

Department of Horticulture

Strategic Plan

2013-2019



College of Agriculture and Life Sciences



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Letter from the Department Head



To CALS Leadership, Colleagues, and Stakeholders,

I am pleased to share the Department of Horticulture’s strategic plan for 2013-2019. This plan was formed following a departmental review by the National Institute of Food and Agriculture in January 2012 and a faculty retreat the following November. Working groups formed at the retreat developed “white papers” on targeted areas. A strategic plan development committee headed by Dr. Holly Scoggins and including Drs. Joyce Latimer and Eric Beers synthesized the information and produced a working document of our strategic plan that was then reviewed by our faculty. In this plan we seek to serve the priorities set forth by our university in *A Plan for a New Horizon* (<http://www.president.vt.edu/strategic-plan/strategic-plan.html>) and the College of Agriculture and Life Sciences in their *Strategic Plan 2012-2018* (<https://www.cals.vt.edu/about/strategic-plan/index.html>).

In the strategic plan presented here we present our mission and vision statements as well as goals and strategies to achieve priority and emphasis areas. We also take a candid look at our current strengths and limitations. With the blueprint provide by this strategic plan, I am very confident that our department will continue to play a critical role in Virginia Tech’s Land Grant missions of Research, Teaching and Extension.

Sincerely,

A handwritten signature in blue ink that reads "J. Roger Harris". The signature is fluid and cursive.

J. Roger Harris
Head, Department of Horticulture

Introduction and Overview

Horticulture is the science and art of cultivating and using high-value plants to improve human life; we create global solutions for sustainable, nutritious food sources and healthy, beautiful environments.

The meaning of “Horticulture” may be unfamiliar to some, but under the umbrella of that term, our programs are very recognizable. Horticulture is plant science that includes the study of plant growth and plant interactions with the environment (soil, air, water) to improve human life through the cultivation of food and ornamental plants and the maintenance of a sustainable environment. Horticulture is unique as a scientific field of study in that it often utilizes artistic expression to aid the design of human landscapes and to restore natural environments. At its core it is an environmental science that recognizes that humans are dependent on their environment for sustenance and well-being. Horticulture has developed as a field of study that recognizes humans are physiologically and artistically linked to nature through millions of years of human evolution.

Virginia Tech’s Department of Horticulture offers graduate and undergraduate degrees in a range of applied and basic environmental plant science topics, from plant-soil interactions, biotechnology, landscape design, sustainable urban landscaping, urban forestry, crop production, and plant breeding. Our department is committed to engaging students in service and learning projects in the local community. We are designated as an Engaged Department by Virginia Tech’s Center for Student Engagement & Community Partnerships – a reflection of our dedication to lifelong service and learning within our curriculum.

We fully embrace the land-grant mission of outstanding undergraduate and graduate education, relevant, problem-solving research, and comprehensive, dynamic outreach and extension. With this strategic plan as a guide, we in Horticulture will address current and emerging issues, all while bettering the quality of life for those in the Commonwealth and beyond.

Mission

The Department of **Horticulture** is committed to discovery, education, and delivery to improve quality of life at the local, national, and international level. We enhance health, the environment, and the economy by advancing and sharing the science of production and use of food and ornamental plants.

Vision

Horticulture is a dynamic department, recognized internally and externally as a valuable and relevant resource in the plant sciences for students, producers, and the general public. We aim to advance and share the science of production and management of fruit, vegetable, and ornamental plants and their use in communities to improve social, environmental, and economic sustainability. Innovative basic, applied and cross-disciplinary research will help solve environmental and economic problems.

Initiatives and Priority Areas

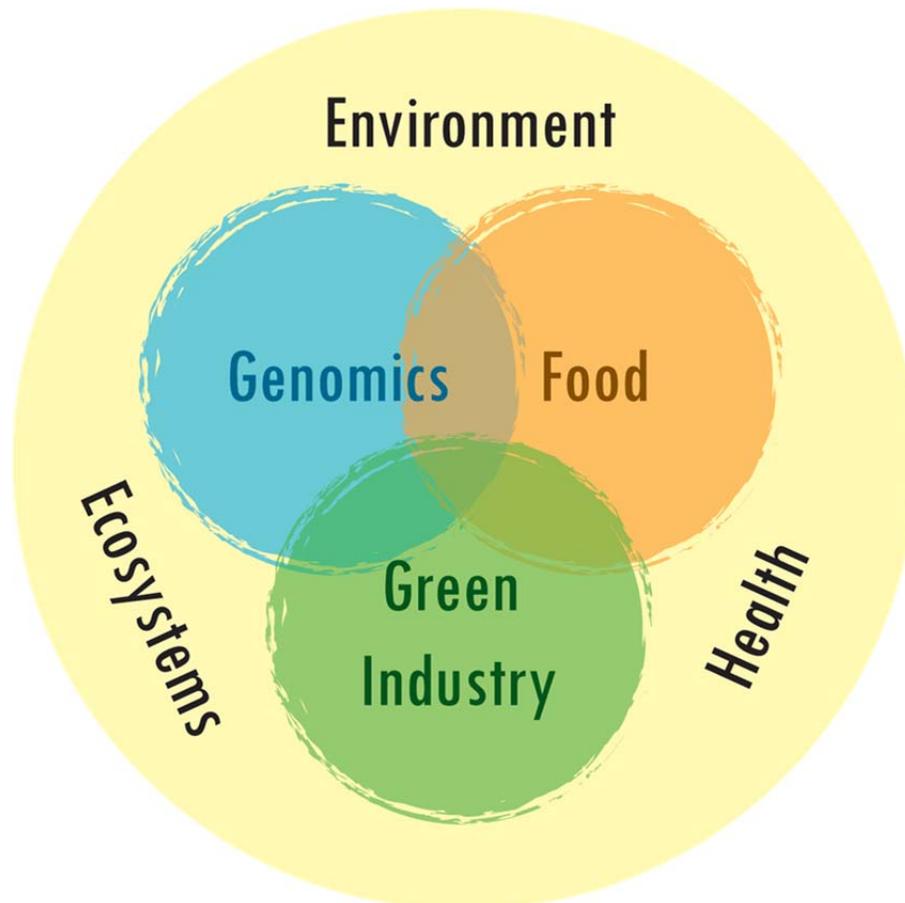
Our efforts focus on *food, genomics, and the green industry*.

All three of these initiatives share the common ground of *environment, ecosystems, and health*.

Horticultural research, products, and services enhance quality of life through:

- **Environmental improvement and amenities** including adaptation to climate change and livable cities.
- **Ecosystem services benefits** including water quality, supply, and management including contributions to initiatives to protect the Chesapeake Bay.
- **Health/well-being enhancements** through safe, nutritious food products and local food networks.

Horticulture



The College of Agriculture and Life Sciences strategic plan (2012-2018) has committed to six priority areas. Our faculty’s innovative and cross-disciplinary work will integrate with these priority areas as follows:

Horticulture Initiative	Focus Areas and Description	CAL S Priority Areas Addressed
Food (Vegetables and Fruits)	<ul style="list-style-type: none"> - Production and food safety - Sustainable production practices - Profitability of local food businesses and producers - Production systems ecology - Enhanced pest resistance <p><i>We will strive to meet the needs of both large and small producers with an ever-diversified product base. Our economic and environmental focus includes more efficient use of resources and adaptation to climate change.</i></p>	<ul style="list-style-type: none"> - Agricultural Profitability and Environmental Sustainability - Food, Nutrition and Health - Community Viability
Genomics	<ul style="list-style-type: none"> - Nutritional genomics to enhance human health - Plant stress response to climate change including disease resistance - Bio-based products - Ornamental plant breeding <p><i>Horticultural crop research will benefit from rapidly expanding genomic resources that will allow us to more easily identify and breed traits for enhanced health benefits, flavor, sustainable production and adaptation to climate change.</i></p>	<ul style="list-style-type: none"> - Agricultural Profitability and Environmental Sustainability - Food, Nutrition and Health - Infectious Diseases - Biodesign and Bioprocessing - The Green Industry
Green Industry	<ul style="list-style-type: none"> - Profitability of nursery, greenhouse, and landscape businesses - Urban Horticulture and sustainable landscapes - Enhance rural ecosystems and economies - Nutrient management <p><i>Horticulture is the major player in the state and region’s green industry. Our focus is to enhance economic viability and sustainable practices to improve plant production and landscape management as we develop high-value horticultural products, businesses, and systems. We will provide programs to assist the Commonwealth in adjusting to the economic and environmental impacts of urban sprawl.</i></p>	<ul style="list-style-type: none"> - Agricultural Profitability and Environmental Sustainability - The Green Industry - Community Viability

Emphasis Areas

Our priority areas complement the following three CALS Emphasis Areas noted in the 2012-2018 Strategic Plan:

1. Safe and sustainable food systems

- *The College's Civic Agriculture and Food Systems Minor provides students with the tools to create sustainable yet socially and economically viable organizations.*
- *We cultivate community partnerships related to sustainable food systems, which will provide students with authentic experiential learning.*
- *Our viticulture and orchard fruit programs are innovators in environmentally sustainable and economically vigorous production systems that prepare us to meet current needs and future challenges.*
- *Horticulture genomics researchers have led research in specialty crops such as strawberries and potatoes to position us to meet global food challenges.*

2. Climate-related changes

- *Our plant production research has an emphasis on runoff reduction from producers, particularly nitrogen and phosphorous.*
- *We are building capacity to increase research and information delivery on urban and suburban greenspace issues and solutions.*
- *Horticulture research in sustainable urban landscapes is quantifying the effect of management decisions on greenhouse gas emissions, carbon sequestration, and urban stormwater runoff.*
- *Our work in the evaluation and development of climate-resilient crops will be critical to the success of producers of food and ornamental crops.*

3. Bioprocessing/bioenergy and bioproducts

- *We have active research programs for two biomass feedstock crops: switchgrass and poplar. Research is aimed at identifying novel genes that can be used to enhance biomass production by both crops and to increase stress and disease resistance of switchgrass.*

Position Assessment of Horticulture

Acknowledging our strengths and taking responsibility for our future

Advantages

Collegial and enthusiastic faculty and staff

Good balance of basic and applied research

Improved interaction among Campus and AREC faculty and staff

Faculty in Latham Hall, state-of-the-art life sciences research facility

Teaching excellence and an engaged department

Growing research programs, personnel, and capacity

Excellent support facilities: the Hahn Horticulture Garden and Urban Horticulture Center

Remodeled and functional teaching greenhouse space

Growing graduate programs (up 15% since 2006)

Strong stakeholder support including alumni and commodity groups/industry

Supportive CALS administration

Limitations

External perception or understanding of Horticulture as a discipline

Decline in tenure-track faculty (decrease of 33% since 2006)

Decline in undergraduate enrollment (decrease of 30% since 2006)

Insufficient faculty to meet demand for Environmental Horticulture major and our local foods initiative

Saunders Hall is inadequate in most aspects, with no renovation plans on the horizon

Inadequate and dated research greenhouse space

Classroom space dated, poor quality, and/or limited access

Goals, Strategies, and Priority Actions

Goal 1 Increase and diversify undergraduate enrollment and improve quality of learning environments

Strategy 1.1. Raise visibility on campus

Priority actions:

- a. Create a marketing plan
- b. Enhance recruiting efforts to University Studies majors
- c. Offer additional “general interest” courses to attract non-majors
- d. Communicate all the ways in which the department engages in volunteerism both internal and external to the department

Strategy 1.2 Increase teaching FTEs in desirable areas such as vegetable and fruit production, urban horticulture, etc.

Priority actions:

- a. Convey necessity of attracting capable faculty in the above areas if enrollment is to increase

Strategy 1.3 Increase alumni involvement in recruiting efforts

Priority actions:

- a. Conduct formal survey of graduating students
- b. Improve tracking of graduates by creating a database, including employment
- c. Diversify Advisory Board to include recent graduates and those in new priority areas of emphasis

Strategy 1.4 Develop plan and identify support for upgrades of facilities and resources

Priority actions:

- a. Create list of renovations and improvements; rank in order of priority
- b. Work with CALS and VT administration to assess potential improvements
- c. Work with CALS development staff to create capital campaign for improvements

Strategy 1.5 Develop a strategy and plan to incorporate horticulture in youth activities statewide

Priority actions:

- a. Create a formal connection with the Extension 4-H Youth Development program statewide
- b. Facilitate training and provide resources to High School Ag and Science teachers statewide
- c. Find innovative ways to continue working with Virginia FFA

Goal 2 Focus on Priority Areas to increase impacts and enhance fundability of research initiatives

Strategy 2.1 Develop logic models for program goals under each initiative: Green Industry, Food Crops, Genomics

Priority actions:

- a. Integrate research, teaching and Extension objectives in each initiative
- b. Encompass the common ground areas of environment, ecosystems and health

Strategy 2.2 Through these logic models identify potential collaborators in the following areas:

- Diversified urban agriculture
- Nutritional genomics/functional foods/phytonutrients
- Ornamental plant breeding/climate change resistant plants
- Landscape management and ecosystems
- Resource management and human-horticulture interface

Priority actions:

- a. Identify needs for new faculty and staff to address these areas

Goal 3 Document and promote the public value of Horticulture Extension programs

Strategy 3.1 Develop and implement documentation plans for program outcomes

Priority actions:

- a. Include Extension programs in logic models for each Horticulture initiative
- b. Include Public Value statements in each logic model

Strategy 3.2 Develop an Extension program to support agents in the local foods initiative

Priority actions:

- a. Identify faculty with interest and expertise in agent training and support
- b. Include this strategy in the Foods logic model

Strategy 3.3 Improve communications with and increase training opportunities for local agents

Priority actions:

- a. Promote signature and emerging programs to agents through targeted marketing materials (e.g.,

public value message briefs)

- b. Solicit more agent input on desired in-service training topics
- c. Review national and state trends to determine cutting edge topics and identify emerging issues relative to horticulture
- d. Offer more web-based and asynchronous options for agent training on specific topics

Goal 4 Strengthen graduate programs

Strategy 4.1. Increase variety of courses available for graduate credit and broaden enrollment to include students across the Plant Science disciplines

Priority actions:

- a. Offer more courses in partnership with other Plant Science departments
- b. Offer courses that coincide with department's Priority Focus Areas

Strategy 4.2 Foster community and enhance interaction among graduate students and with post-docs and faculty

Priority actions:

- a. Facilitate social functions and learning experiences for graduate student as a group
- b. Re-establish departmental Graduate Student Association with faculty advisor

Strategy 4.3. Increase number of On-line Master of Agriculture and Life Science students advised

Priority actions:

- a. Increase offering of on-line courses with graduate credit
- b. Market programs to employers and potential students

Strategy 4.4. Strengthen graduate student recruitment

Priority actions:

- a. Increase assistantship opportunities through graduate school incentive programs to increase PhD enrollment, mentoring student grant-writing, and fellowship applications
- b. Participate in the university graduate student recruitment weekend
- c. Increase participation in interdisciplinary programs

Goal 5 Define and enhance our brand/identity to administration and stakeholders

Strategy 5.1. Define brand to better define faculty expertise, research, academics, and service

Priority actions:

- a. Utilize CALS and University Relations resources/personnel
- b. Bring in an external expert to assist with brand development and marketing

Strategy 5.2. Create marketing/communications plan

Priority actions:

- a. Define target audiences/market and measurable objectives; better define public value of programs

Strategy 5.3. Improve communication of faculty expertise and accomplishments

Priority actions:

- a. Update/renovate/expand critical information on faculty pages within department's website; develop system for continuous updates; add a search function to department webpage.

Hiring Plan

Short- and long-term plans for building Horticulture at Virginia Tech

Short-term (2013-2014)

Assistant Professor - Plant Translational Genomics (Blacksburg campus)

CALS Priority Areas: Agricultural Profitability; Environmental Sustainability, Food, Nutrition, & Health; Community Viability

Rationale: The genomic resources of horticultural crops are increasing at a rapid rate. The complete genomes of papaya, grape, cucumber, apple, strawberry and potato have already been published, and tomato is nearly complete. The sequencing and annotation of the genomes of these major horticultural crops represent a huge investment on the part of federal funding agencies. These new resources are expected to revolutionize plant translational genomics research, which is defined as the application of basic biological findings and methodologies developed with model systems to studying the basic biology of plants of economic importance. The NSF Plant Genome Research Program and various funding programs at USDA-NIFA support plant translational genomics research. Additionally, Plant Translational Science is one of the Interdisciplinary Graduate Education Programs (IGEPs) funded in 2011 by the Graduate School at Virginia Tech and this discipline will integrate well with the very successful Molecular Plant Sciences (MPS) graduate program at Virginia Tech. Consequently, we have identified plant translational genomics as a key emerging opportunity for Virginia Tech Horticulture. The person hired in this position will benefit from both mentorship and collaborations involving Horticulture faculty with excellent funding and publication accomplishments in plant translational genomics. Additionally, he or she will have opportunities for program development in basic research through collaboration with our Rhizosphere Biologist and in applied research through collaborations with our Assistant Professors of Sustainable Foods, our Small Fruit Production Specialist (Hampton Roads), our Tree Fruit Specialist (Winchester), our Wine Grape Specialist (Winchester), and our Vegetable Crops Specialist (Painter). The enhanced research capacity in plant translational genomics and its logical integration with existing Virginia Tech graduate programs will significantly strengthen our horticulture crops team making us very competitive for research funding and graduate student recruitment and training.

Assistant Professor – Extension Sustainable Food Production and Director of Student Programs (Blacksburg campus)

CALS Priority Areas: Agricultural Profitability; Environmental Sustainability, Food, Nutrition, & Health; Community Viability

Rationale: interest in local agricultural products throughout Virginia is at an all-time high. As such, our Extension offices are flooded for requests for information from potential producers, consumers, and the general public. Critical information is scattered or non-existent. The person filling this position will serve be the “go-to” person for such information. Student interest in local foods is also very high and we have

a great opportunity for hands-on learning at various Horticulture and CALS facilities. In accordance with the university's strategic plan, we believe that there is great potential for CALS students to enhance their education through interdisciplinary and participatory learning through hands-on activities. The new Extension Specialist/Instructor will coordinate student field activities, including student programs within the CALS Civic Agriculture and Food systems minor, VT Dining Services, and other initiatives. The successful candidate will also initiate and teach classes in local food production that support the Environmental Horticulture major in Horticulture.

Long-term (2015-2019)

Assistant Professor - Ornamental Plant Breeding

CALS Priority Areas: Green Industry, Agricultural Profitability; Environmental Sustainability; Community Viability

Rationale: Ornamental plants represent a major industry in Virginia as well as a fertile research area for the injection of modern plant breeding tools, especially with the burgeoning of genomic research in many horticultural crops. New model crops have been proposed in many plant families, e.g., both potato and tomato for Solanaceae, *Fragaria vesca* for Rosaceae, and *Populus* for woody species, with the publication of draft genome sequences, gene expression libraries, and mutant collections. The occurrence of commercially important ornamentals within these families, e.g., Petunia, Rosa, and any number of woody ornamentals facilitates the application of translational genomics from these emerging models to ornamental plants. We propose a new position in the Department of Horticulture dedicated to the application of modern plant biology to ornamental breeding. The new faculty is expected to incorporate tools of genome analysis and plant biotechnology into her/his research programs. This could focus on breeding ornamental plants with improved resistance to biotic and abiotic stress, and/or new plant cultivars that can be integrated into current horticultural practice, and contribute to the sustainable agricultural production in Virginia and the nation. We expect the new faculty will conduct and support with extramural funding a research program for varietal improvement of ornamental plants with a focus on plants that have been adapted to the Mid-Atlantic region. The person in this position will be expected to collaborate with faculty in Horticulture or other departments, including adjunct faculty stationed at the Institute for Advanced Learning and Research in Danville, on research and graduate co-advising; and take an active role in undergraduate and graduate education. The new ornamental breeding position aligns well with the mission of College of Agriculture and Life Sciences in Virginia Tech in the priority area of developing high-value horticultural products, genomics, and horticultural enterprise, providing programs to assist the Commonwealth in adjusting to the economic and environmental impacts of urban sprawl, and enhancing rural ecosystems. It will also improve and diversify the portfolio of the Horticulture Department, educate horticulture students with knowledge in cutting-edge research technology for horticulture, and prepare them to be more competitive in their future careers.

Assistant Professor - Alternative Horticultural Crops / Cropping System Specialist (AHS AREC)

Rationale: This is a research/extension position to conduct applied research and extension programs to directly assist alternative horticultural crops, value-added food producers working with horticultural crops, and other niche market opportunities. Research may include any of a range of products and production systems, including, but not limited to: Specialty crop production practices to meet niche market demand (e.g., ethnic, organic); recent examples include need for hops (*Humulus lupulus*) evaluation for mid-Atlantic region and to support local micro-brewing enterprises seeking local sources of this flavorant. Other recent examples include interest in blueberry production in northern Virginia, and multiple requests for assistance with hard cider production. Other areas of focus could be culinary herbs, gourmet vegetables and edible landscape materials; conventional vegetable and small fruit production strategies for local farm markets; season extension systems with protected culture systems (e.g., high tunnels); and greenhouse crops (culinary as well as ornamental). The horticulturist would work as a team member with campus-based market specialists, pest management specialists, and allied agricultural industries to identify potentially profitable crops and researchable solutions to production limitations, especially for small farm operations seeking to diversify their agricultural product base.

Assistant Professor - Plant Pharmaceuticals (botanical therapeutics, novel functional foods, botanical food ingredients)

CALS Priority Areas: Food, Nutrition, and Health; Agricultural Profitability; Environmental Sustainability

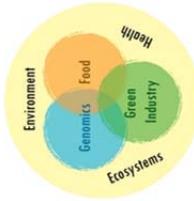
Rationale: Botanical therapeutics are defined as health and wellness products derived from plants and delivered in the form of drugs, dietary supplements (nutraceuticals), functional foods or cosmetic ingredients. The faculty member would combine ethnobotanical knowledge and modern research to identify plant compounds that improve human health and well-being. Cellular and in vivo assays, spectrometry, bioinformatics and molecular biology are all potential tools to identify pharmacologically active phytochemicals and to study their effects in animals and people.

Appendix 1

2013 Faculty, Department of Horticulture

Image by Sarah Gugercin.

Meet the... Horticulture Faculty



To learn more about us, visit:
www.hort.vt.edu/faculty



Genomics

Jim Tokuhisa
 Plant Molecular Biology
and Biochemistry
Main Campus

Eric Beers
 Genomics of Wood Formation
Main Campus

Mark Williams
 Microbial Ecology of
the Root-Zone
Main Campus

Binyu Zhao
 Plant-Microbe Interactions,
and Biotech
Main Campus

Green Industry

Barbara Leshyn
 Spanish Landscape and Culture;
and Floral Design
Main Campus

Sarah Guergin
 Visual Design and Urban Forestry
Main Campus

Holly Scroggins
 Director of the John
Horticulture Garden
Floriculture Production
Main Campus

Roger Harris
 Department Head
Landscape Plant Establishment
Main Campus

Food

Greg Wilkum
 Vegetables, Eggs, and Seed Biology
Main Campus

Richard Veilleux
 Molecular Breeding of
Horticultural Crops
Main Campus

Susan Clark
 Food and Agriculture Systems;
and Civic Agriculture
Main Campus

John Freeman
 Master Gardener Coordinator
Main Campus

Sustainable Food Systems

Greg Wilkum
 Vegetables, Eggs, and Seed Biology
Main Campus

Richard Veilleux
 Molecular Breeding of
Horticultural Crops
Main Campus

Susan Clark
 Food and Agriculture Systems;
and Civic Agriculture
Main Campus

John Freeman
 Master Gardener Coordinator
Main Campus

Urban Forestry, Sustainable Landscapes, and Stormwater

Jim Owen
 Nursery Production
Hampden Road, AREC

Alex Niamera
 Management of Container Grown Crops
Main Campus

Stephanie Hucklestein
 Horticulture and Environmental
Education
Main Campus

Susan Day
 Urban Forestry, Sustainable
Landscapes, and Stormwater
Main Campus

Sustainable Food Systems

Greg Wilkum
 Vegetables, Eggs, and Seed Biology
Main Campus

Richard Veilleux
 Molecular Breeding of
Horticultural Crops
Main Campus

Susan Clark
 Food and Agriculture Systems;
and Civic Agriculture
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John Freeman
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