



Agricultural and Biological Engineering Extension Directory



Faculty Assignments and Current Programs



Purpose of this Directory

This directory is prepared by the Agricultural and Biological Engineering (ABE) Department to:

1. Indicate the breadth of the Agricultural and Biological Engineering Extension program in Pennsylvania.
2. Suggest educational materials in agricultural and biological engineering subject areas available to county staff and clientele.
3. Identify program areas for each faculty member with extension appointments.
4. Provide a list of all ABE faculty members.
5. Identify the department's extension operational philosophy.

The department's educational programs, as outlined in this directory, will assist you in utilizing agricultural engineers and directing inquiries from clientele. Please direct all communications or requests for assistance to the Agricultural and Biological Engineering faculty member working in the assigned subject matter area. If you are not sure who can best answer a question, send the request to the Extension Coordinator for reassignment. Address communications to:
Agricultural and Biological Engineering Extension

246 Agricultural Engineering Building
University Park, PA 16802-1909
Phone: (814) 865-7685 (Extension Office) (814) 863-1031 (FAX)
www.abe.psu.edu
Email Address: agbioeng@psu.edu

Web Sites. Several web site addresses are listed. The ABE Department's address is listed above. The ABE Cooperative Extension site is listed on page 8. Faculty with individual web sites have their addresses listed with their names and contact information.

Administration

Department Head	- Roy E. Young (814) 865-7792, reyoung@psu.edu
Extension Coordinator	- Eileen F. Wheeler (814) 865-3552, efw2@psu.edu

Faculty with Extension Appointments

Dennis E. Buffington (Professor, 60%) (814) 865-2971 dbuffington@psu.edu http://energy.cas.psu.edu	Coping with High Energy Prices; Energy Strategies for Agricultural Production and Food Processing; Renewable Energy Sources; Increasing Energy Efficiencies; Modified Environment Systems; Selection Criteria for Electricity Generators for Home and Farm; Solar Energy Utilization.
Daniel Ciolkosz (Extension Associate) 814-863-3484 dec109@psu.edu www.bioenergy.psu.edu http://energy.extension.psu.edu	Biomass Energy - Production, Processing and Utilization
James W. Garthe (Instructor, 100%) (814) 865-7154 jwg10@psu.edu	Recycling and Solid Waste Management; Waste Minimization; Farm Dump Remediation; Agricultural Plastics/Plasticulture; Open Burning
Robert E. Graves (Professor, 100%) (814) 865-7155 reg2@psu.edu www.biogas.psu.edu www.age.psu.edu/psu-compost	Dairy Housing and Environmental Control; Manure Handling, Treatment, and Utilization; Biogas Production; Composting; Organic Materials Processing and Education Center.
Davis E. Hill (Sr. Extension Associate, 100%) (814) 865-2808 deh27@psu.edu www.farmemergencies.psu.edu	Managing Agricultural Emergencies
Albert R. Jarrett (Professor, 20%) (814) 865-5661 arj@psu.edu www.age.psu.edu/fac/Jarrett.html	On-lot Sewage Systems; Irrigation; Stream Restoration.
Dennis J. Murphy (Professor, 65%) (814) 865-7157 djm13@psu.edu www.abe.psu.edu/ash	Agricultural Safety and Health Education; Farm Hazards; Injury Statistics.
J. Samuel Steel (Sr. Research Associate, 100%) (814) 863-3456 jss13@psu.edu	Horticulture and Landscape Services Safety; Farm Family and Targeted Populations Safety

Eileen F. Wheeler
(Professor, 75%)
(814) 865-3552
efw2@psu.edu
www.age.psu.edu/fac/wheeler.html

Controlled Environments For Animal and Plant Production; Ventilation; Horse Stabling; Agricultural Air Emissions; Air Quality.

Faculty with Teaching or Adjunct Appointments

Dennis E. Buffington
(Professor, 40%)
(814) 865-2971
dbuffington@psu.edu
<http://energy.cas.psu.edu>

Biological Systems Engineering; Modified Environment Systems; Energy Strategies; Renewable Energy Sources; Optimizing Energy Utilization.

Jeffrey M. Catchmark
(Assistant Professor)
(814) 863-0414
jcatchmark@psu.edu

Synthesis and assembly of cellulosic materials, composites and coatings; the development of nano and micro scale vehicles, pumps and sensors based on local (microscale) catalytically produced ion gradients; and the development of plasmonic devices and sensors.

Ali Demirci
(Associate Professor)
(814) 863-1098
demirci@psu.edu

Prevention of Hazardous Microorganisms by Emerging Technologies for Food Safety; Industrial Microbiology/ Fermentation for Production of Value-Added Products.

Herschel A. Elliott
(Professor)
(814) 865-1417
hae1@psu.edu

Treatment and Land Application of Agricultural, Municipal and Industrial Wastes; Fate of Pollutants in Soils and Aquatic Systems; Soil Decontamination.

James M. Hamlett
(Associate Professor)
(814) 865-2651
hyc@psu.edu

Soil and Water Conservation Engineering; Runoff and Sediment Transport Processes; Watershed Hydrology, Nonpoint Pollution Modeling.

Paul H. Heinemann
(Professor)
(814) 865-2633
hzh@psu.edu

Agricultural Systems Engineering; Systems Modeling; Applications of Artificial Intelligence to Agricultural Production and Processing; Mushroom Production.

James W. Hilton
(Associate Professor)
(814) 863-1817
jwh2@psu.edu

Machinery Systems and Management; Sprayer Technology; Waste Management; Agricultural Power; Turfgrass and Agricultural Equipment.

Albert R. Jarrett
(Professor, 80%)
(814) 865-5661
arj@psu.edu
www.age.psu.edu/fac/Jarrett.html

Sedimentation Basins; Stormwater Management;
Hydrology; Erosion; Drainage; Impoundments; Irrigation;
Green Roofs.

Jude Liu
(Assistant Professor)
814-863-6844
jxl79@psu.edu

Evaluation of Machine Systems Performance; Non-
Woody Biomass Logistics; Modeling of Soil—Till-
age Tool Interactions

Harvey B. Manbeck
(Professor-Emeritus)
(814) 865-4071
Hmanbeck@psu.edu

Wood Engineering; Wood Structural Systems; Wood
Bridges; Post-frame Buildings; Environmental Control
Systems for Animal and Poultry Housing Systems. Storage
Systems for Grain and Other Ag Products.

Dennis J. Murphy
(Professor, 35%)
(814) 865-7157
djm13@psu.edu
www.agsafety.psu.edu

Agricultural Safety and Health Education; Farm Hazards;
Injury Statistics.

Virendra M. Puri
(Professor)
(814) 865-3559
vmpuri@psu.edu

Engineering Properties; Agricultural and Food Granular
Materials; Computational and Predictive Modeling.

Tom Richard
(Associate Professor)
(814) 865-3722
trichard@psu.edu

Microbial Systems Engineering; Sustainable Manure
Management; Bioconversion of Lignocellulosic Biomass.

C. Alan Rotz
(Professor, Adjunct)
(814)865-2049
alrotz@psu.edu
<http://pswmru.arsup.psu.edu>

Integrated Farming Systems; Farm Nutrient Management;
Forage Harvest and Storage.

Robert D. Shannon
(Associate Professor)
(814)865-7153
rds13@psu.edu

Biogeochemistry of Wetland Ecosystems; Aquatic
Chemistry; Pollutant Impacts on Aquatic Systems.

Tami Veith
(Assistant Professor, Adjunct)
(814) 863-0888
tveith@psu.edu

Cost-effective BMP Selection and Placement, Farm
-and Watershed-scale Modeling of Water Quality, Multi-
objective Optimization.

Paul N. Walker
(Professor)
(814) 865-4582
pnw@psu.edu

Systems Engineering; Biological Materials Production and Processing.

Roy E. Young
(Professor & Head)
(814) 865-7792
reyoung@psu.edu

Plant Tissue Culture Mechanization; Horticultural Engineering; Photosensitive Filters for Plant Growth; Machine Systems and Automation.

Multi-County Agricultural Engineering Extension Educators

Thomas R. McCarty
(717) 249-7220
trm3@psu.edu

Water Quality Emphasis
(Adams, Cumberland, Dauphin, Franklin, Fulton, Lancaster, Lebanon, Perry and York Counties—office in Cumberland County.)

Dan F. McFarland
(717) 840-7408
dfm6@psu.edu

Animal Housing Emphasis
(Adams, Cumberland, Franklin, Lancaster and York Counties—office in York County.)

John T. Tyson
(717) 248-9618
jtyson@psu.edu

Animal Housing Emphasis
Central and Southwest Region—office in Mifflin County.)

Other Resource People

Glen R. Cauffman
Manager Farm Operations
814 865 4433
grc1@psu.edu

Biobased fuels and lubricants, grain storage and handling systems, machinery selection and management

Nadine Davitt
Manager OMPEC
814-865-6606
njh103@psu.edu
www.age.psu.edu/psu-compost/

Composting, Organic Materials Processing and Education Center

Brian R. Macafee
Asst. Manager Farm Operations
814 865 4433
brm112@psu.edu

Precision Agriculture, machinery selection and management

Agricultural and Biological Engineering Extension Programming

The primary mission of Agricultural and Biological Engineering Extension is to provide high-quality educational programs and materials on agricultural and biological engineering topics important to Pennsylvania. Increased demands and a limited number of faculty positions require us to prioritize our Extension programming efforts. Program technical areas are a blend of some traditional engineering topics along with content aimed at emerging issues. Programming priorities are: a) development and delivery of relevant educational materials and programs; b) networking among constituent groups; and c) applied research activities in support of extension programs. Subject matter areas covered in Agricultural and Biological Engineering Extension are listed on page 9 with more detail on the faculty program responsibility sheets on pages 10 to 16. If you have concerns about other engineering extension areas that we do not cover, please contact us and we will try our best to direct you to expertise elsewhere. Requests for individual engineering design or troubleshooting will be responded to if they can be: a) handled by providing educational materials; b) abstracted quickly from existing reference materials; or c) referred to another public or private source.

Presentations, inservice training, in-depth schools, seminars or other sessions can be organized and conducted in specialized technical areas to address specific topics. Suggestions of topics are welcomed. Multi-county or regional meetings are encouraged.

Requests for presentations from other agencies or organizations should be channeled through the county extension office and be open to the public. Examples of other groups are vo-ag teachers, Pennsylvania Young Farmers Association, and commercial companies.

Most Agricultural and Biological Engineering educational materials are available in both electronic (www.abe.psu.edu/extension) and hard copy formats. Extension materials include:

- Extension Directory
- Fact Sheet Indexes
- Solid Waste Management fact sheets
- Agricultural Safety and Health fact sheets
- Animal Housing Systems fact sheets
- Building and Farmstead Planning fact sheets
- Crops and Greenhouses fact sheets
- Idea Plans; the department no longer provides copies of larger plans

Selected Natural Resource, Agricultural and Engineering Service (NRAES) publications. The College of Agricultural Sciences' Publications Distribution Center no longer distributes NRAES publications. Counties may order NRAES publications directly from NRAES by phone (607) 255-7654 or online at www.nraes.org.

Dairy Practices Council (DPC) Guidelines (three green 3-ring notebooks). This information is updated through Mike O'Connor's office, 324 Henning Building, University Park, PA 16802; (814) 863-3913. Dairy Practices website (<http://www.dairypc.org>) or by phone (732) 203-1947.

Subject Matter Index

Page

Agricultural Plastics.....	12
Air Pollution.....	12
Air Pollution from Open Burning of Wastes	12
Air Quality	18
Animal Quality In and Around Animal Production Facilities	18
Biofuels	11
Biogas Production.....	13
Biomass Energy	11
Burning of Wastes	12
Composting	13
Dairy Housing and Environmental Control	13
Dumps/Farm Dumps	12
Emergency First Aid Care for Farmers	14
Energy Strategies	10
Farm Dump Liability and Environmental Restoration	12
Farm Family Emergency Response Program.....	14
Field Training Programs	13
Horse Stable and Riding Arena Engineering	18
Horticulture and Landscape Safety	17
Irrigation	15
Keystone Farm Family Safety and Health Program	17
Manure Handling, Storage Treatment and Utilization.....	13
Miscellaneous Agricultural Safety and Health	16
Modified Environment Systems.....	10
Municipal Solid Waste (MSW).....	12
Natural Resource, Agriculture Engineering Service (NRAES)	8
On-Lot Sewage	15
Open Burning.....	12
PAgricultural Rescue Training	14
Personal Protection Educational Modules	16
Plant Production Environmental Control.....	18
Plastics/Plastic Wastes	12
Plasticulture.....	12
Renewable Energy Sources.....	10
Recycling	12
Respiratory Hazards and Protection.....	16
Safety & Health Demonstration & Simulators	16
Selection Criteria for Electricity Generators for Home and Farm	10
Solid Wastes	12
Tractor and Machinery Safety.....	16
Trash.....	12
Used Agricultural Plastics	12
Ventilation	13 & 18
Wastes/Rubbish.....	12



Dennis E. Buffington

**Energy Strategies and
Controlled Environment Systems
(814) 865-2971
dbuffington@psu.edu
<http://energy.cas.psu.edu>**



Energy Strategies for Coping with High Energy Prices

This program emphasizes the optimum utilization of energy to enhance profitability and net cash flow of agricultural production and food processing operations. This program includes the four areas of: 1) energy management systems; 2) energy conservation; 3) procurement of energy supplies; and 4) new technologies for on-site generation.

Modified Environment Systems

Effects of various environmental parameters on biological systems is part of the research program and is included in the extension program, especially as related to energy strategies.

Selection Criteria for Electricity Generators for Home and Farm

This program includes the various factors to be evaluated when considering an electricity generator for home and farm use. Methods for determining the appropriate type and size of the generator as well as for establishing operational procedures are discussed. Worksheets are provided to aid in the process.

Renewable Energy Sources

The program provides an overview of the various energy sources available today with a brief assessment of each. Primary focus is on the opportunities available for renewable energy sources including ethanol, bio-diesel, solar, wind, and direct combustion of biomass.



Daniel Ciolkosz

Biomass Energy Systems

(814) 863-3484

dec109@psu.edu

<http://www.bioenergy.psu.edu>

<http://energy.extension.psu.edu>

Biomass Energy

This program is designed to assist and enhance the growth of Pennsylvania's biomass energy industry. Fact sheets are available that describe the technical details of many aspects pertaining to biomass energy, including the proper use of biodiesel fuel, equipment for manufacturing wood pellets, and principles of thermochemical conversion of biomass. Limited assistance is also available for identifying potential biomass energy business opportunities and assessing the feasibility of utilizing biomass as an energy source.



James W. Garthe

Recycling and Solid Waste Management

(814) 865-7154

jwg10@psu.edu

Used Agricultural Plastics

Many used agricultural plastic waste products are improperly disposed of by open burning or on-farm dumping. The intent of this program is to help diverse agricultural communities find environmentally responsible solutions to recovering value from these used agricultural plastics. The program aims to find solutions by providing an economic and environmentally sound means to recycle these wastes or to recover energy using controlled combustion technologies.
<http://plasticulture.cas.psu.edu>

Air Pollution from Open Burning of Wastes

Air pollution from open burning of domestic and farm wastes is a real concern in agricultural and rural areas. This program defines emissions from different waste combustion practices, plus the health and environmental effects of burning various types of wastes. The program also helps rural communities and farmers find feasible options for managing wastes in lieu of burning.

Solid Waste and Environmental Restoration

On-farm dumping and illegal roadside dumping are issues the agricultural and community waste management segments of our society are not always ready to address. This program aims to inform citizens about the increasing liability associated with dumps, and to promote recycling and other proven waste management procedures in lieu of dumping. Legal aspects are not addressed. The program is also geared toward environmental aspects associated with existing dump remediation and natural attenuation.



Robert E. Graves

**Dairy Housing and Manure and Organic
Materials Management**
(814) 865-7155
reg2@psu.edu
www.biogas.psu.edu
www.age.psu.edu/psu-compost



Vision: Pennsylvania Farms will be Respectful, Respectable and Profitable

Dairy Housing and Environmental Control

This program area covers all building and facility components necessary to develop a high quality modern dairy production facility. This includes: site location and farmstead planning, housing for the entire herd (milking, dry, special, calves and heifers), natural and mechanical ventilation systems, cow comfort, milking center selection and layout, robotic milking, manure systems, and feed storage and handling systems. Emphasis is on providing a quality environment for the cow, worker and farmstead surroundings.

Manure Handling, Storage, Treatment and Utilization

Manure handling and storage systems; selection of solid vs, liquid, selection of storage vs. treatment (liquid solids separation, composting, anaerobic digestion...), and manure utilization are all important decisions facing all sizes and types of livestock operations. Problems from odors, migration of non-agricultural residents to farm areas, and increasing non-farm public and regulatory oversight are growing concerns. Manure handling systems and their relationship to regulation are becoming important. This program covers various topics related to manure, regulation and environmental quality.

Organic Material Processing and Treatment

Biologically active organic materials such as animal manures, food processing wastes, leaf and yard debris, source separated food wastes, and other organics can be utilized as a renewable fuel source to produce biogas by anaerobic digestion or as a desirable nutrient and carbon rich soil amendment by aerobic composting. This program covers acquisition and utilization of materials, biogas production and utilization (www.biogas.psu.edu) and composting (www.age.psu.edu/psu-compost/).

Field Training Programs

Programs are offered to small groups of county educators and other advisors to provide hands on experience in diagnosing and solving typical problems such as dairy housing systems, ventilation, farmstead planning and manure handling and treatment.



Davis E. Hill

Managing Agricultural Emergencies
(814) 865-2808
deh27@psu.edu
www.farmemergencies.psu.edu



Farm Family Emergency Response Program

Farm family members that discover an emergency situation on their farm have very difficult decisions to make. These decisions can mean the difference between life and death for not only the victim but also themselves as the “first on the scene”. This program helps farmers, their family members and employees understand how to safely approach a farm emergency scene, how to identify potential hazards that would need to be managed before a successful rescue takes place and discusses what things should and should not be done during the initial stages after a farm emergency is discovered.

Emergency First Aid Care For Farmers

Inherent to rural living, there can be a long delay before an injured person reaches a medical center. Couple this with the fact that farm work often exposes workers to dangerous hazards, therefore, the chances that first aid treatment is needed on the farm are great. Because of the types of injuries that are likely to occur, correct action by family members and employees may be the only chance of survival for injured victims. This program teaches farmers, their families and employees how to provide basic life support measures until more advanced level of care arrives on the scene.

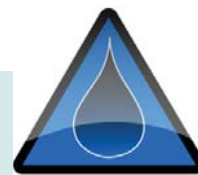
PAgricultural Rescue Training

Emergencies involving farm machinery, farm structures, and farm animals pose very unique challenges to fire, rescue and EMS personnel. Normal training for emergency response personnel does not address these unique challenges and many responders do not have sufficient farm background to manage farm emergency scenes efficiently. Farm rescue is very different from many other types of rescue situations that emergency providers manage. This program teaches fire, rescue, and EMS personnel how to work together in simulated rescue situations to safely and efficiently manage emergencies on the farm.



Albert R. Jarrett

On-Lot Sewage Systems & Irrigation
(814) 865-5661
arj@psu.edu
www.abe.psu.edu/fac/Jarrett.html



On-Lot Sewage Systems

This program is designed to assist homeowners who have on-lot sewage systems understand how their system works and how it should be maintained. Fact sheets are available that describe the proper installation and maintenance of these systems. The program includes topics such as: How can I improve the functioning of my on-lot system; My system is beginning to fail, what should I do?; and Why do I need a sand mound?. There is also focus on the role of alternate on-lot systems; when they maybe appropriate and when they may not be good ideas. Materials and information are available on alternate systems that may prove functional on difficult sites.

Irrigation

This program is designed to assist producers who wish to add irrigation to their production unit. Limitations relating to water supplies required and consumptive use regulations are also available. This program can provide some assistance on how to properly design and manage a sprinkler or drip irrigation system. There is also information available that will help the producer decide if irrigation is worth the investment in the humid Pennsylvania climate.

Stream Restoration

This program consists of two 3-day workshops: One on "Stream Morphology, Assessment, and Classification". The second on "Elements of Stream Design".

Online Power Point presentations and related materials that may be downloaded at <http://www.abe.psu.edu/fac/jarrett/>



Dennis J. Murphy

Agricultural Safety and Health
(814) 865-7157
djm13@psu.edu
www.agsafety.psu.edu



Tractor and Machinery Safety

This program area covers all aspects of the safe use of farm tractors, machinery, and powered equipment. This includes the operation of tractors and machinery by specific groups such as youth, and governmental regulations. Educational programs generally emphasize scale model and hands-on demonstrations concerning tractor overturns, and power take-off and machinery entanglement hazards.

Respiratory Hazards and Protection

This program area includes silo and manure gases, Farmer's Lung, Toxic Organic Dust Syndrome, and entry into confined spaces. Educational programs can include a demonstration of personal protective devices that protect against respiratory hazards.

Personal Protection Educational Modules

This program includes information on four topics: Farm Respiratory Protection, Personal Protection From Pesticides, Farm Sun Protection, and Head, Eye, and Foot Protection for Farm Workers. Each module contains: teaching objectives, test questions and answers, discussion guide with overhead transparency masters, suggested visuals and demonstrations, and handouts.

Miscellaneous Agricultural Safety and Health

Printed information and visuals (slide sets, videotapes, films) on several additional farm safety and health topics are available from the department, the Publications Distribution Center, or the Penn State Audio-Visual library. Examples of such topics includes animal safety, agricultural noise hazards, injury statistics, fire hazards, silo fires, farm accident rescue training, children's safety, and aged farmer safety.

Safety and Health Demonstrations and Simulators

Several demonstrations and simulators are available to help illustrate operational hazards. These include a scale model tractor, a corn picker and PTO hazard simulator, a remote control robot with 2-way voice communication and much more. These resources can be reserved by contacting the extension staff assistants.



J. Samuel Steel



**Production Agricultural Safety and Health
Horticulture and Landscape Service
Sector Safety and Health
(814) 863-3456
jss13@psu.edu**

Agricultural Safety and Health Programs

Assists with the development and delivery of agricultural safety and health training programs for the many diverse audiences involved in Pennsylvania's production agriculture industry. These programs include the Keystone Farm Family Safety and Health Program in collaboration with the PSU School of Nursing; classic and steam tractor safety training programs for event participants and members; and the promotion and adoption of FarmHAT resource materials developed through the Pennsylvania Agromedicine Initiative.

Horticulture and Landscape Services Sector Safety and Health Program

Develops and disseminates safety and health training resources for landscape, lawn service, and tree care industry management and personnel. Emphasis areas include safe machinery operations utilizing tailgate training resources; and training resources and materials for crew managers and workers on the use and proper maintenance of personal protective gear.



Eileen Fabian Wheeler



**Environmental Biophysics for Animal
and Plant Production**
(814) 865-3552
efw2@psu.edu
www.age.psu.edu/dept/fac/wheeler.html

Air Quality In and Around Animal Production Facilities

Educational efforts focus on practical application of principles of environmental biophysics for improved air quality in livestock housing and methods for reducing ammonia and odor emissions from these facilities. Effect of environment management on animal welfare and subsequent performance is primary research area. Educational programs and materials address livestock including laying hen, broiler chicken, turkey, veal calf, swine and dairy environmental control systems. (see barnventilation.psu.edu)

Horse Stable and Riding Arena Engineering

Purpose of this programming effort is to provide engineering-based information to professionals working in the horse industry. Emphasis is on oft-forgotten features of horse facilities such as proper ventilation system designed to maintain fresh air conditions and efficient stall waste (manure) handling that is environmentally-compatible. (see horsestable.psu.edu)

Ventilation

More expansively defined as “environment control systems,” the principles of ventilation and practical application to many types of agricultural buildings is incorporated into educational programs and materials. Troubleshooting instrumentation is one area of emphasis. Ventilation system applications include greenhouses, livestock, poultry, dairy and horse facilities. (see barnventilation.psu.edu)

This publication is available in alternative media on request.

The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, or veteran status. Discrimination or harassment against faculty, staff, or students will not be tolerated at The Pennsylvania State University. Direct all inquiries regarding the nondiscrimination policy to the:

Affirmative Action Director,
The Pennsylvania State University
328 Boucke Building
University Park, PA 16802-2801
Tel 814-865-4700/V,
814-863-1150/TTY.