

# AGRICULTURAL SCIENCES

## About the College

Richard Roush, Dean, College of Agricultural Sciences

The College of Agricultural Sciences (CAS) was the first college established at Penn State and awarded the nation's first baccalaureate degrees in agriculture in 1861. Students can earn degrees related to animal and plant sciences; ecosystems and the environment; food and fuel; human and veterinary health and medicine; business, government, and nonprofits; teaching and extension; engineering; and more. The CAS is home to nine academic units with eighteen graduate programs and participates in eleven Intercollege Graduate Degree Programs (IGDP) and ten Dual-Title degree programs. The CAS had research expenditures in excess of \$112.8 million and faculty received over \$103.7 million in grants and contracts awarded in fiscal year 2017. Graduate students have received numerous fellowships and awards from both federal and state agencies and other private foundations. More than one-third of masters' degree recipients go into government or public-sector jobs, another third work in industry or private sector positions, and the remainder continue their graduate education. More than half of doctoral degree recipients go into academia, one-third enter industry or the private sector, and the remainder work in government or public-sector positions.

## Mission and Goals

The mission of Penn State's College of Agricultural Sciences is to discover, integrate, translate, and disseminate knowledge to enhance the food and agricultural system, natural resources and environmental stewardship, and economic and social well-being, thereby improving the lives of people in Pennsylvania, the nation, and the world. Our goal is to assert leadership and foster innovation through organizational improvement and change. By strategic investment of resources, we aim to address the changing needs of the Commonwealth.

## Departments and Schools

### Department of Agricultural and Biological Engineering

Founded in 1930, the Department of Agricultural and Biological Engineering in Penn State's Colleges of Agricultural Sciences and Engineering, provides high quality engineering education, research, and outreach. Our mission is to advance the engineering sciences, business, and technical management of biological and agricultural systems by promoting scholarship and engaging our students and stakeholders.

The Department of Agricultural and Biological Engineering offers two graduate programs: Agricultural and Biological Engineering and Bio Renewable Systems.

The Agricultural and Biological Engineering graduate program helps prepare students for careers involving the application of engineering principles to agricultural and biological production systems, processing systems, and conservation of land and water resources. The curriculum covers all areas of biological engineering, including development of machines for biological processing and agriculture, postharvest handling and processing of natural resource management and utilization, biological processes, food engineering, and structures and their environmental modifications.

The Bio Renewable Systems graduate program integrates science and technology with business (marketing, management, entrepreneurship, and leadership) for bio-based products/materials and their supply chains;

provides an alternative high-quality graduate degree program for students without an engineering undergraduate degree; and prepares graduates to lead the development and advancement of the growing bio-based economy in key industry sectors: bio-based fuels, energy, chemicals, plastics, and packaging; pharmaceuticals; and cosmetics.

### Department of Agricultural Economics, Sociology, and Education

The scholarship in AESE is related to people, society, and economic systems grounded in theory and methods from the social, behavioral and economic sciences. We develop and employ approaches to discover fundamental and applied principles that advance science and improve the health, prosperity and welfare of people in Pennsylvania and beyond.

The Department of Agricultural Economics, Sociology, and Education has five graduate programs: Energy, Environmental, and Food Economics, Rural Sociology, Agricultural and Extension Education, Applied Youth, Family, and Community Education, and Community and Economic Development

The Energy, Environmental, and Food Economics (EEFE) is a unique intercollege graduate degree program providing state-of-the-art training in economics and quantitative methods as applied to the energy economics, policy and systems, natural resources and the environment, and food industrial organization.

The Rural Sociology program provides students with the highest quality educational and research experiences in rural sociology. Graduates of the program have gone on to launch highly successful careers in academe, in government, and in non-governmental research organizations.

The Agricultural and Extension Education program offers the following core areas of study: Educational Processes, Leadership Development and Communications, Program Development, and Research.

The Applied Youth, Family, and Community Education focuses on educational programming for youth and families within communities. The curriculum prepares students to assume leadership roles in educational and human services organizations.

The Community and Economic Development program provides individuals with the knowledge and skills to work with citizens and leaders to establish and maintain viable communities and community organizations.

### Department of Animal Science

The Department of Dairy and Animal Science originated in 1887, when Henry Armsby became director of the Agricultural Experiment Station. Today the department encompasses all food production animals and companion animals. We offer world-class teaching, research, and extension programs in a variety of key areas in animal agriculture and the food system.

The Department of Animal Science has one graduate program which specializes in animal management, breeding and genomics, growth and development biology, meat science, nutrition, and nutritional, lactational and reproductive physiology.

### Department of Ecosystem Science and Management

The Department of Ecosystem Science and Management is Pennsylvania's leader in preparing students for careers in sustainable management of natural resources. We conduct research to create new knowledge about forests, wildlife and fisheries, soils, and watersheds,

and disseminate that knowledge through the classroom and extension education programs serving various stakeholders. The Department of Ecosystem Science and Management offers three graduate programs: Forest Resources, Soil Science, and Wildlife and Fisheries Science.

The Forest Resources program addresses one or more of the following areas in forestry: forest resource management, forest biology, environmental concerns, and wood products.

The Soil Science program provides opportunities for candidates interested in soil and related water resources to become a professional leader and an independent scholar.

The Wildlife and Fisheries program focuses on habitat evaluation, ecology and management of game and nongame wildlife, animal damage control, urban wildlife, wildlife responses to altered ecosystems, conservation biology, fish systematics, fisheries management, ichthyology, fish behavior and ecology, freshwater ecology, aquaculture, landscape ecology, terrestrial and wetland ecosystems.

## Department of Entomology

The diverse members of the Department of Entomology investigate fundamental and applied biological questions from the level of the molecule to population and community. The Department of Entomology offers one graduate program that is committed to conduct outstanding research on insect science that will improve human health, quality of life, and the sustainability of our food and ecosystems.

## Department of Food Science

The Department of Food Science at Penn State is one of the premier food science departments in the country. Our undergraduate food science major offers students hands-on science dealing with real-world applications; small, friendly atmosphere; world-class internship experiences; excellent scholarship opportunities, and near-100% job placement. The graduate program in the Department of Food Science delivers in-depth training in the core disciplines of food chemistry, food microbiology, food engineering and processing. There are also opportunities for students interested in nutrition education studies.

## Department of Plant Pathology and Environmental Microbiology

The Department of Plant Pathology provides students with top-ranked educational and research opportunities in a collegial and friendly atmosphere. A major goal of our department is to support growth of healthy plants to beautify our living spaces, sustain our food supply, and maintain an inhabitable ecosystem. The graduate program in the Department of Plant Pathology encompasses many diverse and related sciences including microbiology, microbial ecology, plant disease epidemiology, molecular biology, genetics, and associated plant sciences.

## Department of Plant Science

The Department of Plant Sciences encompasses horticulture, agronomy and crops and soils sciences. Our mission is to enhance our understanding and management of agronomic and horticultural crops and managed landscapes that are the foundation for managed ecosystems, food and fiber production, landscapes and environmental quality to enhance human environments. The Department of Plant Sciences offers two residential graduate programs, Agronomy and Horticulture and one online program, Turfgrass Management.

The Agronomy graduate program emphasizes research that increases the efficiency of production of agronomic crops; improves the quality of food,

feed, and fiber; assists in the use and development of land resources; develops an understanding of the basic plant-animal climate complex; and improves the overall quality of the human environment.

The Horticulture graduate program allows students to perform their research in the department's state-of-the-art research locations on- and off-campus, including cutting-edge laboratories, greenhouses, research farms, and our own functional campus green roofs with an emphasis on ecology of agricultural ecosystems, landscape horticulture, marketing and production of horticultural crops, molecular biology, plant genetics and breeding, plant nutrition, and plant physiology.

In the Turfgrass online graduate program students learn business concepts, personnel management theories, and how to manage the day-to-day challenges of running a turfgrass facility through the Master of Professional Studies (MPS) in Turfgrass Management.

## Department of Veterinary and Biomedical Sciences

The Department of Veterinary and Biomedical Sciences at Penn State achieves excellence in research, teaching, and outreach in biomedical sciences and veterinary medicine. Our Department offers three undergraduate degrees at Penn State: Immunology and Infectious Disease, Toxicology, and Veterinary and Biomedical Sciences. The Department of Veterinary and Biomedical Sciences offers one graduate program in Pathobiology which seeks to understand the molecular basis of human and animal disease with a focus on immunology, toxicology, and infectious disease.

## Resources

### Career Services and Experiential Learning

Students in the College of Agricultural Sciences are encouraged to seek out opportunities that will enrich their academic experience, outside of the classroom. The College of Agricultural Sciences offers programs and support for career readiness, including internship and job placement, undergraduate research opportunities, and professional growth and development.

### Study Abroad

Where will your education take you? The college offers an array of international experiences aligned with your interests. Global experience broadens your horizons, giving you a deeper understanding of what you learn, prepares you professionally, and changes how you see the world. Visit our website for courses, programs, funding, and more!

The Office of International Programs offers many resources for graduate students interested in international research or study. Programs such as the Tag Along Fund provide opportunities for students to join their advisors on international trips. Students are also encouraged to submit proposals for travel related to individual research projects, which are considered on a case-by-case basis. Finally, the department houses the INTAD Dual Title Degree program, which enables students to earn a degree in International Agriculture and Development (INTAD) concurrently with many majors offered by the College.

## Contact

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