

**Department of Agricultural Biology
Strategic Plan (2018-2025)**

Mission: We enhance human well-being by improving ecosystem sustainability.

Vision: We will be recognized globally as a primary source for information and education in entomology, plant pathology, and weed science.

Values: We hold ourselves to a standard of excellence in teaching, research, extension, and service and act according to the Principles of Community.

Objectives: All department members will contribute to the Land Grant Mission of teaching, research, extension, and/or service, with a focus on improving ecosystem protection through increased knowledge of entomology, plant pathology, and weed science.

Scientific Priorities for the Department of Agricultural Biology

The Colorado State University College of Agriculture seeks *global preeminence in Agri-tech and the Agribiome focusing on the safety, security and sustainability of food and resource systems contributing to our ongoing efforts to enhance the well-being of humans, plants and animals*. The Agricultural Biology Department will enhance its Agribiome expertise and invest in expertise in agri-tech. We will increase our impact by strategically aligning ourselves with other departments at CSU that have bioinformatics, ecological, engineering and data science expertise.

The Agricultural Biology Department integrates expertise on insects, weeds, plant disease, and abiotic plant stresses to help global food, fiber and bio-fuel production systems become more productive and more sustainable. Food production must increase by 50-70% by 2050 to feed a growing human population and this needs to happen during a time of resource limitation and climate changes. With our current food production systems, we lose over 40% of pre-harvest yields to insect pests, plant diseases, and weeds and are facing another 20% loss due to drought. A further 10% of production is lost post-harvest due to insects and plant pathogens. Therefore, much of the agricultural production needs for our growing population could be met by reducing these losses.

The Agricultural Biology Department also integrates expertise on natural systems. The global ecosystem services value is estimated at \$125 trillion annually. However, since human survival, well-being, and agriculture relies entirely on ecosystem services, its true value is inestimable. The ecosystems that provide agricultural services such as reservoirs for insect pollinators and predators, wild crop relatives for plant breeding, and water for agriculture are all under stress from human activities that increase pressure from invasive pests, pathogens, and weeds and that intensify demands on natural resources. To support our own health and that of natural ecosystems, we must understand how species within ecosystems interact and evolve and which biological traits lead to ecosystem resilience or species invasiveness.

We are one of the few departments worldwide with cross-disciplinary expertise in biotic and abiotic stresses in agricultural and natural environments and are therefore uniquely positioned to meet critical global challenges. We contribute to providing society with a safe, nutritious, and sustainable food supply by increasing our fundamental understanding of biology and ecology, by working in close partnership with stakeholders to translate these findings to production systems, and by training the next generation of agricultural scientists. We will also contribute to this global challenge by broadly training a new generation of students and scientists to better understand the partnership and balance that agriculture and natural systems must have in order to sustain human well-being.

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Educational Programs

- Largest, most comprehensive, and highest rated undergraduate major in Agricultural Biology (200 students) and M.S. in Pest Management in North America (25 students)
- Internationally-known M.S. and Ph.D. Agricultural Biology programs (60 students)
- Essential courses taught for other majors or programs in CAS, CNS, Warner College, the Veterinary School, and inter-college majors, such as the Data Science major (20% SCH increase)
- Online courses in entomology, plant pathology, and weed science accessed by students globally (200% SCH increase)
- Modern teaching facilities for high quality laboratory and experiential learning courses
- Scholarships and research fellowships for undergraduate and graduate students (50% increase)
- Travel scholarships for students to attend scientific and professional development meetings, including SACNAS and MANNRS
- Diversity, retention, and job placement rates meeting or exceeding college goals
- Position priority: academic success coordinator, museum curator

Research

- Globally-preeminent in agricultural ecosystems biology research that leads to fundamental discoveries and immediate improvements in ecosystem management (25% increase in publications and patents)
- Productive international and industry research collaborations and routine scientific exchange visits with these research partners
- Among the top 5 departments at CSU for grants, contracts, and gifts (25% increase)
- At median among peers for number of faculty positions in entomology, plant pathology, and weed science so that we can serve Colorado citizens and conduct research, teaching, and engagement relevant to Colorado.
- At least 1 endowed research chair and an increase in the number of research-related awards or fellowships
- Entomology position priorities: urban/horticultural entomology^{AT, AB}, insect physiology^{AT}, insect systematics^{AT}, museum curator^{AB}
- Plant Pathology position priorities: mycotoxins^{AT, AB}, oomycete biology^{AT, AB}, nematology^{AT, AB}
- Weed Science position priorities: rangeland and aquatic weed science^{AT, AB}

^{AT} possible agri-tech position

^{AB} possible agribiome position

Extension and Engagement

- Premiere agricultural biology extension programs in that improve well-being through increased food security, safety, and ecosystem sustainability by applying knowledge gained through agribiome and agri-tech research.
- K-12 and adult education programs that increase agricultural biology literacy and aid in recruiting students to CAS. (100% participant increase)
- A named and endowed Bug Zoo that becomes nationally known and that serves students in a greater geographical range
- National leader among public plant diagnostics service laboratories (200% sample number increase)
- Quality programs on worker protection standard training for the Intermountain West
- Participation in the Global Food Innovation Center through online courses in food safety (≥ 4 courses)
- Position priority: outreach coordinator

Community

- All departmental members adhere to the Principles of Community and participate in professional development to improve expertise in inclusion and diversity, leadership, supervision, and/or student mentoring
- Departmental faculty located in no more than two buildings, each of which have high quality teaching, research, office, and meeting room facilities.
- All faculty participate in professional development in teaching, writing, research, and extension
- Salaries, stipends, and review processes for students, faculty, and staff are competitive and the promotion path for faculty and staff is transparent
- Budget and hiring decisions are transparent and support the departmental strategic plan
- Improvements in departmental climate, particularly in transparency, conflict resolution, and fairness.