100-level

Electives (9)

- Biotechnology/Food Systems* 200-400 Level
- Renewable Energy Bio-Sources (Animal Science, Agronomy)* 200-400 Level
- Renewable Energy Engineering* 200-400 Level
- Energy Economics/Policy* 200-400 Level

*Student chooses three courses from one, or more, of these lists
Credit-hours shown in parenthesis
### NCESR Research Grant Budget Request

<table>
<thead>
<tr>
<th>Item</th>
<th>CY2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries</td>
<td></td>
</tr>
<tr>
<td>Graduate Students (3 ea.) (each at 0.25 FTE for 3.5 mos.)</td>
<td>$7,350</td>
</tr>
<tr>
<td>Benefits</td>
<td></td>
</tr>
<tr>
<td>Graduate Student (32% + Health)</td>
<td>3,102</td>
</tr>
<tr>
<td>Workshop</td>
<td>1,500</td>
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<tr>
<td>Total Request</td>
<td>$11,952</td>
</tr>
</tbody>
</table>

**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.
Ronald E. Yoder, Professor and Head

Biological Systems Engineering Department; University of Nebraska

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(402) 472-1413; (402) 472-6338 FAX; ryoder2@unl.edu

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).


Predicting Offsite Subsurface Migration of AgrochemicalsNoninvasive 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)


**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.


*Neal and Tacie Peacock Teaching/Learning Merit Certificate* in recognition for implementing innovative teaching activities, 1997
Jerry L. Hudgins

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Phone: (402)472-3771
FAX: (402)472-4732
E-mail: hudgins@engr.unl.edu or j.hudgins@ieee.org

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
PUBLICATIONS (SELECTION FROM 2003-2006):


HONORS AND AWARDS INFORMATION:

- *IEEE Third Millennium Medal*, 2000, recipient for Outstanding Contributions in the area of Power Electronics.
- *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
- 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.
* 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 814, Commodity Demand and Price Analysis, 1989 to present.

Current Research Program
  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

Major Professional Awards and Honors
* Outstanding Teaching Award, CASNR Week, 2002.
* Gamma Sigma Delta, Teaching Award of Merit, 1995.

**SELECTED PUBLICATIONS**

**Journal Articles**


**Congressional Testimony**


Galen E. Erickson

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Email: GEERICKS@UNLNOTES.UNL.EDU

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:


Membership Information:
- American Registry of Professional Animal Scientists
- American Society of Animal Science
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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.
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)
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:


JACK L. SCHINSTOCK

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Biological Systems Engineering  
University of Nebraska - Lincoln  
201 L. W. Chase Hall  
Lincoln, Nebraska 68583-0726  
(402) 472-1629  
Email: jschinstock1@unl.edu

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)


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 of 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*