

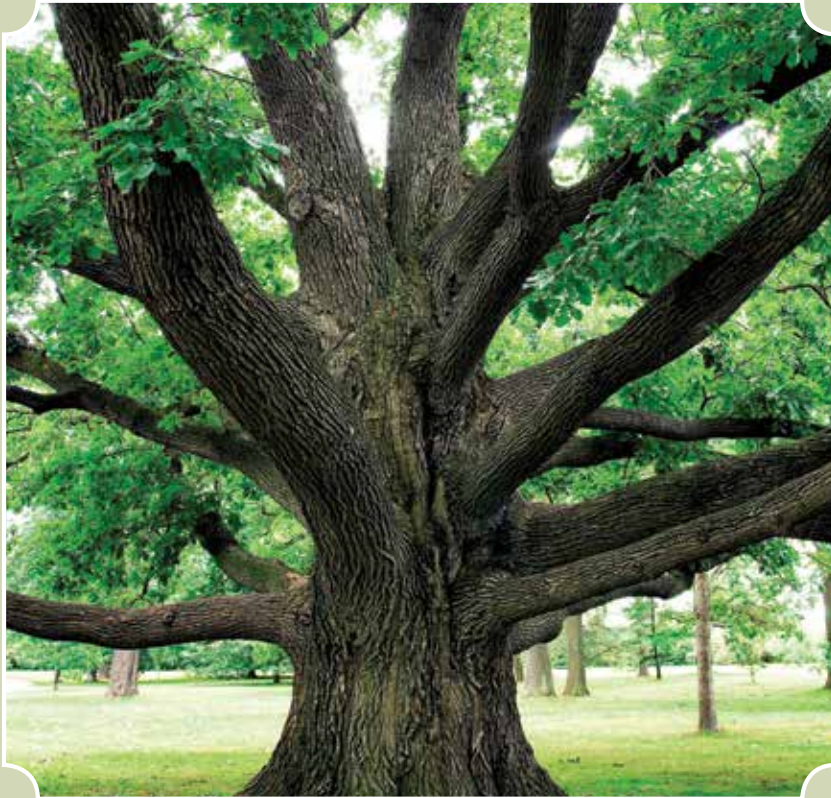


Celebrating 125 Years of Research, Teaching and Service 1889–2014



Department of Horticulture

College of Agricultural & Life Sciences • University of Wisconsin-Madison





History of the
Department of Horticulture

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Letter from the Chair

The Department of Horticulture at the University of Wisconsin-Madison was one of the four original departments of the College of Agricultural & Life Sciences and is the only one whose name has not changed since the college's inception. The college began in 1889 and has risen in prominence to be among the top colleges of agriculture in the U.S. Likewise, the Department of Horticulture has consistently ranked among the top horticulture programs in the country for its depth and strength in a variety of areas. On the occasion of the department's 125th anniversary, it is appropriate to look back and consider the set of circumstances that led to such a long tradition of success.

This departmental retrospective provides some of the facts and figures, as well as the personalities and programs, that have shaped our department's history. Throughout its history, faculty, staff, and students have made scientific discoveries that have led to new understandings of plant biology and practical technologies for plant production. No small contributor to the success of the department is the support of the people of Wisconsin for this great university, and for its unique shared-governance model. The extraordinary freedoms that faculty and staff possess to chart their own course in research, outreach, and instruction help ensure a vibrant academic climate. In addition, the department and its faculty and staff have benefited tremendously from collaborative connections with horticultural and agricultural industries throughout the state. The support of our industry partners for our programs and our service to their industries makes these collaborations a model of what a land-grant university can achieve.

Of particular note on this 125th anniversary are the students who have studied and learned in our department over its long history. One of our primary jobs is to create and share knowledge. One of the best ways to succeed at that job is to help educate generations of students, who take what they have learned and apply it in real-world situations. This anniversary celebration should give us an opportunity to reflect on, and celebrate with, the many students who have spent time in our classrooms, greenhouses, laboratories, and fields.

The motto of our university is "Forward," signifying a commitment to the future. The occasion of our anniversary pulls us to look at our past and to define what has led to our success. But it should also send us looking to the future, to what lies ahead, and trying to meet those challenges as successfully as we have in the past 125 years.

Irwin Goldman PhD'91
Chair, Department of Horticulture



June 19, 2014

Irwin L. Goldman, Chair
Department of Horticulture
1575 Linden Drive
Madison WI 53706

Dear Irwin:

I am pleased to join your faculty, staff and students in celebrating the 125th anniversary of one of the college's original academic departments, the Department of Horticulture at the University of Wisconsin-Madison!

It is inspiring to imagine how President Chamberlain and Dean Henry conspired at the time to create a college that would forward Wisconsin agriculture from their offices in South Hall. It is also humbling to think of the many generations of students who have come to this university for an education and who have gone on to make significant contributions to communities around the world.

As you know, Horticulture is the only one of the original CALS departments to still have the same name that it had in 1889. While the name may be the same, I know the department has continued to grow and change over the past century and a quarter and your scientists have continued to innovate through their scholarly activities and teaching.

The work done by those in your department is evident in both the economy and the physical landscape of Wisconsin. The department is distinguished by the many creative contributions it has made across the college, the campus and to science broadly.

As we celebrate our past, I look forward to the future contributions of the UW-Madison Department of Horticulture's students, alumni, faculty and staff. Congratulations on this milestone!

Sincerely,

Kathryn A. VandenBosch
Dean and Director

Office of the Dean and Director

140 Agricultural Hall 1450 Linden Drive Madison, WI 53706
608-262-1251 Fax: 608-262-4556 www.cals.wisc.edu



State of Wisconsin
Governor Scott Walker

Department of Agriculture, Trade and Consumer Protection

Ben Brancel, Secretary

February 21, 2014

Irwin L. Goldman
Department of Horticulture
University of Wisconsin-Madison
1575 Linden Drive
Madison, WI 53706

Professor Goldman,

Congratulations to the Department of Horticulture at the University of Wisconsin on reaching their 125th anniversary. This long-standing tradition of education in our state is an achievement we can all be proud of.

As one of the four original departments, the Department of Horticulture has served Wisconsin students, residents and businesses for more than a century. Since 1889, horticulture has been an active member of the University of Wisconsin community. Horticulture truly combines the science and art of growing.

The Department of Horticulture focuses on the fundamental studies of plant biology, crop production and utilization of horticulture crops. This work prepares students for long, successful careers in the field. Undergraduates and graduate students alike can pride themselves in knowing they are receiving quality instruction and unique learning opportunities from the Department of Horticulture.

The foundation of the state's strong horticulture industry can be attributed to the department at the University of Wisconsin. The Horticulture Department partners with the University of Wisconsin-Extension and state associations to serve the state's citizens. Faculty and staff provide great outreach efforts in crop, nutrient and pest management, ensuring sustainability and productivity.

Because of the dedication of the Horticulture Department, new plant varieties and technologies have been created. The department is recognized nationwide for its faculty and emphasis on research. Scientific discoveries made by the Department of Horticulture have been well chronicled in journals and have greatly influenced the industry.

All the best as your department celebrates this remarkable milestone. I am confident the Department of Horticulture will continue its collaborative work to educate students and build the state's horticulture industry. Congratulations again to the Department of Horticulture on this great accomplishment of 125 years of service.

Sincerely,

Ben Brancel

Agriculture generates \$59 billion for Wisconsin

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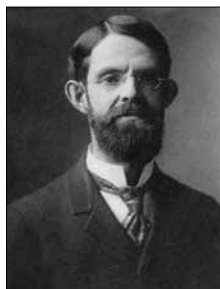




Department of Horticulture

Despite the intentions of the 1836 Wisconsin territorial legislature in authorizing a University of Wisconsin, 13 years passed before the university was actually established. Another 40 years passed before an official horticulture department was created. The Department of Horticulture, one of the original four College of Agriculture departments, was established in April 1889 with the appointment of Emmett S. Goff as a horticulture professor. The department was housed in King Hall on Observatory Drive until 1911, when Moore Hall was built on Linden Drive.

Department of Horticulture Chairs



Emmett S. Goff
1889–1902



Emil P. Sandsten
1902–1909



James G. Moore
1909–1949



O. B. Combs
1949–1965



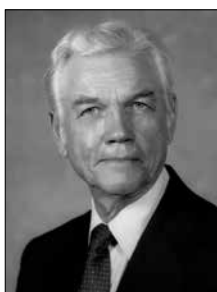
Warren H. Gabelman
1965–1973



Malcolm N. Dana
1973–1978



Richard L. Lower
1978–1984



John A. Schoenemann
1984–1985



Herbert J. Hopen
1985–1991



Larry Binning
1991–2000



Dennis Stimart
2000–2008



John Stier
2008–2011



Irwin Goldman
2011–present

1889–2014

Chronology of the Department's Research Highlights and Growth



Left: Emmett S. Goff was the first chair of the horticulture department, and his driving interests in horticultural research and teaching aided him in accomplishing an incredible amount of work.

overwork may have contributed to his early death in 1902, at the age of 49.

Goff's farm background made him aware of the need for research to solve immediate problems. His scientific curiosity, however, led him to also explore more fundamental problems, such as his classical studies of the initiation and development of flower buds of a wide range of orchard and small fruits. Similar studies included strawberry plant morphology; strawberry, raspberry, grape, and apple root growth and distribution; plum and cherry flower-bud cold resistance; and conditions affecting fruit set, including pollen germination and pollen tube growth. He also wrote monographs: *Culture of Native Plums of the Northwest* (Wisconsin Bulletin #63) and *Native Plums* (Wisconsin Bulletin #87).

Emmett S. Goff came from the New York Agricultural Experiment Station at Geneva, where he had seven years' experience doing breeding and selection work with grapes and vegetables and pioneered in the insecticide and fungicide spraying of fruit trees. At Wisconsin, he worked closely with the Wisconsin State Horticultural Society and began a program that was to encompass almost the entire range of horticultural crops.

Goff was also successful in the classroom, building a student enrollment from fewer than a dozen to more than 300. In addition, he found time to write two textbooks, *Principles of Plant Culture* and *Lessons in Pomology*. His driving interest in horticultural research and teaching aided him in accomplishing an incredible amount of work. Some colleagues surmised that

A partial list of other studies illustrates the diversity of his interests: insecticide and fungicide trials; spraying-equipment improvements; potato cultivar tests for plant vigor, productivity, culture, and starch content; tomato hybridization and propagation from immature and mature seeds; cranberry growth and selection; tobacco culture; tree and small-fruit cultivar tests; plum sterility; native plum breeding; ornamental field tests and various experiments with greenhouse culture.

For several years, Goff worked alone. Frederick Cranefield, one of his students, later assisted him and went on to become secretary of the Wisconsin State Horticultural Society.

Emil P. Sandsten, a Swedish immigrant with B.S. and M.S. degrees from Minnesota and a Ph.D. from Cornell University, succeeded Goff as department chairman. During Sandsten's five-year tenure, he continued the work begun by Goff and established the Cranberry Experiment Station in Wood County near Port Edwards. He instituted a research program on cranberry weed control, culture and management in cooperation with O. G. Malde, station superintendent. Sandsten also initiated research on tobacco production. The tobacco program has remained in the department. The close working relationship between staff and horticultural industry interests had become established.

James G. Moore, appointed to the staff in 1905, became acting chairman in 1907 and chairman in 1909, a position he held until 1949. Moore, along with other early members of the department such as Sandsten, encouraged

During James G. Moore's chairmanship, the department moved to its current home in the Horticulture Building.



public service as part of their research programs.

Under Moore's chairmanship, the department moved to its current home in the Horticulture Building. The basement was unfinished and was used for storing farm equipment and as a produce salesroom. The first floor contained offices, classrooms and a small research laboratory. The second floor, which had a large exhibit hall on the west end, was shared with the Plant Pathology Department until it moved in 1963 to Russell Labs. The third floor served as a studio for the landscape architecture program.

The tobacco research program started by Sandsten expanded during the long career of **James Johnson**, who was appointed in 1909. Johnson, a U.S. Department of Agriculture (USDA) employee from 1915 to 1946, was the leading plant virologist of his day. A plant pathologist by training, Johnson solved the problem of damping-off disease by steaming tobacco seedbeds, worked out the optimum environmental conditions for curing cigar binder tobacco and developed procedures for controlled fermentation and sweating of this tobacco.

In the early 1920s he began studying tobacco mosaic virus disease.



Tobacco harvesting



A plant pathologist by training, James Johnson solved the problem of damping-off disease by steaming tobacco seedbeds, worked out the optimum environmental conditions for curing cigar binder tobacco, and developed procedures for controlled fermentation and sweating of this tobacco.

His major contributions included determining that high-temperature environments mask virus disease symptoms, observing that tobacco plants acquire immunity to streak disease and using different means to weaken virus strains — an early indication that different virus strains existed.

Johnson developed methods of separating and characterizing viruses into distinct entities on the basis of their tolerance to heat, dilution, aging and host reactions. He was a leader in recognizing the need for adequate plant-virus nomenclature and classification. His later work dealt with attempts to determine the true nature of virus inactivation and the origin of new viruses.

Johnson's studies on tobacco black root-rot disease led to the

development of a tobacco-breeding program at the UW and the eventual release of resistant cultivars. This was the first tobacco-breeding program for disease resistance.

The tobacco-breeding program also developed lines and released cultivars resistant to tobacco mosaic and wildfire disease. Havana 425 and Havana 501 were released in 1956 after Johnson's death, but Johnson and his co-workers made the early crosses in the development program.

Ray H. Roberts came to Wisconsin from Oregon in 1915. Considered brilliant and independent by his co-workers, Roberts was a tireless worker. His abiding interest was fruit crops, but his work ranged widely across other crops as his interest in photoperiodism and growth

regulators attracted him to herbaceous plants that were more easily manipulated than perennial tree crops.

Roberts showed the relationship between vegetative growth and flower-bud formation in sour cherries and developed pruning programs to take advantage of this relationship. With **Leonard R. Langord**, he identified potassium deficiency as the cause of curl leaf disease in sour cherries.

Roberts also explained the causes of biennial bearing in 'Wealthy' and other apple cultivars, developed the competition theory as an explanation for apple thinning with auxin materials; showed that detail pruning of 'Golden Delicious' could be a useful procedure to thin the blossom buds to result in larger fruit and proposed theories on the relative influences of apple stocks on scions and scions on stocks.

Furthermore, he determined the time of flower initiation for apples,

cranberries, onions, and red raspberries; popularized the use of petroleum derivatives for cranberry weed control; released four strawberry cultivars adapted to Wisconsin; used auxin materials to solve the fruit-set problem in greenhouse tomatoes and solved the "blind wood" problem in greenhouse roses.

At the time of his retirement, Roberts was working with substances extracted from green plants by immersing them in refined oil. Storing the oil and dissolved material in a freezer resulted in small quantities of crystalline material forming in the bottom of the container. Roberts obtained growth-regulator effects from his "anthogens" and at one time proposed that he had isolated the flowering hormone, florigen. The crystalline substance was supposed to suppress skin-cancer formation in mice. Unfortunately, the crude method of extraction apparently resulted in different

materials being extracted at different times, and perhaps several compounds being mixed. In any event, chemists were never able to identify any specific substance, and thus the work was all lost when Roberts, in failing health, left the department.

The tobacco program gained support with the appointment of **William B. Ogden** in 1924. Ogden worked with Johnson on the breeding and disease work and assumed the responsibility for the field culture of tobacco (nutrition, harvesting, curing). Ogden determined that high chlorine levels detrimentally affected the "burn quality" of tobacco. A healthy leaf will burn slowly and evenly, but a high-chlorine leaf will not sustain the burn. As a result of his fertilizer work, potassium sulphate was recommended rather than potassium chloride. Under Ogden's direction, the Havana 425 and Havana 501 disease-resistant



Ray H. Roberts came to Wisconsin from Oregon in 1915. His abiding interest was fruit crops, and he explained the causes of biennial bearing in 'Wealthy' and other apple cultivars.



The vegetable-crops arena (other than potatoes) became an area of research with the appointment of **O. B. Combs** in 1930. He served in extension, research and teaching and as departmental chairman for 15 years.



Gus Rieman was appointed in 1936 with a split appointment in horticulture, genetics, and plant pathology to establish a potato-breeding program at the university.



In 1963, **Burdean E. Struckmeyer** joined the staff. She was one of only three or four plant anatomists in the country who were working in a department of horticulture.

cultivars were released.

The vegetable-crops arena (other than potatoes) became an area of research with the appointment of **O. B. Combs** in 1930. He served in extension, research, and teaching and as departmental chairman for 15 years.

He also had four years of foreign service at the University of Western Nigeria at Ife. Combs's research resulted in the introduction of tomato, pepper, edible soybean, and eggplant cultivars; an extensive vegetable-cultivar testing program and a cooperative program on the freezing preservation of vegetables.

Gus Rieman was appointed in 1936 with a split appointment in horticulture, genetics, and plant pathology to establish a potato breeding program at the university. His office was in the genetics department and

utilized the basement of the Horticulture Building for potato storage. His research was conducted in northern Wisconsin, establishing the Wisconsin Potato Breeding Farm near Rhineland on land donated by the Starks Farms. His main objective was the development of scab-resistant varieties. One that obtained widespread use was 'Superior' which was a medium, early, white variety. He worked with the home economics staff to minimize potato darkening during cooking. He also was a leading motivator in getting the USDA Potato Introduction Station located at Sturgeon Bay. He transferred his entire appointment to genetics in 1959.

In 1936, **Burdean E. Struckmeyer** joined the staff. She was one of only three or four plant anatomists in the country who were working in a de-

partment of horticulture. She assisted Roberts with his fruit-bud initiation studies and his studies of fruit set in apples. Her other research included examining oak-tissue response to oak wilt fungus infection (with plant pathology), explaining white-pine resistance to blister rust fungus (with plant pathology), characterizing mineral deficiency tissue aberrations in several test plants, and describing anatomical effects of gibberellic acid and auxins on plant leaves and stems. Her study of tissue responses gave insight into the functional systems affected by mineral deficiencies and growth regulators.

Struckmeyer did the anatomical studies for research on lettuce tipburn injury (with T. W. Tibbitts), copper toxicity condition in seedling tobacco (with L. A. Peterson) and periderm healing of potato tubers after

vine-killing treatments (with L. K. Binning).

The vegetable crops research started with Combs in 1930 was expanded when plant breeder **Henry M. Munger** joined the staff in 1942.

Within three years, however, Munger moved to Cornell University, where he had an outstanding career as a plant breeder.

G. Fred Warren, who followed Munger in vegetable crops, came in 1945 and left in 1948. His primary interest was weed-control, and he later developed a major weed control

research program at Purdue University.

The department initiated a floriculture program with the appointment of **Gail E. Beck** to the extension staff in 1949. Two years later, Beck transferred to teaching and research and developed those aspects of the program. With graduate students, he made contributions to the understanding of oedema in Geranium, the physiological changes associated with cold hardiness in Chrysanthemum and the environmental control of flowering in Poinsettia. He worked out a program for the greenhouse culture of *Clero-*

dendrum as a potted plant and cooperated on the hybridization leading to the release of five cultivars of Cape Primrose for potted-plant culture.

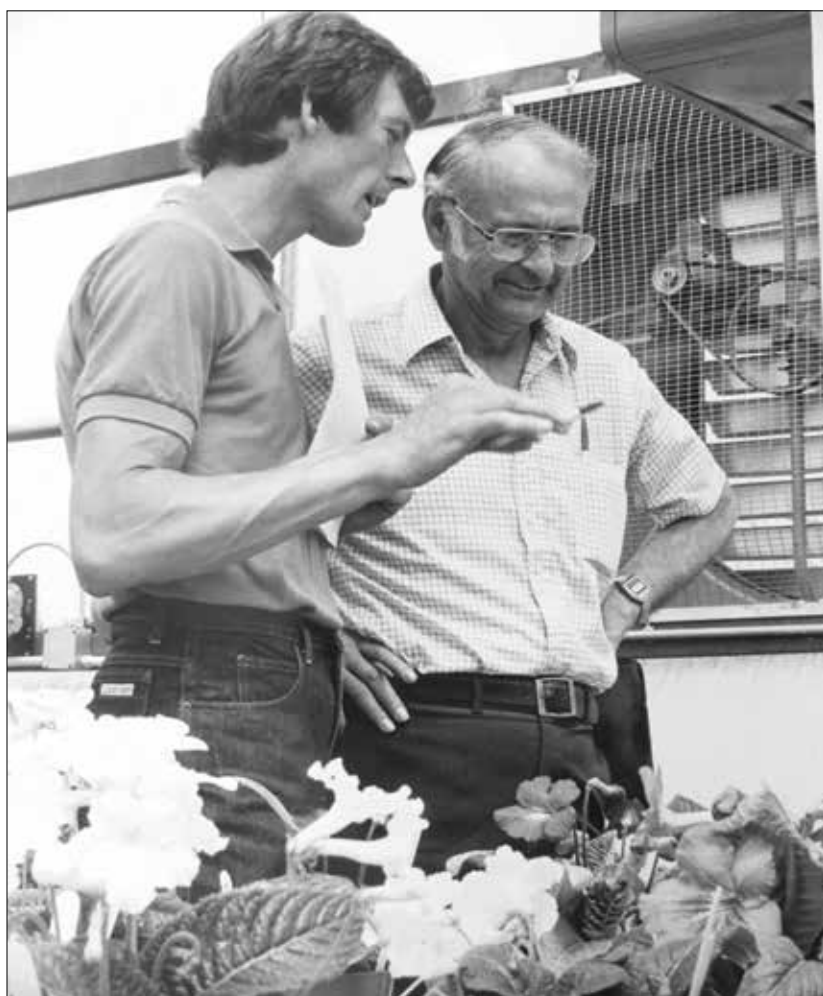
He also tested the use of wood-fiber blocks for the production of bedding plants and evaluated several greenhouse cover materials, leading to the eventual adoption of several glass substitutes for greenhouses.

LeRoy G. Holm, hired in 1949, was the first horticultural staff member to research an area independent of a crop interest: growth regulators and plant physiology. His appointment coincided with the beginning of chemical weed control as a viable supplement to standard cultural practices for vegetation control. The use of phenoxy compounds for selective weed control had opened a whole new area for chemists to synthesize materials that had manageable and differential biological activity.

Holm evaluated a large number of herbicides for vegetable, tree fruit and woody plant nursery crops and contributed data to support herbicides' registration for weed-control programs. With his colleagues at Wisconsin and other states, he was a founding father of the North Central Weed Control Conference and the Weed Science Society of America.

He measured the competitive effect of weeds of various densities on crops at several stages of growth. He also studied the longevity of weed seeds and did a major study on factors

Gail E. Beck, working with graduate students, made contributions to the understanding of oedema in Geranium, the physiological changes associated with cold hardiness in Chrysanthemum and the environmental control of flowering in Poinsettia.



controlling *Abutilon Theophrasti* germination. Before his resignation in 1970, he initiated an extensive information-collection effort that led to the later publication of three books detailing the weed problems of the world-weed biology, geographic distribution and problem severity in crops.

As part of this effort, he took a leave to visit Russian weed scientists and an 18-month term of service with the Food and Agriculture Organization, headquartered in Rome, Italy.

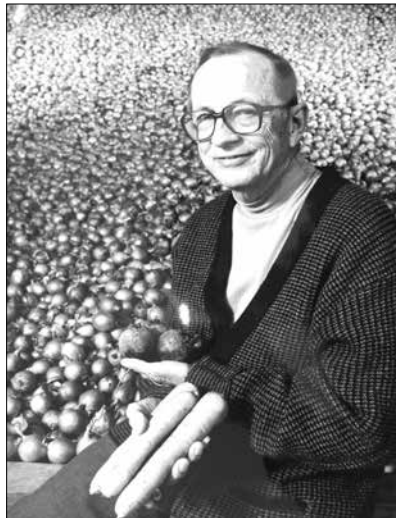
Warren H. Gabelman was hired in 1949 to develop a vegetable-crops breeding program. Vegetable-crops breeding had been underway at the Wisconsin experiment station for a number of years. The agronomy department handled green peas and sweet corn, and plant pathology worked with cabbage. Gabelman chose other crops — onions, carrots, red beets and tomatoes — so as not to infringe on established programs. His program incorporated pink root rot resistance into onion breeding lines, and these have been widely utilized for breeding resistant hybrids. He also released high-carotene carrot cultivars and breeding lines that have been widely used in breeding carrots with improved appearance and nutritional



LeRoy G. Holm



Franklin A. Gilbert



In landmark research, Warren H. Gabelman and a graduate student, Ronald Engle, were able to identify a leaf flecking disease on onions as being induced by atmospheric ozone.

quality. In red beets, he selected for color, shape, size, and quality, and released several lines and cultivars for industry use. The tomato breeding resulted in the release of one cultivar adapted to the Central Sands growing area.

Gabelman evaluated a number of vegetable crops for their potential under irrigation in the Central Sands — sweet potatoes, transplant onions, muskmelons, green beans, sweet corn, peppers, eggplant, and other crops that could be grown there — but green beans became established as an economic success. Gabelman's research on irrigation timing versus fruit set, cultivar evaluations, fertilizer utilization and plant spacing laid the groundwork for production in what is today known as the Central Sands, approximately 80,000 acres. The Central Sands is known as a productive region for potato and vegetable production.

Wisconsin's share of the nation's

vegetable production grew significantly with the development of the Central Sands.

In landmark research, Gabelman and a graduate student, Ronald Engle, were able to identify a leaf-flecking disease on onions as being induced by atmospheric ozone. The Gabelman program also identified genetic lines of tomatoes with differential capacities for absorbing phosphorus and potassium from media with low supplies of these elements. Theoretically, a horticulturally desirable cultivar from "deficient" soil would be widely accepted in countries where fertilizers are expensive or unavailable.

In 1950, **Franklin A. Gilbert** was hired as superintendent of the Peninsular Research Station at Sturgeon Bay, designated as a horticultural research station in 1947. Gilbert succeeded Charles F. Swingle, who had served as superintendent from 1947 to 1950. Gilbert, a fruit specialist, immediately instituted a research program to supplement his extension and administrative responsibilities.

Strawberry breeding to develop cultivars adapted to Wisconsin was his first priority. He released three cultivars, the last being 'Gilbert' in 1982. He also introduced the 'Viking' apple, an early 'McIntosh' type, selected from the apple scab resistance breeding program at Purdue and Illinois. He was instrumental in establishing the virus-free strawberry certification program in Wisconsin and maintained the basic stock material in the screen houses at the station. He directed cultivar testing of strawberries, apples, plums, pears, grapes, raspberries, and cherries. He also worked on weed



Cranberries are harvested.

control in fruit crops and refined the application rates for potassium fertilization of cherries. And he also participated in the comprehensive apple rootstock evaluation program, initiated by the North Central Region Rootstock Committee (NC 140).

Malcolm N. Dana joined the faculty in 1952 with a teaching and research position in the fruit-crops area. His chief research interest became cranberry weed control and cranberry culture. In an early study that proved valuable to the industry, he identified sources of weed invasion of cranberry marshes. He also evaluated the new and growing array of chemical

weed-control materials and provided data on efficacy and residue to support the registration of several herbicides that reduced weed competition in the Wisconsin cranberry marshes. His program also demonstrated the preference of cranberry plants for ammonium nitrogen over nitrate nitrogen — a result that refined the fertilizer program for cranberries.

Dana provided registration information for several strawberry herbicides and evaluated strawberry, raspberry and apple cultivars at different times over the years. He also served as department chairman from 1973 to 1978.

Walter Wedin joined the faculty

in 1953 to assist in research on tobacco and helped to develop disease-resistant cultivars. He left in 1957 for a position at Iowa State University and later transferred to the University of Minnesota.

Theodore W. Tibbitts joined the faculty in 1955 to assist the tobacco-research program. He explored the possibility of direct-seeding tobacco using pelleted seed and cooperated in cultural work on cigar tobacco. After several years, his program switched to lettuce research, and Tibbitts shared in the release of a new cultivar with Ed Ryder in California. Lettuce tipburn was a serious problem



Theodore W. Tibbitts served as director of the University of Wisconsin-Madison Biotron from 1987 to 1992. His work on lettuce tipburn led to extended research in the environmental effects on plants and the development of guidelines for the most effective use of controlled-environment growth chambers.

in Wisconsin fields, and Tibbitts was able to show that this malady was related to cell injury from laticifer rupture and latex release at the leaf margins in the heads of lettuce. The tipburn work led to extended research in the environmental effects on plants and the development of guidelines for the most effective use of controlled-environment growth chambers. This led to his serving as director of the University of Wisconsin-Madison Biotron from 1987 to 1992.

Tibbitts also researched problems of air pollution and developed a course on air pollution for plant majors. He became involved in space-science research, and an early highlight of his career was sending a small pepper plant into space on a Biosatellite mission in 1968 — one of the first tests of higher-plant response to the space environment. Tibbitts continued as a leader in the research work for NASA to determine the potential of utilizing plants for life

support on long-term space bases. In 1995, he was the principal investigator on a shuttle flight that was the first demonstration of producing food in space using small potato plants.

Ernest T. Haltvick started graduate study at UW in 1955, and after completing a Ph.D., joined the faculty. His special interest was vegetable-crops culture, with particular interest in processing vegetable crops. Haltvick was one of the first people in the country to take advantage of effective weed-control options with herbicides and to modify planting systems for vegetables — lima beans, green beans and red beets. Because herbicides reduced the need for traditional cultivation, rows and plants could be placed closer together to use space more efficiently and increase yield per unit area. He worked closely with manufacturers on developing machinery for precision planting of vegetable-crop seeds and mechanical harvesting.

Lloyd A. Peterson, who joined

the faculty in 1958, researched plant nutrition of horticultural crops. He was hired to fill a tobacco-research position but soon moved on to other crops and interests. He arrived in time to do some of the work on the chlorine content of tobacco as an influence on leaf burn and showed conclusively that the repeated use of copper-containing fungicides in seedbeds could result in copper accumulation in the soil, with toxic effects to seedling tobacco. When the department occupied the Horticulture Research Center at Arlington, Peterson reserved several acres that were not fertilized or limed along with the rest of the farm. This reserved area provided plots with low levels of available phosphorus and potassium that offered baseline levels for studies on the fertilizer needs of sweet corn, green peas, green beans, soybeans, cauliflower, red beets, and cabbage. Peterson pioneered the use of micro-propagated blueberries and cranberries in glass jars, called aeroponics, for



Ernest T. Haltvick



Lloyd A. Peterson



Robert C. Newman



Edward R. Hasselkus

precise mineral nutrition studies, that documented the preference of these crops for ammonium nitrogen rather than nitrate nitrogen. He was the first to show that manganese deficiency was a common problem in Door County sour cherry orchards.

Robert C. Newman, who joined the faculty in 1960 primarily as an extension specialist in tobacco and turf, initiated tobacco studies on seedbed management, chemical weed control, chemical sucker control, treatments to reduce transplanting shock, and breeding and cultivar evaluations. He also carried out turf research in weed control, chemical growth control and cultural practices. Newman and extension horticulturist Larry K. Binning cooperated to evaluate many herbicides for use in selected woody plant nurseries and on herbaceous ornamentals. These practical research studies came about from Newman's recognition that there was no research program in the department to support his extension programs; therefore, he needed to generate information if he was going to have an effective and current educational program.

Edward R. Hasselkus, hired in 1961, evaluated woody ornamental cultivars and their selection for landscape use. He introduced cultivars of

creeping juniper, birches, Amelanchier, Phellodendron, Nyssa, Aronia, Fothergilla and a Korean/Japanese maple hybrid for distribution to the nursery trade. This research was conducted at the UW-Madison Arboretum, where he developed the Longenecker Horticultural Gardens into the premier collection of woody plants in Wisconsin, numbering more than 2,500 taxa.

The transfer of **Robert W. Hougas** and **Stanley J. Peloquin** from the genetics department in 1962 brought to the Department of Horticulture established programs in the breeding, cytogenetics and genetics of *Solanum* (potatoes). Shortly before his transfer to horticulture, Hougas became associate dean in the College of Agriculture, thus curtailing his research.

Before the transfer to horticulture, the potato-genetics program had identified the occurrence of haploid plants in seedling populations from *Solanum phureja-tuberosum*. The identification of (2X) haploids made breeding much simpler and more efficient because there are fewer chromosomes than at the typical tetraploid (4X) level via 2n gametes. Peloquin, with his graduate students, was able to explain the cytogenetic basis for the occurrence of haploids and the unique nuclear behavior that



Robert W. Hougas



Stanley J. Peloquin

restores the haploid to the tetraploid level. Gene transfer and recombination may be accomplished at the diploid chromosome level, and then the chromosome numbers may be doubled to regenerate the "normal" tetraploid *Solanum tuberosum*. This research was of great significance to basic science and potato breeding.

Peloquin was responsible for the procedure of producing potatoes from true seed rather than from tuber pieces, the traditional propagation method in potato production. Use of true seed, though not currently utilized in the United States, has been adopted in other parts of the world where it has provided a valuable way to avoid potato diseases. Two new cultivars were introduced from the breeding program: 'Superior' for table and shipping use, and 'Snowden' for chipping use. This research earned



Harvesting Beans.

Peloquin membership in the prestigious National Academy of Sciences. He retired in 1994.

Fredrick A. Bliss, hired in 1966, immediately joined the UW group working at the University of Western Nigeria in Ife, Nigeria. Returning to Madison in 1968, he initiated a program of bean breeding with particular emphasis in improving bean protein quality. He identified breeding lines that had the capability of transmitting genes for higher than normal production of essential amino acids.

Incorporation of these genes into the cultivars grown in many areas of the world could assist with the problem of malnutrition from protein deficiency. Other specific goals of the bean breeding program were to select for strains that developed a high level of nitrogen fixation by the symbiotic *Rhizobium* bacteria that colonize the bean roots, to restructure the bean plant so it was suited to mechanical harvesting, and to utilize natural components of some beans for insect resistance.

Bliss left in 1988 to accept a

position as chair of the pomology department at the University of California-Davis.

In the mid-1960s, the agricultural community became concerned about overproduction of agricultural commodities. The research administration counseled departments such as horticulture to downplay applied programs designed to increase production and to expand basic programs that would put information "in the bank," to be drawn on in the future to expand production after world population

needs exceeded food production.

This shift also encouraged the presence of faculty who could obtain basic research funding from agencies such as the National Science Foundation and the National Institutes of Health. Up until this time, faculty research activities were undertaken with technical staff, graduate research assistants and even postdoctoral appointments supported by state and federal funds tied to their appointments. However, beginning in the 1960s, this support was reduced, and thus it became necessary for research faculty to obtain industry and federal research grants in order to get the needed support staff for their research activities.

Acting on this philosophy, the department shifted a fruit position to basic research, and in 1966 hired **Timothy Hall**, a protein chemist. Hall instituted a major plant-protein isolation and identification program. He worked closely with Bliss on the bean-improvement program's amino-acid analyses, separated and characterized the coat proteins of turnip mosaic virus, and developed techniques for the exploitation of recombinant DNA technology. At the height of his career in 1981, Hall moved to private industry to continue his studies with gene-transfer techniques. He later moved to Texas A&M University.

In 1960, the college acquired the 160-acre Lone Oak Farm (Hahn Farm), now known as the Horticulture Research Center, in Arlington. Later land purchases by the college connected this land with the Arlington Agricultural Research Station.

Previous horticultural teaching and research plots had been on the

west campus: the present-day sites of Russell Laboratories, Babcock Hall, the Nielsen Tennis Stadium, and the WARF office building. Parking Lot 60 covers an area of muck soil that was used for horticultural research and raising corn for animal and dairy science animals. Since the loss of this research area, muck-crops work has moved to fields rented or donated by commercial growers at several state locations.

From 1960 to 1980, the department gained new research sites by building 10 greenhouses on Walnut Street on campus and nine greenhouses at the Arlington Research Center. A new greenhouse complex was also constructed on the west side of the Horticulture Building, completed in the fall of 1996. It was named the D.C. Smith Greenhouses because a significant gift for the construction came from the D.C. Smith family. This greenhouse facility provides plant-growing space for all departments and programs of the College of Agricultural & Life Sciences, primarily for undergraduate classes. The facility

has 10,000 square feet under glass, and it consists of 10 growing bays, a high-humidity propagation bay and a 1,600-square-foot conservatory. Designed as a combination of science and aesthetics, it has won several architectural awards. The environment of the greenhouses is controlled by a computer system that allows users to program the environment to suit the needs of the plants and the class. The conservatory emphasizes the ornamental function of plants while demonstrating the science of plant culture, and it has won a major national award for design. **Johanna Oosterwyk** is the current D.C. Smith Greenhouse manager.

During this period, **Clinton E. Peterson**, a dedicated and widely recognized plant breeder at Michigan State University joined the faculty in 1968. As a USDA employee, he headed the carrot and onion investigations for that agency. He introduced several onion, carrot, and cucumber cultivars and breeding lines before he transferred to Wisconsin.



The D. C. Smith Greenhouse facility provides plant-growing space for all departments and programs of the College of Agricultural and Life Sciences, primarily for undergraduate classes.

He also discovered the gynoeceious character in cucumbers, which led to a major increase in that crop's productivity. At Wisconsin, he built a program to include a physiological geneticist, a cucumber breeder, and a plant pathologist, in addition to carrying out his own breeding program in carrots and onions. Several cultivars and breeding lines of carrots and onions were released during his 18 years at Wisconsin.

George L. Hosfield joined Clinton Peterson in 1971 in the USDA vegetable breeding program. He transferred to Michigan State University in 1975 and was replaced by Phillip W. Simon.

In 1969, **Larry Binning** was hired to replace Wayne A. Cole as weed scientist for horticultural crops, extension and research. He developed an extensive herbicide-evaluation program across a wide variety of horticultural crops, resulting in the designation of the program as one of four sites nationally accepted by the EPA for the collection of efficacy data and residue samples to support the registration of herbicides for minor-use crops. Binning

also worked to reduce the environmental impact of herbicide use in sensitive sites such as the central Wisconsin area with a shallow water table. He was one of a group of scientists who worked to set standards for crop-production systems that protect the environment and maintain production. He was also an active participant in IPM programs and later a co-founder of the Nutrient and Pest Management program (NPM). He was co-director until his retirement in 2001.

Binning carried on an extensive research program evaluating weed and crop competition and the effect of crop shading on weed development. He also carried on an extension program that served most of the horticultural industries — most notably, the potato and processing industries. He was awarded the Friday Chair for vegetable production for his efforts. He served as department chair from 1991 to 2000.

By the early 1970s, the department was filling the Horticulture Building. About 3,000 square feet of laboratory and office space were added to the department with the addition



Robert Hanneman



Larry Binning

of the Horticultural Annex at 2105 Herrick Drive.

The department's commitment to basic research was also expanding.

Gerald E. Edwards was hired to fill the Holm position in 1971. Although Edwards had agricultural training, he was encouraged to avoid commodity research and to develop his research in photorespiration and biochemical pathways of photosynthesis, particularly the Crassulacean system. His contributions earned him international recognition from the plant physiology community. He left the department in 1981.

Brent H. McCown joined the faculty in 1972 with a joint position between horticulture and the new Institute for Environmental Studies (IES). He assumed a major role in the undergraduate instructional program and initiated research involving micro-propagation and genetic engineering of perennial species. He developed the Woody Plant Medium (WPM), utilized worldwide for research and the commercial cloning of woody crops. He was the first to successfully transfer genes into trees and cranberries and introduced the first patented cranberry cultivar, 'HyRed,' which is now widely grown. McCown was a leader in the organization of the Biotechnology Center at UW-Madison and was



About 3,000 square feet of laboratory and office space were added to the department with the addition of the Horticultural Annex at 2105 Herrick Drive.



Brent H. McCown joined the faculty in 1972 with a joint position between horticulture and the new Institute for Environmental Studies (IES). He developed the Woody Plant Medium (WPM), utilized worldwide for research and the commercial cloning of woody crops.

director of the Center for Integrated Agricultural Systems. He retired in 2011, but he continues to maintain a research program on a part-time basis.

Robert Hanneman, a former student of Stan Peloquin, was hired as a USDA research geneticist and faculty member to conduct research on potato breeding and genetics. He specialized in crossability barriers among wild species and cultivated potatoes. His work helped breeders around the world to understand how to incorporate wild species' germplasm into cultivated potato. Hanneman, Peloquin and their students discov-

ered the endosperm balance number concept, which helped to explain the relationship between ploidy level and the formation of the endosperm. This in turn helped to develop a better understanding of crossability with wild species. Hanneman also studied the production of $2n$ gametes in potato and worked on processing traits such as chip quality.

Philipp W. Simon, employed by the USDA, joined the faculty in 1978. He initiated a program of carrot breeding and genetics, with an emphasis on improving flavor and nutritional quality. He identified genes

and developed breeding lines that are sweeter and a darker orange color, due to higher provitamin A carotene content. More recently, carrots with purple, yellow, and red pigments have been incorporated into breeding lines, as well as those with resistance to root-knot nematodes. Another project focused on producing true seed on garlic, which has led to the improvement of garlic breeding. Simon has led several national and international expeditions to collect wild and commercial carrots, onions, and garlic.

Richard L. Lower joined the staff as chair in 1978. He chaired the

plant science building committee that doubled the available department space, and he also led the development of the Allen Centennial Gardens. He was named associate dean of CALS and assistant director of the Experiment Station in 1984. In 1993, Lower was named interim executive director of the Experiment Station. In 1994, he became executive director of the North Central Region of the State Agricultural Experiment Stations. Throughout his time at the UW, he maintained a cucumber-breeding program with emphasis on stabilizing gynoecey, yield, and parthenocarpy. He released five cucumber inbred lines (seeded) and developed a series of parthenocarpic cucumber inbred lines. The parthenocarpy program was released to WARF, which licensed it to a private company in 2005–2006. Lower retired in 2002, but he continued his research until 2005.

Eldon Stang carried out a research and extension program with small and tree fruit crops, including cranberries. With the retirement of Malcolm Dana, Stang switched to a research and teaching position, and **Teryl Roper** was hired to fill the research and extension position. Roper's early research helped to elu-

cidate carbon-partitioning patterns in cranberry. Later research focused on mineral nutrition. He demonstrated that full crops of cranberries could be produced using much less phosphorus and potassium fertilizer than the industry was generally using. In 2008, Roper left Wisconsin to accept an appointment at Utah State University, in his home state.

When Stang retired from the department in 1994, he developed a commercial cranberry production and processing industry in Chile.

Also working on the improvement of processing cucumbers was **Jack E. Staub**, who was initially employed by the university in 1981 and then became a USDA employee in 1983 to continue the cucumber program started by **Clinton E. Peterson**. In 1995, Staub's research was expanded to include the improvement of shipping-type melons and then later to squash on which he conducted research about the flow of transgenes into wild squash populations. His research with cucumbers and melons led to the development of technologies to increase breeding efficiency using molecular markers, which in turn led to the clarification of the domestication of these species and the release of novel

cucumber and melon germplasm. In 2007, Staub took a position with the USDA in Logan, Utah.

During this same period, the department further expanded its basic-research emphasis with the addition of three faculty members: **Jiwan P. Palta**, **Michael R. Sussman**, and **Richard D. Vierstra**.

Palta has worked actively with the potato and cranberry growers of the state. His basic research has been focused on the physiological and genetic mechanisms of frost injury and cold adaptation of plants. Together with John Bamberg (USDA Potato Genebank), Palta has made advances in breeding frost-tolerant potatoes. His program demonstrated that wild potato species turn on a desaturase gene during cold acclimation to acquire frost tolerance. This gene has now been cloned, and he is now developing and validating molecular markers that can be used to screen for frost tolerance. Palta also developed a strategy for breeding frost-hardy carrots. This has led a French seed company to release two frost-hardy carrots, 'Eskimo' and 'Artico.'

Palta has served as the leader of the Wisconsin Potato Breeding Program since 2005. Four potato varieties



Philipp W. Simon



Richard L. Lower



Eldon Stang



Jack E. Staub

have been named and released during this time. His program led an effort to improve potato-tuber internal quality and storage quality by increasing tuber calcium concentration. His early research showed that potato tubers derived calcium from the soil via the roots on the tubers and stolons. Because tubers are generally calcium deficient, this research demonstrated that potato tuber quality can be improved by providing calcium nutrition to the potato tubers during the bulking period. These findings led to the development of liquid fertilizers containing soluble calcium that could be injected into the irrigation water to deliver calcium to the tuber area at the top of the hill during the tuber-bulking period. This research has led to the development of practical means to improve the potato-tuber internal quality.

Palta and his student, Karim Farag, discovered that a natural lipid, lysophosphatidyl-ethanolamine (LPE), is able to accelerate the ripening of cranberries and also to prolong cranberry shelf life during storage. This research has provided evidence that natural lipids such as LPE can act as bioregulators and have the potential to be used as an environmentally safe

means to promote the shelf life of fruits, flowers and vegetables.

Palta led an effort to develop a simple, affordable, and locally available technology to improve the production of native potatoes in the Peruvian Highlands. In the past six years, along with Bamberg and Alfonso DelRio, they have demonstrated that the yield of indigenous potatoes can be increased up to twofold by incorporating gypsum at the time of planting. These studies are being conducted with the cooperation of the International Potato Center. (CIP)

Michael Sussman, a biochemist, investigated the molecular mechanisms by which nutrients cross the plasma membrane and satisfy the nutritional needs of plants. He also performed research in the area of hormone signaling: how the various cells within a plant communicate with each other and respond to changing environmental stresses. In the early 1990s, he initiated research projects devoted to the development and application of new genomic technologies. Sussman and colleagues led the development of *Arabidopsis* research on the UW campus, obtaining federal funding for the successful *Arabidopsis* training grant. In 1996, he was asked by the

dean of the Graduate School to direct the Biotechnology Center with a 50 percent administrative appointment. The center was one of the larger interdisciplinary centers on campus administered by the Graduate School. In 2002, he transferred his tenure appointment to the Department of Biochemistry.

Richard Vierstra, a molecular biologist, was the first to describe the ubiquitin system in plants using *Arabidopsis* and demonstrated that ubiquitin is one of the largest regulatory proteins in the plant kingdom. He was the first to provide the description of the ubiquitin-like protein SUMO, with special significance to plants under stress. He also studied the roles of different phytochromes in light perception and how they work mechanistically through structure/function analyses. He discovered that phytochromes are found in fungi and bacteria. Vierstra was in the department from 1984 until 2003 and then transferred to the genetics department, but he continues to teach a joint course with horticulture in molecular approaches for crop improvement.

Joining the faculty in 1982 was **Brian S. Yandell**, a statistician,



Jiwan P. Palta



Michael R. Sussman



Richard D. Vierstra



Brian S. Yandell

biometrician, and computer specialist who served as a statistical consultant to the College of Agriculture staff and students with a joint appointment with the Department of Statistics. He also served as chairman of the statistics department.

As the faculty expanded, so did the department's space. After remodeling and an addition, the Horticulture Building complex at 1575 Linden Drive nearly doubled its laboratory and classroom area.

However, the addition displaced the Horticulture Garden between Moore Hall and the Babcock greenhouses. A new outdoor teaching garden was constructed at 620 Babcock Drive, the site of the "dean's residence," along with large floral-display gardens. This was named the Allen Centennial Gardens after Ethyl Allen, whose donation was critical to starting the project. These Gardens are the site of the annual department garden party, during which new faculty are introduced, awards are announced, and thanks are given to all of the industry supporters of the department.

In 1985, **Herbert J. Hopen**, a Wisconsin native who was a vegetable-crops and weed-control researcher and acting head from the University of Illinois at Urbana-Champaign, was hired as chairman. He maintained a vegetable-crops weed biology and herbicide program. In addition, he served as interim tobacco specialist. After the term he served as department chair, he conducted herbicide-efficacy and weed-biology research on cranberries, cabbage, and cucumbers. As an emeritus professor, he developed a field-research program with the major producer and proces-



After remodeling and an addition, the Horticulture Building complex nearly doubled its laboratory and classroom area.



The Allen Centennial Gardens, an outdoor teaching garden, was constructed at 620 Babcock Drive, the site of the "dean's residence," along with large floral-display gardens. They were dedicated in 1989.

sor of horseradish and worked for several years on cranberry weed control.

In 1986, **Dennis R. Stimart** joined the faculty to teach the floriculture curriculum and conduct research with floriculture and woody plants. He played a major role in and directed the Allen Centennial Gardens at 620 Babcock Drive and served as chairman from 2000 to 2008.

David M. Spooner joined the faculty as a plant taxonomist in 1987 as an employee with the USDA Agricultural Research Service. He investigated the species boundaries and phylogenetic relationships of potatoes and tomatoes (*Solanum* sections *Petota* and *Lycopersicon*) using comparative morphology, crossing studies, and DNA marker and DNA sequence analysis. In 2009, he also began to work on wild and cultivated carrot (*Daucus*). He serves as a germplasm collector of these crops and has collected them on 17 expeditions throughout Latin America and the western Mediterranean region.

These international efforts have deepened our knowledge of the evolution, domestication, and spread of the cultivated potato. Spooner has used morphological and molecular data to completely revise and reduce the taxonomy of cultivated potato down to four species. He demonstrated, for the first time, a single origin of cultivated potato, and placed the event in southern Peru. Phylogenetic studies by Spooner showed tomatoes and potatoes to be close relatives, which led to the reclassification of tomatoes, former genus *Lycopersicon*, into a genus of *Solanum*.

John Bamberg has played a major

role in potato improvement world wide. He directed the USDA Potato Genebank at Sturgeon Bay, starting as manager in 1985 and then becoming project leader in 1989. This genebank provides data and a broad array of disease-free germplasm to potato researchers and breeders worldwide. Bamberg initiated a formal, collaborative association of world potato genebanks, and he has been editor-in-chief of the *American Journal of Potato Research* since 2001. He initiated a program of research using DNA markers to assess the status and dynamics of genetic diversity in the genebank. He led 20 years of collecting wild potatoes in the southwest USA and used those stocks for research on methods of germplasm collection and evaluation.

Michael J. Havey joined the faculty in 1988 as a USDA vegetable crops research geneticist. His research has focused on molecular and classical genetics of vegetable crops, primarily onion and cucumber, with practical breeding efforts focused on onion. He has provided inbred lines of onion for commercial hybrid production, as well as several molecular markers tagging important traits such as male-fertility restoration, flavor, and health-enhancing anthocyanins, fructans, and thiosulfinates in onion and virus resistances in cucumber. These markers are widely used by breeders as selection tools for the development of unique cultivars of onion and cucumber.

James Nienhuis was hired in 1990 to improve self-pollinated crops and focused on using molecular-marker technology to facilitate introgression of disease resistance into snap beans. He also works to improve



Herbert J. Hopon



Dennis R. Stimart



David M. Spooner



John B. Bamberg



Michael J. Havey



James Nienhuis

chili pepper, squash, tomatoes and tomatillos.

Nienhuis has been especially active in teaching and co-teaches two courses, Plant Breeding 501 and World Vegetables 370, with his colleague Irwin Goldman. He also has developed a new course on organic/sustainable agriculture (Horticulture 372), which includes a field trip to Costa Rica, as well as a new course



James Nienhuis and Irwin Goldman became famous around the campus for their annual Pumpkin Regatta, held in Lake Mendota off the Memorial Union pier.

in tropical horticulture (Horticulture 374), which also includes a study-abroad field trip to Central American countries. Nienhuis, along with Irwin Goldman, became famous around the campus for their annual Pumpkin Regatta, held in Lake Mendota off the Memorial Union pier.

Vegetable breeding has also been promoted by **Irwin Goldman** since 1992, with emphases on the human-health attributes of vegetables and the history of plant breeding. He has developed numerous inbred lines and open-pollinated populations for use by breeders of carrot, onion, and table beet. His research work has included close collaborations with scientists in medicine, food chemistry, and genetics. His program has examined oxalic and folic acid in table beet, tocopherols and carotenoids in carrot, and organosulphur compounds in onion. He and his students also helped to develop the open-source seed initiative.

Goldman has worked to release table beets with increased betalain

pigment and yellow pigment for natural colorants in a wide variety of food products. He served as associate dean and vice dean in CALS from 2004 to 2009 and as interim dean from 2009 to 2010. He has served as department chair since 2011.

Jiming Jiang was the leader of the Wisconsin potato-breeding program from 1995 to 2004. He developed a set of chromosome-specific bacterial artificial chromosome clones in potato, which became a new system and the foundation for potato cytogenetic research. His lab also sequenced and characterized the centromere of rice chromosome 8, the first fully sequenced centromere from any multicellular eukaryote, as part of the International Rice Genome Sequencing Project. This important discovery opened the door for centromere research in several important cereal crops, including rice and maize. His most recent research focuses on genome-wide mapping of epigenetic chromatin features in several plant species, including potato.

A.J. Bussan was hired in 2001.

He provided vegetable-research support, emphasizing the sustainability of production systems, including seeding rate, mulching systems, cover crops, and storage with emphasis on potatoes and other vegetables. His research has focused on water management in irrigated vegetable-growing areas of Wisconsin. He was instrumental in helping to establish the state-of-the-art Potato and Vegetable Storage Research Facility at the Hancock Experiment Station in 2006, permitting storage research at small and commercial scales, which led to the rapid introduction of several new potato chipping varieties.

Bussan, and Paul Bethke have led a coordinated, national research effort toward the mitigation of acrylamide to improve the quality of processed potatoes.

Shelley Jansky, a USDA geneticist, began work in 2004, emphasizing the use of wild *Solanum* species to improve cultivated potatoes, and focused on mechanisms to overcome barriers to the utilization of wild germplasm using haploids and 2n gametes to develop haploid wild-species hybrids with processing traits and resistance to early blight. Jansky has developed a molecular marker for *Verticillium* wilt resistance based on the tomato resistance gene ortholog *Ve*. Genetic studies are underway to determine the inheritance patterns and molecular basis of high-amylose potato starch in order to enhance the flavor of fresh market potatoes. She has found environment has a large effect on flavor.

Paul Bethke joined the staff in 2006 as a USDA post-harvest physiologist.



Irwin Goldman has developed numerous inbred lines and open-pollinated populations for use by breeders of carrot, onion, and table beet.

ogist emphasizing water relations and carbohydrate metabolism as influencers on the marketability of stored potatoes.

Also supporting breeding activities with potatoes was the hiring of **Jeffrey Endelman** in 2013 to be the new program leader in potato-breeding research, with emphasis on the use of pedigrees and genome-wide markers to improve the efficiency for quantitative traits.

The first formal appointment in the area of turf research was **Frank Rossi** in 1995. He initiated research at the O.J. Noer Turfgrass Research and Educational Facility, along with an active extension program. When he left in 1997, **John Stier** was hired to continue the research and extension, along with teaching a course in turf. This continued until 2011, when he accepted an appointment at the University of Tennessee. This work is now being conducted by faculty in the Departments of Soil Science and Plant Pathology. Stier also served as department chairman from 2008 to 2011.

Sara Patterson joined the

faculty in 2000, with responsibility for research, teaching and community outreach. She teaches the two main introductory classes in the Department of Horticulture and has also developed a graduate class in Research Ethics.

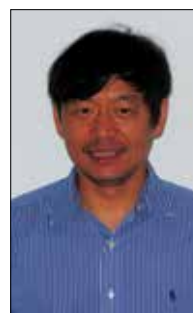
She has pioneered molecular and genetic studies on abscission, using *Arabidopsis* as a model system. The lab's research currently focuses on cell-cell adhesion and separation in plants in respect to abscission of fruit and floral organs, ethylene responses during seedling development and senescence, and changes in cell-cell adhesion in respect to bioenergy. Her abscission research is also directed toward several crops, including fonio, grapes, tomatoes, roses and carnations. In 2008–2009 Patterson spent a year at the National Science Foundation as program director for the Plant Genome Program. She helped to establish and became director of the UW Science and Medicine Graduate Research Scholars Program, which provides support to more than 140 underrepresented minority students from four colleges and 38 graduate



A. J. Bussan



Irwin Goldman



Jiming Jiang



Shelley Jansky



Paul Bethke



Jeffrey Endelman



John Stier



Sara Patterson



Patrick Krysan



Jed Colquhoun



Yiqun Weng



Juan Zalapa



Julie Dawson

programs. It provides community activities, professional development and leadership opportunities.

Basic research on gene function was emphasized with the hiring of **Patrick Krysan** in 2002 through a joint appointment with the Genome Center of Wisconsin. Krysan's lab uses the methods of functional genomics to study signal transduction in the plant model system *Arabidopsis thaliana*. His laboratory has devoted considerable effort to the generation of a novel reverse-genetics resource for the international *Arabidopsis* research community. It has produced a collection of mutant *Arabidopsis* lines that allow one to perform deletion of targeted segments of the genome. The laboratory, in collaboration with Nienhuis, has developed a simplified DNA microarray protocol that is suitable for use in high school classrooms.

Weed-control research was renewed with the hiring of **Jed Colquhoun** in 2005, with an emphasis on weed ecology and integrated management strategies in commercial fruit and vegetable production. Much of Colquhoun's integrated pest-management research and outreach have focused on ways to integrate cultural practices into production systems

in order to reduce the reliance on pesticides while maintaining economic solvency. Colquhoun has also taken on leadership of sustainability-related programming countrywide, much of which was initiated by his vegetable-team predecessors. Key initiatives in this include the Field to Foodbank program, which developed a logistics system that has been used to capture millions of pounds of fruit and vegetables for foodbanks since 2011; and the National Initiative for Sustainable Agriculture, which has assessed agricultural sustainability on more than a million U.S. crop acres in the past year.

Yiqun Weng joined the faculty in 2008 as a USDA vegetable crops research geneticist. His research focuses on genetics, genomics and germplasm enhancement of cucumber and other cucurbit crops. His lab sequenced/ assembled the whole genome of the pickling cucumber inbred line Gy14, and it developed a high-density cucumber reference genetic map. Research in his lab revealed the history of chromosome variation during the evolution and domestication of cucumber. His lab has developed molecular markers for several horticulturally important traits in cucumber for plant architecture, disease and fruit quality.

These genetic and genomic resources and molecular markers are widely used by the cucurbit community.

The importance of Wisconsin as the leading cranberry-producing state led to the hiring of **Juan Zalapa** in 2010 to study the genetic diversity in wild cranberries and to find valuable traits for incorporation into cultivated varieties. He has also evaluated the inheritance of plant architecture and fruit-yield traits in melons.

With the increasing interest in local foods and organic agriculture, **Julie Dawson** was hired in 2013 to undertake research and extension to support urban and regional food systems, with an emphasis on small-scale diversified farms, market gardens, and community gardens. Her research will identify varieties for small-acreage farms and gardens with high flavor and nutritional quality, encourage high-value rotation crops for small acreages and promote scale-appropriate equipment and technologies.

All research programs over the years have also been aided and supported by postdoctoral students, academic appointees, graduate research assistants, and undergraduate students under the direction of the research professors.



Research Project's Impacts and Outcomes

Many successful projects have been directed and completed under the direction of faculty and staff in the Department of Horticulture over its long history. The brevity of this report does not allow for detailed reporting of the outcomes of these projects, but some recent examples provide insight into the discoveries and impacts from our work. The following illustrates the wide variety of projects, species, commodities, and stakeholder groups that are affected by the work of our department.

Jiming Jiang is credited with developing several molecular cytogenetic techniques that are now widely used in the plant-science community. His lab has made significant contributions to the sequencing of several important crop genomes, including potato, maize, and papaya. Jiang's group discovered the first plant centromere DNA element conserved in distantly related grass species. In 2003, the Jiang lab successfully cloned a late-blight resistance gene, RB, from a Mexican wild potato species, *Solanum bulbocastanum*. Transgenic potato containing the RB gene shows a high level of resistance against all known strains of the late-blight pathogen. Another recent major research achievement was the discovery of the molecular mechanism responsible for resistance to "cold-induced sweetening" in potato.

Michael Havey released three new inbred populations of onion: B8667 A&B (the first male-sterile red

inbred with maintainer from the public sector), SKI-1 A&B (an early-maturing yellow male-sterile inbred with maintainer), and OH-1 (a genetic stock with the highest production of gynogenic haploids ever reported). The Havey lab developed the most detailed genetic map of available to scientists. Havey also identified and mapped a unique genetic locus (*Psm*) controlling sorting of paternally transmitted mitochondrial DNAs in cucumber.

Yiqun Weng sequenced and released the genome of the pickling-cucumber inbred line Gy14, which is an important genomic resource for the cucurbit-research community. Weng's research is the first to reveal global chromosome differentiations between wild and cultivated cucumbers. Significant differences, including six inversions, were identified. Weng also conducted the first large-scale comparative genetic mapping in melon with cucum-

ber microsatellite markers.

Jiwan Palta served as the leader of the Wisconsin Potato Breeding Program from 2005 until 2013. Four potato varieties were named and released during that time. Three of these ('Tundra,' 'Nicolet' and 'Lelah') have better cold storage quality as compared to the current standard cultivar 'Snowden.' The fourth ('Accumulator')



Jiming Jiang next to a "giant potato plant" at the Rhinelander Agricultural Research Station. These plants are specially grown to make crosses with different potato varieties and for breeding purposes. These plants are over six feet tall.



Yiqun Weng's research program sequenced and released the genome of the pickling cucumber inbred line Gy14, which is an important genomic resource for the cucurbit-research community.



Transplanting potato plants at the Rhinelander Agricultural Research Station.

is the highest yielding potato variety suitable for producing chips without cold storage. Palta led an effort to improve potato-tuber internal quality and storage quality by increasing tuber calcium concentration. His early research showed that potato tubers derived calcium from the soil via the roots on the tubers and stolons. Because tubers are generally calcium deficient, this research demonstrated that potato-tuber quality can be improved by providing calcium nutrition to the potato tubers during the bulking period. Palta also led an effort to understand the mechanism of action of a natural lipid that acts as a bioregulator with an implication for improving the shelf life of fruit, flowers and vegetables.

David Spooner successfully

completed 13 wild-potato germplasm-collecting expeditions of six to 10 weeks each year throughout his career at UW-Madison in Mexico, Chile, Argentina, Ecuador, Colombia, Venezuela, Bolivia, Guatemala, Costa Rica, Peru, Honduras, and Panama. Beginning in 2009, he began to collect carrots in Tunisia and the western U.S.A. The potato expeditions explored many new areas and added about 700 collections of 60 taxa that were new to the world's genebanks.

Spooner has used morphological and molecular data to completely revise the taxonomy of cultivated potato (to four species, with *S. tuberosum* being the most widespread, and diverse, and comprising many ploidy levels that were formerly recognized as

distinct species). He demonstrated, for the first time, a single origin of cultivated potato, and he placed the event in southern Peru. Spooner's work also helped to reclassify tomato. Early phylogenetic studies by Spooner showed tomatoes and potatoes to be their closest relatives (sister clades) and led to the reclassification of tomatoes (former genus *Lycopersicon*) into a different genus (*Solanum*). This classification, and its biological implications, took about 10 years to be accepted, but it is now used universally by taxonomists and breeders alike.

Phil Simon developed and released a number of inbred lines of carrot and other carrot germplasm with nematode resistance, human nutritional quality and flavor. Simon organized



Shelley Jansky, pictured with one of her potato varieties, showed how haploids can be used to access wild *Solanum* species germplasm. Wild *Solanum* species are abundant in traits useful for potato-cultivar improvement.

and participated in four international and two U.S. germplasm expeditions to collect wild and land-race carrots, onions, garlic and their relatives in the last 10 years. He conducted outreach activities with the global vegetable-production and seed industry, including short-term training of 17 international scientists in last 10 years. Simon co-developed the RoBuST database to support *Apiceae* and *Alliaceae* research and education, and from 2009 to 2011, he served as chair of the Plant Breeding Coordinating Committee, a national association of plant breeders.

Shelley Jansky showed how haploids can be used to access wild *Solanum* species germplasm. Jansky has led efforts to utilize haploids ($2n=2x$) of potato cultivars to access

diploid wild *Solanum* germplasm. Haploid-wild species hybrids are being used worldwide (Poland, Italy, Scotland, the Netherlands, China, Japan, Chile, Argentina, Peru, Canada) to access valuable genetic diversity in wild *Solanum* species. Jansky conducted breeding for *Verticillium* wilt resistance and has identified strong sources of resistance in exotic *Solanum* germplasm. She has developed a triage method to identify resistant clones using multiple resistance measures. Jansky has developed a molecular marker for *Verticillium* wilt resistance based on the tomato resistance gene ortholog, *Ve*. Jansky also improved potato fresh market quality and flavor. Jansky's research determined that boiling tubers reduces potassium levels by 50% or more.

Juan Zalapa developed molecular tools in cranberry. Currently, next-generation sequencing technology is being used to sequence the cranberry genome. The development of molecular tools in cranberry will allow the development of innovative plant-breeding systems to speed the breeding of unique cranberry cultivars to meet the current and future challenges of the industry, including increasing yield in sustainable production systems, improving berry quality (including nutrition) and responding to increasingly variable and extreme climates and pressures from insects and diseases.

John Bamberg created 1,168 new data points from research on tuber pH, calcium, late blight, antioxidants, unique alleles, dry matter, GA dwarfs, and other traits on germplasm in the U.S. Potato Genebank. He conducted 7,400 disease tests, 1,947 seed increases, 10,617 clonal increases, and he distributed 7,584 units of germplasm over the most recent 10 year period. Bamberg led 10 germplasm-collecting expeditions in the southwest U.S.A., acquiring 157 new germplasm accessions from locations previously undocumented and uncollected. Bamberg also served as editor in chief of *American Journal of Potato Research* and chair of the Potato Crop Germplasm Committee.

Irwin Goldman's program released ten inbred lines of table beet, seven inbred lines of processing carrot, three open-pollinated cylindrical table beets with unique pigment characteristics, an open-pollinated table beet cultivar suitable for fresh market or processing, and a population of yellow table beets selected for elevated pigment levels. This breeding work

was a partnership with D. Nicholas Breitbach, a long-time staff member in the department. Goldman's lab identified low oxalate levels in certain table beet germplasm accessions, which are now being introgressed into breeding populations. Low oxalate levels are correlated with greater nutrient availability and may offer improved nutritional opportunities. For a period of 15 years, his lab examined the unique relationship between organosulfur compounds from onion and their ability to inhibit human blood platelets. This work led to the identification of cultural practices that influence medicinal activity in onion, genetic factors associated with medicinal traits, and information about culinary practices and their influence on medicinal activity.

Sara Patterson has focused on understanding the genetic and developmental components of basic plant processes such as abscission and senescence. Her lab has used a variety of techniques, including scanning electron microscopy, breakstrength, light microscopy, in situ hybridization, and expression of molecular markers to characterize new mutants that the laboratory has isolated. Most of this research used *Arabidopsis thaliana* as a model system; however, her lab has also assessed these traits in food and floral crops, including onion, grapes, tomatoes, roses, and carnations. Her lab has also evaluated ethylene responses during seedling development and senescence, and on the identification and characterization of cell-wall biogenesis mutants with respect to bioenergy crops.

Patrick Krysan's lab discovered that chromosomal translocations were a very common occurrence in T-DNA-transformed *Arabidopsis* lines.



Irwin Goldman's program developed three new fresh market table beet cultivars called Badger Flame, Badger Torch, and Badger Sunset, each with concentric rings of yellow and red in the interior.

His lab has had success in characterizing many *Arabidopsis* lines carrying copies of the T-DNA randomly inserted in their genomes. Using a technique he developed called ice-cap, Krysan's lab has been able to demonstrate that a large proportion of these *Arabidopsis* T-DNA insertional mutants carry a major chromosome restructuring, such as a translocation or a deletion/rearrangement, in proximity of the T-DNA insert. His lab also developed a new method for performing mutation screening in plants. In 2013, his group showed that the kinase MEKK1 is a critical component of a signaling pathway that regulates how *Arabidopsis* roots respond to the presence of glutamate in the environment.

James Nienhuis's lab has focused on breeding common beans for resistances to abiotic and biotic stresses. His program developed a root-rot-resistant snap bean cultivar, 'Accelerate,' which is in use in the commercial seed industry. He has successfully developed unique strains of pepper, tomatillo, and tomato

in his breeding programs. He developed a unique partnership, funded by a USAID grant, with women farmers in Central America that has helped to develop and support a small seed industry. He has also developed unique instructional programs, including the use of gene chips in the classroom and an intensive workshop on organic agriculture.

Jed Colquhoun has developed a unique program focusing on a systems approach to sustainable food production. He has developed sustainable approaches to ecologically based weed management and integrated pest management. He has served as a co-leader of the National Initiative for Sustainable Agriculture that focused on producer-led sustainability-assessment programs. He has also developed innovative programs such as Field to Foodbank that incorporate community nutritional sustainability into sustainable food production and connect producers with food banks around Wisconsin.

Extension Programs

Extension education as an assigned responsibility for horticulturists apparently started with the 1904 appointment of **Walter S. Brown** with an extension and instruction appointment. Brown's involvement ended in 1906.

Although there were few faculty members in the early years of the department, they responded to public needs as best they could with the time available to them. In the early years of the department, the Wisconsin Horticultural Society and the Wisconsin State Cranberry Growers Association initiated educational and research programs in fruit crops and cranberries respectively. These two organizations encouraged university personnel to assist with growers' problems and provided the opportunity for professionals to reach the growers with new and helpful information.

This cooperation and out-of-state education preceded the formal organization of the Cooperative Extension Service in 1909. As years went by, personnel specifically charged with extension-education responsibility were added to the staff. During the 1970s, there were 7.87 full-time equivalents of professional horticulture extension in the department. Since that time, the number has decreased because departing faculty were not replaced, reflecting changes in Extension funding.

POTATOES

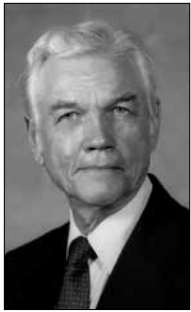
The year that Walter Brown left the department, **James G. Milward** was appointed as a potato specialist with extension responsibilities. In 1915,



James Milward was an early leader in the development of superior potato-seed stocks through a rigorous program of selecting productive plants and operating separate fields for "seed" (tuber piece) production.

the potato program was supplemented with the appointment of **John W. Brann**, a disease specialist. Brann later (1939) transferred to the Department of Plant Pathology. Milward and Brann assumed leadership for developing and implementing the Wisconsin Certified Seed Potato Program, the first of its kind in the United States.

The program's maintenance of a quality seed source for the Wisconsin potato industry became a national standard. Milward was an early leader in the development of superior potato-seed stocks through a rigorous program of selecting productive plants and operating separate fields for "seed" (tuber piece) production.



John A. Schoenemann



Conrad L. Kuehner



George C. Klingbeil



Teryl R. Roper

John A. Schoenemann, who succeeded Milward in 1951, continued the potato program. Schoenemann worked closely with the industry on production and marketing strategies for the successful development of the potato industry in the "Golden Sands" area of Portage, Waushara, Waupaca and adjacent counties. He earned national recognition for his grasp of all aspects of the potato industry. He also conducted studies that lead to the successful production of the 'Russet Burbank' variety in Wisconsin.

David Curwen, located at the Hancock Experiment Station, assumed responsibility for this work upon Schoenemann's retirement in 1986. More recently A.J. Bussan and Jed Colquhoun have been responsible for the potato extension program after Dave Curwen retired in 1994.

LANDSCAPE ARCHITECTURE

The 1915 appointment of **Franz A. Aust** to a landscape architecture teaching and extension position is an example of the horticulture department's diversity. This was perhaps a milestone in terms of the landscape architecture program's commitment to rural beautification and the college's recognition of aesthetic and social

values in the agricultural area. The landscape architecture group (Morris, Holmes, Ziegler) maintained extension interests through their years in the horticulture department, and this interest has been continued after the program attained separate departmental status in 1964.

FRUIT CROPS

Fruit-crops extension work, initiated by the grower associations, developed as an offshoot of research and teaching programs (Goff, Sandsten, Moore, Roberts, and others) until 1921, when **Frank R. Gifford** was hired to do fruit extension. **Conrad L. Kuehner** succeeded him in 1923 and was the first person with major extension responsibility in fruit crops. Kuehner, extremely practical and popular, worked primarily with tree fruits and with the many small farm orchards that were so popular from 1920 to 1960. He is perhaps best remembered for assisting with the numerous "spray rings" around the state: a group of growers would organize cooperatively to buy a power sprayer and to hire a knowledgeable operator. Thus, a farmer could obtain pest protection for quality fruit without the heavy capital outlay needed for the hydraulic sprayers of that day.

George C. Klingbeil filled Kuehner's position in 1953. He developed an aggressive educational program with the cranberry industry, worked closely with the You-pick strawberry industry, and maintained an active educational program with apple and sour-cherry growers. Klingbeil was known for the quality of his educational programs and the initiation of the in-depth educational "schools" for strawberries, cranberries, and apples. The two-day Midwest Strawberry School, first held in 1967, was the first in-depth conference for strawberry growers anywhere in the United States.

After Klingbeil retired, **Elden J. Stang** filled the fruit position from 1978 to 1988, when he transferred to a teaching and research position. His insistence upon professional involvement of county extension personnel in the educational process was well received by agents.

Teryl R. Roper replaced Stang in the extension-research position in 1988. Roper revitalized winter meetings for Wisconsin fruit growers and helped to bring the three fruit-commodity associations under professional management, which allowed them to stand alone and to better represent fruit growers' interests. His work was recognized with "service to industry" awards from both apple and cranberry growers' associations. Along with co-authors in entomology and plant pathology, he created a series of comprehensive extension publications to serve both professional and hobbyist fruit growers. In 2008, he left for an appointment at Utah State.

The position was then filled by **Rebecca Harbut** until she left for an appointment in Canada in 2013.



Louis M. Berninger worked with the members of the Horticulture Club and Pi Alpha Xi Floriculture Fraternity to conduct two major plant sales at the Stock Pavilion, with profits providing scholarships and travel for students.

It has now been refilled by **Amaya Atucha**, who will join the department in November 2014.

FLORICULTURE AND ORNAMENTALS

The floriculture and ornamental horticulture industries received no formal extension consideration until 1949, when **Gail E. Beck** was appointed to the faculty. The state florist associations provided the initial impetus for this appointment and financial support. Beck transferred to teaching and research and was replaced in extension by **David A. Bosley** in 1952.

Louis M. Berninger succeeded Bosley in 1954 and built a nationally recognized program in floriculture extension. He helped to establish the Extension Committee of American

Society of Horticultural Science (ASHS) and served as its first chairman. The contributions of industry personnel to ASHS were formally recognized with the establishment of an Industry Division in ASHS for which Berninger served as the initial chairman. Berninger worked extensively on educational programs in merchandising floriculture crops and was one of the initial extension specialists providing guidance to the developing bedding plant industry. He worked closely with the Society of American Florists and Bedding Plants Inc., speaking frequently at industry conferences and was instrumental in helping to formulate proposed Grades and Standards for Flower Crops. He worked with the members of the Horticulture Club and Pi Alpha Xi Floriculture Fraternity to

conduct two major plant sales at the Stock Pavilion, with profits providing scholarships and travel for students.

Berninger developed the *Garden Almanac* television show on WHA-TV, which ran for six years and promoted plant research in the department and college. He also played a role in creating one-minute taped broadcasts that were distributed to radio stations around the state. Berninger retired in 1984, but his position was not filled after retirement because of reduced funding.

TOBACCO

The department has maintained an active research program on the problems of Wisconsin tobacco growing since the appointment of **James Johnson** in 1909. Over the

years, he and his co-workers (Heggestad, Fulton, Ogden) assumed extension responsibilities. In 1956, the department was able to appoint **George E. Nettum** as extension specialist in tobacco production and handling.

Norman O. Everson succeeded Nettum and stayed for three years before transferring to the youth extension program. In 1961, **Robert Newman** assumed responsibility for extension work in tobacco and continued this until his retirement in 1991.

TURF

Robert Newman provided formal extension activity with the turf industry

(sod growers, golf courses, lawns) in 1961. He also taught a course in turf management. This is the first time that the department had identified extension programs in this area. The landscape architecture group had sponsored a Turf Management Conference in the 1930s and 1940s, but this was conducted without extension funding. The turf extension program expanded significantly with the appointment of Frank Rossi in 1992, who was followed by John Stier in 1997. Their extension and instructional responsibilities were well supported by their research activity, much of which was conducted at the O.J. Noer Turfgrass Research and

Educational Facility on Highway M between Madison and Verona, which opened in 1992. Between 1997 and 2008, Stier helped double the facility's size from 13 to 26 acres. His extension program became nationally recognized as a leader in developing integrated pest

management strategies in K-12 schools and for addressing urban water-quality issues involving turfgrass.

VEGETABLES

The outreach program in vegetable crops prior to 1930 was handled by the research and teaching faculty. In 1930, O.B. Combs joined the staff and had a partial extension responsibility. He was known for his broad knowledge of vegetable cultivars and their adaptation, and for his tireless efforts for the Victory Garden Program during World War II.

Vegetable production in the "Golden Sands" area grew rapidly in the late 1950s and into the 1960s. The department realized that educational service to these growers of potatoes, green beans, cucumbers, green peas, sweet corn, and green peppers should be provided and that it could be based most conveniently at the Hancock Agricultural Research Station. **David Curwen** was hired as a regional extension specialist in 1963. Proximity to grower problems and the research base provided by the Hancock research farm have made this a strong service program. Curwen collected data for efficient irrigation



Louis M. Berninger developed the *Garden Almanac* television show on WHA-TV, which ran for six years and promoted plant research in the department and college.



Laura Jull



Helen Harrison



David Curwen

scheduling and was the project leader for integrated pest management.

WOODY ORNAMENTALS

Extension programming in the woody ornamentals area (sometimes called landscape horticulture) awaited Hasselkus's transfer from instruction and research to instruction and extension in 1963. This program, along with programs in floriculture and turf management, marked the department's accommodation of the public concern with aesthetic and amenity horticulture. For the department, these positions filled voids in the service provided to the diverse horticulture industries. In 1998, **Laura Jull** was hired to assume woody ornamental extension activities part time along with teaching. She has served as a resource for the green industry in Wisconsin and teaches key courses in woody ornamentals and plant propagation. Jull has also developed a substantial effort on lilacs adapted to the Midwest.

WEED CONTROL

The surge of public interest in the 1960s for safe pesticide use led to the appropriation of federal money to fund educational programs in the safe use of pesticides. In 1966, **Wayne A. Cole** was appointed to generate and execute such an educational program. The program evaluated methods and materials for vegetable-crop weed control. Cole left after two years and was replaced by Binning, who developed a comprehensive herbicide-evaluation program in vegetable and other horticultural crops. Herbert Hopen also worked in extension weed control from 1985 to 1997.

With the retirement of Binning in 2001, the responsibility for weed control has been assumed by Jed Colquhoun.

URBAN HORTICULTURE

When Combs retired in 1979, the department reviewed its extension programs and recommended that urban horticulture be given support. In the 1970s, urban horticulture had experienced a great boost in popularity. **Helen Harrison** was appointed as a specialist in this area in 1980.

In recent years, the department's extension outreach abilities have been enhanced with the addition of county horticultural specialists, who serve several counties with large urban populations. This trend toward county horticultural specialists began with the surge of public interest in horticulture in the late 1960s and on through the 1980s. Decreased extension funding has stopped further expansion in recent years. As of this writing, there are horticulture agents in Milwaukee, Dane, Fond du Lac, Waukesha, Brown, Door, and Racine Counties, plus agents with horticultural expertise in several other counties. Although these people are not members of the department faculty, some are department graduates, and they maintain close professional ties with the department's educational programs and appropriate industry groups.

The hiring of **Julie Dawson** in 2013 renewed the departmental extension emphasis on urban and regional food systems. This position will help to connect the ongoing work of urban horticultural specialists with research outreach in many departments across campus.

INTEGRATED PEST MANAGEMENT (IPM)

The program was initiated in 1979 with a federal grant administered by Cooperative Extension through the Department of Horticulture, proposed by **David Curwen** and other interested extension specialists. The initial crops chosen were potato and snap bean. These are high-value crops with extensive use of pesticides for control of weeds, diseases and insects. With this in mind, it was thought that the probability of influencing change might be greater in high-pesticide-use crops.

The program success was in part due to using the new money to hire program staff rather than using the money to support existing faculty. It gave the program the additional expertise and strength to develop necessary threshold treatment strategies and generate scout data to target treatment only when needed. The program placed scouts in the field to collect data — paid for by the program in the first year, with growers picking up 25 percent of cost the second year, 50 percent in year three, 75 percent in year four and all scouting costs paid by the grower beyond year four.

The purpose was to fine-tune treatment, maximize efficient use of pesticides and diminish the environmental impact of use. It was theorized that reduced use would offset the scouting costs. The program proved to be highly successful, and after the fourth year, scouting became private businesses hired by the growers that are still being used today. The success of the program has been noted as exemplary throughout the country.

As the potato and snap bean industries picked up the scouting costs, the monies recovered were used to develop other programs, including cranberry, other horticultural crops, urban horticulture, agronomic crops and others. Currently almost anywhere pesticides are used, there is an IPM component that has been developed, following the example set from the initial introduction of the program.

Bussan and colleagues have created assessment tools and BioIPM workbooks for carrot, snap bean, potato, and soybean. Current efforts are underway to create assessment tools for sweet corn, field pea, and soybeans. These assessment tools and BioIPM workbooks have served as the bases for international educational programs in Serbia, Albania, and China. The successes in this program recently attracted the attention of mainstream U.S. agriculture and resulted in the National Initiative for Sustainable Agriculture (NISA), which is co-lead by Bussan and Colquhoun.

The IPM program involved partnering with specialists with appropriate expertise from many departments on campus, including but not exclusive to plant pathology, entomology, agronomy, soils, agricultural economics, rural sociology, the animal science departments, plus others on and off campus as needed.

As the program matured, other similar programs were developed — somewhat as spinoffs of the original IPM program — that provided directed information to end-user clientele. The Integrated Crop and Pest Management program is one example: broader in scope and more inclusive in overall information, but

with information as the product to aid in quality decision-making by the end user. These programs have been highly successful in part because of the generous cooperation of the many faculty, staff and county staff who have bought into the concept throughout the years.

NUTRIENT and PEST MANAGEMENT (NPM)

In 1989, Larry Binning and Jeff Wyman (entomology) developed the Nutrient and Pest Management program to speak directly to water-quality issues resulting from fertilizer and pesticide use and to assist growers with compliance of county, state and federal regulations. It continues to be a highly successful program, resulting in a “Healthy Grown” label for potatoes when certain standards are met. This program has been used nationally as an example of environmentally sound production practices and was endorsed by the World Wildlife Fund, which allowed the use of its Panda logo on the label.

Current projects and impacts in the NPM program include the Healthy Grown Potato program, which has been a national model of sustainable production systems, exemplifying integrated pest management and reduced pesticide systems for potato production. There is also an innovative ecosystem conservation component to restore privately owned landscapes in Wisconsin. NPM is part of a UW team (including faculty and staff from the Departments of Entomology, Horticulture, and Agronomy) that is conducting multi-year field research and associated educational outreach on the influence of soil-fertility man-

agement on pest and beneficial insect activity in organic field-crop rotations. In addition, NPM staff, along with UW faculty, represent UW-Extension on the Wisconsin Organic Advisory Council. NPM has aided the development and instruction of cover-crop professional-development training programs for conservation staff professionals. NPM staff field inquires and provide advice on cover-crop selection and management, as well as cooperate with UW researchers. NPM staff have released NPM mobile applications (apps) for hand-held devices. Two apps are currently available: a nitrogen (N) price calculator and a Wisconsin N rate calculator for corn. A third app — the IPM toolkit — is in the works. This app will feature pest and disease identification, scouting tips, agricultural news feeds and more. The NPM and IPM program website delivers the popular *Wisconsin Crop Manager* newsletter, featuring contributions from faculty and staff across CALS departments. *Wisconsin Crop Manager* is produced weekly during the growing season, with semi-monthly and monthly releases during the winter months. The NPM program has a long history of publishing timely, pertinent, high-quality publications on the topics of improved agricultural management practices. Formats have ranged from simple, pocket-sized cards to extensive manuals and workbooks. As a result of successful grant applications, NPM publications have always been free to the public. Leadership for the NPM program rests with **Scott Sturgul**, while the IPM activities are led by **Dan Heider** and **Bryan Jensen**.



Since 1999, more than 15,000 people have completed Master Gardener training and are responsible for contributing more than 2.2 million hours of volunteer service. Currently, there are 52 active local associations across Wisconsin.

MASTER GARDENER

In the early 1970s, particularly in urban areas, county agricultural agents had significant demands on their time from home gardeners. A national conference in Denver focused on ways and means to address the needs of this “new” clientele group. The Master Gardener program introduced in western Washington state by Bernard Wesenburg, a graduate of this department, spurred considerable interest and led to a trial project in Milwaukee County. Programs in Milwaukee and Waukesha Counties formally started in 1977, and they were soon followed by Brown and Dane Counties. In subsequent years, Master Gardener training was offered by the UW-Extension county offices as part of a statewide program led by

Helen Harrison and **Bob Tomesh**. The statewide Wisconsin Master Gardener Association was formed in 1992 by UW-Extension Master Gardener volunteers from around the state.

Today, the Master Gardener program office in the horticulture department is the hub for the statewide program. In 1999, **Susan Mahr** was hired to be the first program coordinator. **Mike Maddox** was added in 2012 as the director after the retirement of Bob Tomesh. Together, they provide support and direction to county UW-Extension colleagues with educational materials and volunteer management. In addition, the program office creates new training materials and promotes volunteer projects for Master Gardener volunteers. It is also responsible for collect-

ing and maintaining volunteer records and generating the annual report.

Since 1999, more than 15,000 people have completed Master Gardener training and are responsible for contributing more than 2.2 million hours of volunteer service. Currently, there are 52 active local associations across Wisconsin.

Today Master Gardener volunteers can be found doing many different things in their communities. In many places, Master Gardeners still remain a valuable resource for home gardeners to find answers to their gardening questions. Master Gardeners have expanded their roles in their communities and can be found doing various garden-education projects with youth, the elderly, the disabled and the incarcerated.

Agricultural Research Stations



The Peninsular Agricultural Research Station near Sturgeon Bay was established in 1922 as a location for research to support agriculture in the Door County peninsula.

The availability of land and facilities at several out-state locations (the Agricultural Research Stations) has influenced the department's research programs. The first of these outlying stations was the Cranberry Experiment Station, operating from 1903 to 1917, five miles west of Port Edwards on State Highway 54. It was the site for research on cranberry culture, insects, and diseases. Superintendent

Malde, although not assigned to the department, conducted research on the horticultural aspects of cranberries, particularly on weed control. The station closed in 1917 due to a lack of funds. All field research on cranberries has been done with cooperating growers since 1917.

The Peninsular Agricultural Research Station near Sturgeon Bay, established in 1922 as a location for

research to support agriculture in the Door County peninsula, has focused its research on diseases, insects, and the culture of sour cherries and apples, as well as on other phases of agriculture.

In 1950, **Franklin Gilbert**, a fruit specialist, became station superintendent. His appointment marked a shift in research concentration to the horticultural crops area and away



The Hancock Agricultural Research Station in Waushara County was established in 1916 as a location to develop management techniques that could improve the productivity of agriculture in what was a marginally productive area.

from agronomic crops. From 1950 until Gilbert's retirement in 1983, this station was the site of fruit-cultivar studies, the strawberry-breeding program, apple-rootstock studies, herbicide evaluations, and cherry and apple nutritional and cultural studies. The Peninsular station is also the home of the Interregional Project (IR-1) *Solanum* germplasm collection. Under Gilbert's direction, the station earned a national and international reputation. Following his retirement, station research has been cooperative programs with Madison-based staff.

The IR-1 project for the collection and evaluation of *Solanum* germplasm was located at the Peninsular

station, with Robert Hougas as the early leader, because the climate was judged to be suitable for seed set and maintenance of the plant material. The collection of *Solanum* germplasm is currently the largest in the world.

In 1987, **David M. Spooner**, a USDA employee, was added to the faculty as a professional taxonomist to classify existing *Solanum* materials and to make further explorations in the native habitats for additional and unique *Solanum* materials. Although funded by USDA, the professional staff are faculty members of UW-Madison and contribute strongly to the research productivity and direction of the department.

P. Roger Rowe was leader of the project and a member of the department staff from 1963 to 1973. He was replaced by **Robert E. Hanneman** in 1974. In addition to administrative responsibilities, both carried out research.

Leigh E. Towill joined the staff in 1977 and was responsible for part of the potato-genetics program. He was particularly interested in the low-temperature preservation of meristem cultures, seeds and other tissues as a means of long-term storage of germplasm. After only a short period, he was transferred to the National Seed Storage Facility in Colorado.

The Hancock Agricultural Re-

search Station in Waushara County was established in 1916 as a location to develop management techniques that could improve the productivity of agriculture in what was a marginally productive area. The sandy soils in the "Golden Sands" area, better known now as the Central Sands, have low water-holding capacity and are subject to wind erosion and drought. Prior to 1950, the research thrust there was soil management, agronomic crop evaluation, and dairy management.

During the 1940s, lightweight and portable aluminum pipe was adapted for irrigation purposes. At the same time, researchers recognized that an abundant water supply was within a few feet of the soil surface over many thousands of acres in the Central Sands area. Bringing the water to the surface and distributing it through aluminum pipes started in the early 1950s at the Hancock station, and by 1988, the Central Sands area had expanded to 200,000 acres of irrigated crops. The growth was facilitated by the lower labor requirements of "center-pivot" systems.

A major project for evaluation of horticultural crops under irrigation began in 1953 under Gabelman and Dana. They and others demonstrated the successful culture of strawberries, green beans, peppers, cucumbers, tomatoes, transplant onions, sweet potatoes, muskmelons, and eggplants. Concurrently, Schoenemann initiated work with potatoes, and Ogden was able to grow excellent tobacco with irrigation. The work with potatoes and green beans soon attracted commercial-grower interest, and these two crops have become the mainstay of crop production in this specialized soil

area. In succeeding years, green peas and sweet corn have become popular supplements to the bean-and-potato economy.

The Hancock station has been the site for vegetable disease and insect research, as well as irrigation-quantity and timing research for many crops. The station provides facilities for research programs in strawberries, green beans, potatoes, tomatoes, cucumbers, and cole crops.

In 1964, **Gavin G. Weis** became station superintendent after serving as superintendent at the Horticulture Research Center-Arlington. After transferring to the Hancock station, he maintained a research effort primarily working with the Madison-based faculty of several departments. With his death, Chuck Kostichka became station superintendent under Research Station direction.

The Rhinelander Agricultural Research Station was transferred from the Department of Horticulture to the Experimental Farms Office in 1974. This station is devoted to research on the genetics, cytogenetics, and breeding of potatoes. 'Rhinered,' 'Wischip,' and 'Langlade' were developed and tested here. Also, Peloquin developed his procedure here for potato production from true seed. The culture and evaluation of haploid seedlings and their reconstitution as tetraploid potatoes takes place at the Rhinelander station.

Other UW agricultural research stations have been used for horticultural crops research and demonstration, but on a lesser scale than those mentioned in the preceding paragraphs. Ashland has had a small apple orchard for many years. Newman

established a turf plot there in the 1970s. Dana had a small project there in the 1960s, on strawberry multiplier disease, and Berninger has evaluated annual flowers for home use.

The Spooner station has an apple orchard, established in the 1930s. Klingbeil planted a few new trees between 1960 and 1975. Klingbeil had a blueberry-cultivar planting in the 1960s, and Schoenemann conducted potato-cultivar trials there for 30 years. Binning conducted potato weed-control and potato vine-killing experiments there from 1970 to 2001.

The Marshfield station is on a soil unsuited for most horticultural crop production. Horticultural involvement there has been limited to a home-garden-sized fruit orchard and home-garden flower, vegetable, and turf demonstrations.

The Lancaster station has a small orchard for apple rootstock and cultivar evaluation. Other UW experiment stations have not been utilized by department programs.

The Arlington station was established in 1960, when the college acquired the 160-acre Lone Oak Farm (Hahn Farm) to replace the research areas on the west side of Madison in the Hill Farms area. This provided excellent silt-loam soil for research plots. On the north side of the farm, an orchard was established. Greenhouses and cold-storage rooms were constructed along with a tobacco-curing barn.

Today the Arlington Horticulture farm provides a valuable resource for research and extension in vegetable and fruit crops, woody ornamentals and tobacco.

UW-Madison Arboretum



G. William Longenecker, the first director of the arboretum, was responsible for the large lilac and crabapple collections and the smaller collections of other shrubs and trees in the horticultural areas.

The UW-Madison Arboretum is a widely recognized laboratory area for the study of plant and animal communities native to the southern Wisconsin area. The arboretum was conceived as a location where several ecosystems could be saved or developed within a single, contiguous-management area. It includes prairie, oak-hickory forest, marshland, Lake Wingra shoreline and several other plant communities, as well as a substantial area devoted to plant collections of horticultural significance. Several far-sighted individuals worked together to obtain this land and its irreplaceable plant communities and

to assign its care and management to the university.

G. William Longenecker was one of the champions of this land use. He used his considerable prestige to influence a number of donors to give land parcels that were added to the original core area, which was a Civilian Conservation Corps camp during the 1933–1940 depression years. Longenecker, the first director of the arboretum, was responsible for the large lilac and crabapple collections and the smaller collections of other shrubs and trees in the horticultural areas.

The arboretum would not have been realized without Longenecker,

and he drew strong support from other members of the university community (Albert F. Gallistel, John Curtis, and others). Hasselkus substantially expanded the arboretum's horticultural collection with his appointment to the staff in 1961. He served as curator of the gardens for 47 years and has continued his involvement as an emeritus professor. The arboretum serves as a woody ornamental test area as well as an accessible teaching area for horticulture classes and classes from other university departments. The arboretum is under the administrative control of the Graduate School.

Allen Centennial Gardens

JEFF MILLER, UNIVERSITY COMMUNICATIONS



Allen Centennial Gardens surrounds the agricultural dean's residence.

Allen Centennial Gardens (ACG) is centered around a stately, Victorian, gothic house nestled on the agricultural campus. The house, known as the "Lake Dormer," the "Fred House," the "Agricultural Dean's Residence," and simply as "10 Babcock Drive," was one of the first buildings on the agricultural campus and served as the home of the college's first four deans. It remains a cherished landmark for generations of students, alumni and friends of the College of Agricultural & Life Sciences. Each of the four deans, William A. Henry (1891–1907), Harry L. Russell (1907–1931), Christian L. Christensen (1931–1943) and Edwin B. Fred (1943–1945), played a major role in the development of the College of Agricultural & Life Sciences at UW-Madison. Dean Fred continued to reside in the house after becoming president of the university.

Even though the house is no lon-

ger used as the dean's residence, the building continues to carry the imprint of the deans' families who once called it home.

Today, the house serves as the home for the offices of the Agricultural Research Stations. In 1984, it was placed on the National Register of Historic Places. This provided overdue recognition of the building and its grounds and gave the residence its appropriate place among Wisconsin's historic resources. Registration also saved it from certain demise as the campus grew and looked to expand classroom and research facilities. The former outdoor-classroom gardens were destroyed in 1979 to make room for the new Plant Sciences building addition. In the early 1980s, plans evolved for the instructional garden to be relocated on the 2.5 acres surrounding the house. Allen Centennial Gardens was dedicated in October

1989. The development of the horticulture outdoor classroom was designed to complement the home and its existing plantings, including a larch tree (*Larix decidua*) planted in 1899 to commemorate the birth of the dean-in-residence's son. Today, the Gardens functions as a public garden and an outdoor teaching garden for the Department of Horticulture.

Allen Centennial Gardens is constantly evolving. Visitors assume that it is a much older garden than it actually is, and they marvel at how established and complete it looks after only slightly more than a decade. The varied topography and exposures of the 90,000-square-foot site allow for a great diversity of plantings, and the "hardscapes" suggest a much older age. The major emphasis in the Gardens is on herbaceous ornamental perennials, but the site features many other plantings, including annuals and woody plants. **Ed Lyon** manages the Gardens and has won many awards for his garden designs.

At ACG, you will find a mix of historic garden styles, plant materials, and design innovations within 21 individually themed gardens. The foundation is based upon horticulture, gardening, botany and landscape history and design in a combination of art and science. The style and approach to gardening may be directed by landscape architectural history, a passion for a particular type of plant material or region of adaptation and trends and/or concerns. Overall the goal is to demonstrate the enormous diversity within the plant

kingdom, the importance of that diversity to human sustainability and how homeowners and professionals can use plants effectively in their own landscapes.

Perennial plantings include conifers, deciduous trees, shrubs and herbaceous perennials. Some gardens highlight plants with large numbers of species and cultivated varieties such as conifer, lily, peony, iris and daylily. Other gardens demonstrate regional, cultural and environmental plant adaptation such as rock, woodland and wildflower. Still other gardens demonstrate particular design styles, both historical and current. Additional areas highlight utility such as kitchen, herb and small fruits. Future additions will include areas of demonstration with focuses on small-space gardening, organics, sustainability, "home-grown" safe and fresh produce, and other gardening-based concerns.

The Gardens is funded primarily by private gifts, with some augmentation through rentals. Maintenance, enhancements, education and projects are possible only through the generosity of those who consider the Gardens to be an asset to the region-

and community. The Gardens provides valuable experience for college students who intend to find careers in horticulture when they graduate. Dedicated volunteers provide much of the necessary skill, expertise and labor to run the Gardens.



BRUCE RICHTER, UNIVERSITY COMMUNICATIONS

Ironwork adorns a bridge in the Gardens.



JEFF MILLER, UNIVERSITY COMMUNICATIONS

At ACG, there is a mix of historic garden styles, plant materials, and design innovations within 21 individually themed gardens.

International Service

The University of Wisconsin College of Agricultural & Life Sciences entered into a contractual arrangement with the United States Agency for International Development (USAID) in which the college provided on-site faculty assistance for selected institutions outside of the United States. O.B. Combs accepted the position of "chief of party" from 1963 to 1967 with the Wisconsin group working at the University of Western Nigeria in Ife. The Wisconsin group worked with the host institution to develop an undergraduate curriculum and laid the basis for starting an agricultural research program.

Fred Bliss joined the Wisconsin group in Ife in 1966. He instituted a program to improve the quality of cultivars of cowpeas and other vegetable crops for tropical culture and initiated a course in plant breeding for the undergraduate curriculum. From Madison, he continued his interest in and counsel with the University of Ife and developed a close working relationship with South American bean breeders. His research showed that certain beans have insect resistance that holds great promise for improved bean production, particularly in developing countries, and thus he developed a bean and cowpea research program in Brazil. Several graduate students from tropical countries completed their advanced-degree work with Bliss.

The UW-Madison agreement with the University at Rio Grande de Sol, in Brazil called for faculty assistance, primarily with graduate programs. The

department participated in a three-month survey by George Klingbeil to find and evaluate sites for potential apple production in Brazil. He successfully identified at least one area that had the soils, climate, and topography to promise successful production.

James Nienhuis has developed two opportunities for undergraduate and graduate students to participate in international horticulture.

The first opportunity is through the Tropical Horticulture course that he teaches. Students take a trip to Costa Rica during the winter break to learn about the country and the nature of tropical horticultural production. The second course is a collaborative effort with the Department of Latin American, Caribbean, and Iberian Studies that brings students from Central America to Madison during the summer months and offers them an opportunity to become involved in teaching and learning about U.S. agriculture and horticulture. In addition, the course offers the opportunity for UW-Madison students to travel to Costa Rica during spring break to participate in programming there.

In 2011, the Department of



Jim Nienhuis' research program works with women cooperatives on vegetable production in Guatemala and Honduras.

Horticulture, with Laura Jull's and Sara Patterson's support, began work on a new international program in Florence, Italy. This program will result in a course called Renaissance Horticulture, to be taught in a future semester. A trip to Italy during the summer will be part of the requirements for this course.

Instruction

UNDERGRADUATE

Horticulture instruction started with the appointment of William Trelease as professor of botany and horticulture in 1883. Horticulture enrollments climbed after Emmett Goff was appointed to the newly created Department of Horticulture in 1889. Goff was an outstanding instructor, and enrollment in his courses reached 300 students before his death in 1902. This was at a time when there were few departments in the college, and presumably every student took at least one course in horticulture as part of his program. This was also at a time

when there were only two department faculty members.

As additional faculty were added, the diversity of offerings in specialty areas expanded. The landscape architecture area got underway with the appointment of Franz Aust in 1915. Enrollment in this area grew to about 100 majors in the early 1960s, when landscape architecture was established as an independent department, with G. William Longenecker as chairperson. Enrollment in horticulture areas other than landscape architecture reached 15 to 20 majors in 1952 and expanded rapidly to 317 majors in

1976. The sharp increase from 1969 to 1976 was followed by a sharp decline to 60 majors in 1987. The number of majors hovered around 100 for many years before dropping to about 60 in recent years.

The department faculty has developed 22 formal courses in specialty areas of horticulture (fruits, vegetables, floriculture, and ornamental horticulture) and in discipline-oriented courses (propagation, physiology, genetics and breeding, environment, and plant nutrition).

Faculty appointments have commonly carried responsibility either for



JEFF MILLER, UNIVERSITY COMMUNICATIONS

Jim Nienhuis, at left, sits among students in his organic agriculture class and listens to two student-group presentations about production practices in organic agriculture.

teaching and research or for extension and research. Very few positions have been in only one area. The exceptions are those whose primary responsibility was landscape architecture instruction (Aust, Longenecker, Elfner, Zube, DeDeurwaerder) and those who were USDA research appointees (Johnson, Ogden, Hanneman, Peterson, Simon, Staub, Rowe, Havey, Bamberg, Bethke, Jansky, Hougas, Spooner, Towill) and thus did less classroom teaching. Newman and Hasselkus are the exceptions to this rule. Several (McCown, Dana, Hasselkus, Peloquin, Nienhuis, Goldman, Patterson) have received teaching awards from the college or university. The awards were not instituted until 1967, so early faculty had no opportunity to be recognized in this way.

GRADUATE

The department offered doctor of philosophy degrees only on a joint-major basis with other departments until the mid-1970s. At about this time, several members of the faculty, in cooperation with like-minded colleagues from other departments, organized and implemented the Plant Breeding and Plant Genetics (PBPG) program for students who were interested in developing expertise in the genetic improvement of crops. The PBPG program has become a strong interest area and has had as many or more students than the traditional horticultural areas.

Master's degrees have been offered in horticulture for many years and in the PBPG program since its inception. Unfortunately, no accurate record of successful advanced-degree candidates has been maintained over

the years. Before 1950, there were few graduate students, but after 1950, the number of enrolled graduate students has ranged from 30 to 60 in all semesters with about half being master's degree candidates and half Ph.D. candidates. From 1950 to the present, the number of Ph.D.'s awarded per year has averaged more than five and the number of master degrees has averaged more than seven.

FARM SHORT COURSE

The Department of Horticulture began participating in the Farm Short Course — now the Farm and Industry Short Course (FISC) — in 1888, soon after its inception in 1885. Professor Goff had 60 lectures in horticulture and economic entomology until 1896, when FISC was changed to a two-year program. Then Goff had a total of 77 lectures, with the first-year course titled Plant Life and the second-year course titled Horticulture and Greenhouse Crops. In 1902, Professor Emil Sandsten took over the scheduled lectures, with help from Walter Brown and Ramsey. Then in 1906, Professor James Moore and James Milward assisted Professor Sandsten for several years. For many years, there was a course on fruits and one on vegetable crops.

After 1960, a course in turf management was added. The reorganization of the FISC offerings in 1986 allowed the department to offer intensive, one-week courses to specific clientele groups (greens keepers, cranberry growers, etc.) in lieu of the longer, general-enrollment courses of former years. Enrollments indicate that this new approach was long overdue for horticulture. Currently, there is

also is a course called Introduction to Plant Science and Landscape Management taught by **Eileen Nelson**.

UNDERGRADUATE HORTICULTURE SOCIETY

The Horticulture Society was organized to interest and acquaint students in the college with career opportunities and requirements in the field of horticulture and related fields. The society is made up of undergraduates, the majority of whom are majoring in horticulture. A faculty advisor works with the group, which meets bimonthly. The society travels to horticultural events and meetings, visits botanical gardens and arboreta around the country, has traveled internationally, and runs programming for children at elementary schools and gardens around Wisconsin. The society also runs a large and successful plant sale each fall on campus.

PLANT SCIENCES GRADUATE STUDENT COUNCIL

The Plant Sciences Graduate Student Council was founded in 2000 to promote educational and social outreach and to welcome new graduate students in the plant sciences. This involves graduate students from horticulture, agronomy, plant breeding and plant genetics (PBPG), and plant pathology.

Courses and Instructors

General Horticulture

- 1 General Horticulture • 1892–1902 • Goff, Cranfield
- 8 Home Horticulture Moore • 1941–1954
- 20 Survey of Horticulture • 1955–1962 • Comb
- 120 General Horticulture • 1963–1978 • Dana
- 120 General Horticulture for Non Majors • 1979–2013 • Peterson, Dana, Hopen, Nienhuis, Velguth, Patterson
- 121 Experimental Horticulture • 1919–1932 • Moore, Staff
- 122 General Horticulture for Majors • 1979–2008 • McCown
- 374 Tropical Horticulture • 2003–2013 • Nienhuis
- 375 Plants as Food • 2010 • Patterson

Vegetables

- 3 Vegetable Gardening • 1903–1951 • Rogers, Moore
- 4 Vegetable Forcing • 1903–1926 • Rogers, Hepler & Moore
- 11 Potato and Tuber Crops • 1919–1931 • Milward
- 123 Systemic Olericulture • 1915–1916 • Hepler
- 163 Structure & Physiology of Vegetable Crops • 1950–1956 • Holm & Gabelman
- 370/371/372 Vegetable Production • 1955–1995 • Combs, Tibbitts, Haltvick, Hopen, Bliss, Nienhuis, Goldman, Harrison
- 370 World Vegetable Crops • 2002–2013 • Nienhuis, Goldman

Fruits

- 1 Fruit Growing • 1903–1954 • Moore
- 2 Advanced Fruit Growing • 1915–1932 • Potter, Moore, Nightingale, Roberts
- 5 Small Fruits • 1916–1951 • Moore, Aust, Moore
- 122 Systemic Pomology • 1903–1931 • Moore, Nightingale
- 122 Pomology • 1932–1953 • Roberts
- 140/345 Small Fruits • 1954–2013 • Dana, Stimart, Roper, Stang, Harbut
- 141/341 Tree Fruits • 1954–2013 • Dana, Stimart, Kosola

Floriculture

- 8 Floriculture • 1908–1933 • Moore
- 30 Floriculture • 1954–1961 • Beck
- 134 Ornamental Greenhouse Plants • 1962 • Beck
- 232 Ornamental Plants I • 1971–2013 • Beck, Stimart
- 232/233 Ornamental Plants II • 1972–2013 • Beck, Stimart, Oosterwyk
- 330 Principles of Floriculture • 1963–1974
- 334 Greenhouse Production of Ornamental Plants • 1966–2013 • Beck, Stimart, Oosterwyk
- 335 Greenhouse Production of Ornamental Plants Lab • 1977–2013 • Beck, Stimart, Oosterwyk
- 360 Nursery Management • 1966–1979 • Hasselkus

Seed Identification

- 16/103 Crop Identification & Standards • 1932–1950 • Moore

Plant Breeding

120 Plant Breeding • 1903–1919 • Moore, Rogers, Potter
107/127/627 Techniques & Methods of Breeding Horticultural Crops • 1950–1970 • Gabelman
375 Plant Genetics & Sustainability • 2010 • Krysan, Patterson
500/501 Principles of Plant Breeding • 1971–2013 • Bliss, Gabelman, Nienhuis, Goldman
502 Techniques of Plant Breeding Lab • 1971–2013 • Bliss, Gabelman, Nienhuis, Goldman, Havey
550 Molecular Approaches for Crop Improvement • 1989–2013 • Vierstra, Havey, Krysan
555/875 Plant Functional Genomics & Biotransformations • 2006–2013 • Krysan
561 Introductory Cytogenetics • 1966–2013 • Peloquin, Simon, Jiang

Propagation

7 Plant Propagation • 1903–1960 • Brown, Moore, Longenecker
57/227 Propagation • 1962–2013 • Hasselkus, Holm, Dana, McCown

Landscaping

6 Landscape Plants • 1915–1931 • Aust, Longenecker,
6 Landscape Design • 1931–1956 • Aust, Longenecker, Elfner
12 Home Ground Design • 1932–1956 • Aust, Longenecker, Elfner
14 Land Construction Problems • 1939–1955 • Longenecker, Elfner
15 Water Problems • 1932 • Aust, Longenecker
50/157 Landscape Design • 1959–1962 • DeDeurwaerder, Zube
102 Public Grounds • 1941– 1961 • Aust, Elfer, Longenecker
104 Landscape Plants • 1932–1946 • Longenecker
105/155 Herbaceous Landscape Plants • 1950–1957 • Longenecker
125 Advanced Landscaping • 1914–1930 • Aust
150 Site Planning • 1961 • Longenecker
152 Land Construction Problems • 1961–1962 • DeDeurwaerder, Zube
154 Woody Landscape Plants • 1956–1960 • Longenecker
263 & 264 Landscape Plants • 1963–2012 • Hasselkus, Jull
360/361 Production & Maintenance of Landscape Plants • 1983–1989 • Hasselkus
375 Lawn, society & Environment • 2009–2011 • Stier
375 Arboriculture & Landscape Maintenance • 2006–2012 • Jull

Turf

13 Lawns 1944–1950 Longenecker
53 Lawns & Grading 1956 Elfner
153 Turf & Grading Problems 1960 DeDeurwaerder
261/262 Turf Management 1963–2011 Neuman, Rossi, Stimart, Stier
375 Lawn, Society & Environment 2009–2011 Stier
375 Arboriculture & Landscape Management 2010–2013 Jull
461 Advanced Turf Management & Physiology 2002–2011 Stier

Plant Nutrition

326/328/333 Plant Nutrition 1979–1999 Peterson, Roper

Environment

320 Environment of Horticultural Crops • 1973–2013 • Tibbitts, Palta

Air Pollution

420 Crop Reactions to Atmospheric Pollutants • 1970–1986 • Tibbitts

Entomology

5/20 Economic Entomology & Pathology • 1903–1908 • Sandstein, Milward

Forestry

10 Farm Forestry • 1918–1927 • Aust

Experimental Horticulture

21/121 Experimental Horticulture • 1903–1915 • Sandstein, Moore, Rogers, Hepler, Potter

Organic Production

372 Colloquium in Organic Agriculture • 2010–2013 • Nienhuis

375 Organic Research Colloquium • 2013 • Patterson, Goldman

Horticulture History

121 Horticulture History • 1916–1929 • Moore, Staff

156 History of Landscape Architecture • 1960 • Longenecker

Camouflage

128 Principles of Camouflage • 1942–1943 • Aust

Rural Planning

126 Rural Improvement • 1923–1931 • Aust

192 Rural Regional Planning • 1934–1942

Growth Regulators

109 Effects of Growth Regulators on Horticultural Crops • 1951–1954 • Holm

129 Application of Growth-Regulating Chemicals to Horticultural Crops • 1955–1961 • Holm

629 Principles of Plant Growth Regulation • 1963–1979 • Holm, McCown

Integrated Pest Management

375 Diagnosing Pest & Nutrient Status • 2005 • Nienhuis

Ethics & Future

375 Plants & Human Well-being • 2013 • Goldman

375 Assessing Agricultural Sustainability • 2013 • Bussan, Colquhoun

375 A Growing Dilemma: The Future of Food • 2013 • Bussan, Colquhoun

875 Introduction to Research Ethics • 2006–2010 • Patterson



Julie Dawson looks over produce and vegetables growing at the Eagle Heights Community Garden.

Current List of Courses Offered by the Department of Horticulture

HORT 1	Cooperative Education/Co-op in Horticulture	Credits: 1
HORT 120	Survey of Horticulture	Credits: 3
HORT 121	Horticulture Colloquium	Credits: 1
HORT 227	Propagation of Horticultural Plants	Credits: 3
HORT 232	Herbaceous Ornamental Plants I	Credits: 2
HORT 233	Herbaceous Ornamental Plants II	Credits: 2
HORT 261	Turf Management	Credits: 2
HORT 262	Turfgrass Management Laboratory	Credits: 1
HORT 263	Landscape Plants I	Credits: 3
HORT 289	Honors Independent Study	Credits: 1–2
HORT 299	Independent Study	Credits: 1–3
HORT 309	Diseases of Landscape Trees and Shrubs	Credits: 3
HORT 320	Environment of Horticultural Plants	Credits: 3
HORT 326	Plant Nutrition Management	Credits: 3
HORT 328	Integrated Weed Management	Credits: 4

HORT 332	Turfgrass Nutrient and Water Management	Credits: 3
HORT 334	Greenhouse Production of Ornamental Plants	Credits: 2
HORT 335	Greenhouse Production of Ornamental Plants Lab	Credits: 1
HORT 338	Plant Breeding and Biotechnology	Credits: 3
HORT 339	Plant Biotechnology: Principles and Techniques I	Credits: 4
HORT 340	Plant Biotechnology: Principles and Techniques II	Credits: 4
HORT 345	Fruit Crop Production	Credits: 3
HORT 370	World Vegetable Crops	Credits: 3
HORT 372	Colloquium in Organic Agriculture	Credits: 1
HORT 374	Tropical Horticulture	Credits: 2
HORT 375	Special Topics	Credits: 1–4
HORT 399	Coordinative Internship/Cooperative Education	Credits: 1–8
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HORT 400	Study Abroad in Horticulture	Credits: 1–6
HORT 410	Undergraduate Seminar	Credits: 1
HORT 461	Advanced Turfgrass Management and Physiology	Credits: 3
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HORT 500	Molecular Biology Techniques	Credits: 3
HORT 501	Principles of Plant Breeding	Credits: 3
HORT 502	Techniques of Plant Breeding	Credits: 1
HORT 524	Urban Soil and Environment	Credits: 3
HORT 550	Molecular Approaches for Potential Crop Improvement	Credits: 3
HORT 555	Plant Functional Genomics and Bioinformatics	Credits: 2–3
HORT 561	Introductory Cytogenetics	Credits: 2–3
HORT 571	Statistical Methods for Bioscience I	Credits: 4
HORT 572	Statistical Methods for Bioscience II	Credits: 4
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HORT 626	Mineral Nutrition of Plants	Credits: 3
HORT 681	Senior Honors Thesis	Credits: 2–4
HORT 682	Senior Honors Thesis	Credits: 2–4
HORT 699	Special Problems	Credits: 1–4
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HORT 799	Practicum in Horticulture Teaching	Credits: 1–3
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HORT 811	Biometrical Procedures in Plant Breeding	Credits: 3
HORT 812	Selection Theory for Quantitative Traits in Plants	Credits: 3
HORT 850	Advanced Plant Breeding	Credits: 3
HORT 875	Special Topics	Credits: 1–4
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HORT 910	Seminar	Credits: 1
HORT 957	Seminar: Plant Breeding	Credits: 1
HORT 990	Research	Credits: 1–12

Department of Horticulture Faculty

Department faculty grew from one in 1889 to 28 by 1980, and then decreased to 21 in 2014. Growth was steady from 1905 to 1980 and held steady for 10 years; it has decreased since that time.

Nine chairpersons served the department in its first 100 years. Only four chairpersons served in the first 75 years (Goff, Sandsten, Moore, and Combs), and nine in the last 48 years. During the tenure of Combs, the method of selecting the chair changed from being an appointment by the dean of the College of Agriculture to a department vote. The department then sends its recommendation to the dean for approval.



BRYCE RICHTER, UNIVERSITY COMMUNICATIONS

John Stier at the O.J. Noer Turfgrass Research and Education Facility.

Name	Years	Title	Program
Trelease, William	1883–1885	Professor	Administration, general horticulture, botany
Goff, Emmett S.	1889–1902	Professor	Teaching, research: physiology, general horticulture, department administration (chair 1889–1902)
Cranefield, Frederick	1894–1904	Instructor	Teaching: general horticulture, fruits
Sandsten, Emil P.	1902–1909	Professor	Teaching: general horticulture, fruits, departmental administration (chair 1889–1902)
Brown, Walter S.	1904–1906	Instructor	Teaching, extension: general horticulture
Moore, James J.	1905–1952	Professor	Teaching, research: culture, breeding, general horticultural crops (chair 1909–1949)
Milward, James G.	1906–1951	Professor	Extension: potatoes
Rogers, Jr. August J.	1907–1911	Instructor	Teaching, research: fruits
Johnson, James	1909–1952	Professor	Research: tobacco diseases, breeding, culture
Hepler, Jesse R.	1911–1917	Instructor	Teaching: vegetable crops
McCarthy, T.J.	1911–1913	Instructor	Teaching: fruits
Howard, Robert	1912–1914	Asst. Prof.	Teaching, research
Potter, George F.	1913–1920	Asst. Prof.	Teaching, research: fruits, winter hardiness
Aust, Franz A.	1915–1943	Assoc. Prof.	Teaching, extension: landscape architecture
Brann, John W.	1915–1939	Asst. Prof.	Extension: potatoes, diseases
Roberts, Ray H.	1915–1960	Professor	Research: fruits, physiology, natural hormones

Gifford, Frank R.	1921–1924	Instructor	Extension: fruits
Kuehner, Conrad L.	1923–1952	Professor	Extension: fruits
Longenecker, G. William	1924–1964	Professor	Teaching: landscape architecture, UW Arboretum director, William campus landscape consultant
Ogden, William B.	1924–1971	Assoc. Prof.	Research (USDA): tobacco, diseases & culture
Watts, Victor M.	1925–1927	Instructor	Teaching, research: vegetable crops
Hoggan, Isme A.	1925–1938	Asst. Prof.	Research: tobacco, diseases
Burke, Earl F.	1927–1930	Instructor	Research: vegetables
Combs, O.B.	1930–1979	Professor	Teaching, research, extension, vegetable crops culture, breeding (chair 1949–1965)
Morris, Norman A.	1930–1934	Instructor	Extension: landscape architecture
Holmes, L.G.	1934–1941	Asst. Prof.	Extension: landscape architecture
Struckmeyer, Burdean E.	1936–1981	Professor	Research: anatomy, nutrition
Rieman, Gustaf H.	1936–1959	Professor	Research: potatoes, breeding, culture
Fulton, Robert W.	1937–1955	Asst. Prof.	Research: tobacco breeding, diseases
Elfner, Joseph S.	1941–1957	Assoc. Prof.	Extension, teaching: landscape architecture
Munger, Henry M.	1942–1945	Asst. Prof.	Research: vegetable breeding, culture
Chamberlain, D. W.	1943–1945	Instructor	Research: tobacco diseases
Heggestad, Howard E.	1944–1946	Instructor	Research: tobacco diseases
Langord, Leonard R.	1945–1965	Instructor	Research: fruits
Warren, G. Fred	1945–1948	Asst. Prof.	Research: vegetable crops culture, weed control
Swingle, Charles F.	1947–1950	Asst. Prof.	Research, extension: fruits, Peninsular Research Station superintendent
Ziegler, George A.	1947–1964	Asst. Prof.	Extension: landscape architecture
Beck, Gail E.	1949–1985	Professor	Extension, teaching, research: floriculture
Holm, LeRoy G.	1949–1970	Professor	Research, teaching: physiology, growth, weed control
Gabelman, Warren H.	1949–1991	Professor	Research, teaching: vegetable crops, breeding, genetics, culture (chair 1965–1973)
Gilbert, Franklin A.	1950–1982	Professor	Research, extension: fruits, breeding, culture, Peninsular Research Station superintendent
Schoenemann, John A.	1951–1986	Professor	Extension: vegetable crops, potatoes (chair 1984–1985)
Dana, Malcolm N.	1952–1987	Professor	Research, teaching: fruits, culture, weed control in cranberries (chair 1973–1978)
Bosley, David A.	1952–1954	Instructor	Extension: floriculture
Klingbeil, George C.	1953–1976	Professor	Extension: fruits
Wedin, Walter F.	1953–1957	Asst. Prof.	Research: tobacco, nutrition, culture
Berninger, Louis M.	1954–1984	Professor	Extension: floriculture
Tibbitts, Theodore W.	1955–1996	Professor	Research: tobacco physiology, vegetable physiology, plants for space life support
Haltvick, Ernest T.	1955–1974	Assoc. Prof.	Research: vegetable culture
Nettum, George E.	1956–1957	Instructor	Extension: tobacco
Bracken, John R.	1957–1959	Prof. (visiting)	Teaching: landscape architecture
Peterson, Lloyd A.	1958–1993	Professor	Research, teaching: tobacco, plant nutrition, culture
Everson, Norman O.	1958–1961	Instructor	Extension: tobacco
DeDeurwaerder, Charles A.	1959–1961	Instructor	Teaching: landscape architecture

Weis, Gavin G.	1959–1990	Professor	Administration: Horticultural Research Center director, Hancock Agricultural Research Station director
Newman, Robert C.	1960–1991	Professor	Teaching, extension, research: tobacco, turf
Heinicke, Donald	1960–1961	Asst. Prof.	Research: fruit crops
Zube, Ervin	1961–1962	Asst. Prof.	Teaching: landscape architecture
Hasselkus, Edward R.	1961–1994	Professor	Teaching, extension: woody ornamentals
Hougas, Robert W.	1962–1985	Professor	Teaching, research (USDA): <i>Solanum</i> genetics, leader of IR–1 <i>Solanum</i> genetics, CALS administration
Peloquin, Stanley J.	1962–1994	Professor	Teaching, research: <i>Solanum</i> genetics and cytogenetics
Curwen, David	1963–1994	Professor	Extension, research: vegetable crops
Rowe, P. Roger	1963–1973	Assoc. Prof.	Research (USDA): leader of potato germplasm collection (IR–1)
Leuty, Stanley J.	1964–1965	Asst. Prof.	Research, teaching: fruit crops
Bliss, Fredrick A.	1966–1988	Professor	Research, teaching: vegetable breeding, bean improvement
Hall, Timothy C.	1966–1981	Professor	Research, teaching: protein chemistry, bean improvement
Cole, A. Wayne	1966–1967	Asst. Prof.	Extension, research: safe use of pesticides
Peterson, Clinton E.	1968–1987	Professor	Research (USDA): carrot, onion, cucumber, breeding
Binning, Larry K.	1969–2001	Professor	Extension, research: weed control in horticultural crops (chair 1991–2000)
Hosfield, George L.	1971–1977	Asst. Prof.	Research (USDA): vegetable crops breeding
Edwards, Gerald E.	1971–1981	Assoc. Prof.	Research, teaching: plant physiology
McCown, Brent H.	1972–2012	Professor	Teaching, research: micropropagation, plant physiology
Hanneman, Robert E.	1974–2002	Professor	Research (USDA): Leader, IR–1 <i>Solanum</i> genetics and germplasm collection
Towill, Leigh E.	1977–1983	Asst. Prof.	Research (USDA): cryopreservation of plants
Simon, Philipp W.	1977–Present	Professor	Research (USDA): flavor in carrots, vegetable breeding
Stang, Elden J.	1978–1994	Professor	Extension, teaching, research: fruit crops
Tolla, Greg E.	1978–1980	Asst. Prof.	Research (USDA): cucumber breeding
Lower, Richard L.	1978–2002	Professor	Research, admin: cucumber breeding, CALS administration (chair 1978–1984)
Harrison, Helen C.	1980–2004	Professor	Extension, research, teaching: non-commercial horticulture
Staub, Jack E.	1981–2007	Professor	Research (USDA): cucumber breeding and physiology
Palta, Jiwan P.	1982–Present	Professor	Teaching, research: stress physiology of crops
Sussman, Michael R.	1982–2002	Professor	Teaching, research: nutrient movement, director Biotechnology Center
Yandell, Brian S.	1982–Present	Professor	Teaching, research: biometry, statistics and data processing (joint appointment in statistics)
Vierstra, Richard D.	1984–2003	Professor	Teaching, Research: protein, molecular biology
Hopen, Herbert J.	1985–1997	Professor	Teaching, research: vegetables, cranberries (chair 1985–1991)
Stimart, Dennis R.	1986–2010	Professor	Teaching, research: floriculture crops (chair 2000–2008)
Spooner, David M.	1987–Present	Professor	Research (USDA): taxonomy of <i>Solanum</i> species
Roper, Teryl R.	1988–2008	Professor	Extension, research, teaching: fruit crops
Havey, Michael J.	1988–Present	Professor	Research (USDA): vegetable breeding
Bamberg, John	1989–Present	Professor	Research (USDA): potato breeding
Nienhuis, James	1990–Present	Professor	Research, teaching: vegetable production, breeding, cytogenetics

Goldman, Irwin	1992–Present	Professor	Research, teaching: vegetable breeding, CALS administration 2004–2010 (chair 2011–present)
Rossi, Frank	1992–1996	Asst. Prof.	Extension, research, teaching: turfgrass
Jiang, Jiming	1995–Present	Professor	Research, teaching: plant cytogenetics, potato genetics and breeding
Stier, John	1997–2011	Professor	Extension, teaching: turfgrass (chair– 2008–2011)
Jull, Laura	1998–Present	Professor	Extension, teaching: woody ornamentals
Connell, Timothy	1998–2000	Asst. Prof.	Extension, research: vegetable crops
Patterson, Sara	2000–Present	Professor	Research, teaching: post-harvest physiology
Bussan, A.J.	2001–Present	Professor	Extension, research: vegetable, potato physiology
Kosola, Kevin	2001–2008	Asst. Prof.	Research, teaching: cranberry physiology
Krysan, Patrick	2002–Present	Professor	Research, teaching: functional genomics
Jansky, Shelley	2004–Present	Assoc. Prof.	Research (USDA): potato breeding
Colquhoun, Jed	2005–Present	Professor	Extension, research: Weed science
Bethke, Paul	2006–Present	Assoc. Prof.	Research (USDA): potato physiology
Weng, Yiqun	2008–Present	Asst. Prof.	Research (USDA): vegetable genetics
Harbut, Rebecca	2009–2013	Asst. Prof.	Research (USDA): vegetable genetics
Zalapa, Juan	2010–Present	Asst. Prof.	Research (USDA): cranberries.
Dawson, Julie	2013–Present	Asst. Prof.	Extension, research, teaching: urban & regional food systems
Endelman, Jeffrey	2013–Present	Asst. Prof.	Research, teaching, extension: potato breeding
Atucha, Amaya	2014–Present	Asst. Prof.	Extension, research, teaching: fruit crops

Department of Horticulture Staff

Throughout its history, the department has been fortunate to attract and retain a large number of highly qualified academic and classified staff. Many of these staff members have been primary contributors to key discoveries, signature courses, and workshops, and to the ongoing success of the department. A high percentage have made a career commitment to the department. Research, outreach, and instructional staff work side by side with faculty in the lab, classroom, and field to collect data, run experiments, write publications

and present results, train and mentor undergraduate and graduate students, as well as plant, cultivate, and harvest. They are the day-to-day laboratory and program managers of many complex programs, including the Integrated Pest Management (IPM), Nutrient and Pest Management (NPM), IR-4, Herbaceous Ornamentals, and Master Gardener Volunteer programs, as well as the D.C. Smith Greenhouse and the Allen Centennial Gardens. In the office, administrative staff keep the department running smoothly and efficiently in many ways, including grant adminis-

tration, payroll and personnel management, and purchasing, as well as being the social glue and often the public face of the department. The benefit to the department lies in the substantial increase in productivity by the faculty and the continued growth and success of the Department of Horticulture.

Although staff records are not available back to the founding of the department, the tables below list individuals over the past 20+ years who have had significant impacts on the success of the Department of Horticulture.

BRYCE RICHTER, UNIVERSITY COMMUNICATIONS



Horticulture 375 students watch a demonstration during a tree-climbing lab conducted at the large Swamp White Oak tree outside the Microbial Sciences Building.

Horticulture Classified Staff

Name	Latest Title	Start	End
Anderson, Jane	Financial Specialist	1972	2011
Anlauf, Ellen	Financial Specialist	2012	present
Barth, Judith	Academic Department Manager	1970	2010
Ben-Zikri, Natalie	University Services Program Associate	2013	present
Check, Tricia	Academic Department Manager	2000	present
Cook, Findley	Department Manager		
Cupery, Robert	Program Assistant	1994	1995
Denk, Karen	Technical Typist	1995	2003
Eason, Clarence	Laboratory Technician	1989	1994
Fernandez, Charles "Chico"	Facilities Maintenance Specialist — U.S. Potato Genebank, Sturgeon Bay	1978	2009
Frank, Thomas	Information Systems Professional	1982	present
Fuller, Joseph	Program Assistant	1988	1988
Hansberry, Martin	Program Assistant — Master Gardener Program	1999	2000
Hansen, Cheryl	Program Assistant	1993	1993
Hergenrother, Jennifer	Program Assistant	1985	1993
Hon, Tormey	Maintenance Mechanic — Arlington Horticultural Farm	1959	1998
Hutchins, Christine	Graphic Designer	1999	2001
Jacobson, Kristin	University Services Program Associate	2008	2013
Jaekel, Sharon	Technical Typist		1997
Koch, Laurie	Program Assistant	1993	1993
May, Barbara	Department Manager		1978
McMillan, Jean	University Services Program Associate	2005	2006
Parker, Edith	Research Gardener — Palta/Rhinelanders ARS	2008	2012
Pryes, Catherine	University Services Program Associate	1980	2006
Smejkal, Jean	Laboratory Technician — U.S. Potato Genebank, Sturgeon Bay	1960s	1990
Sterud, Mary	Department Manager	—	—
Stoneman, Sheila	Research Gardener — U.S. Potato Genebank, Sturgeon Bay	1996	2007
Young, Julie	University Services Program Associate	2006	2008
Zajda, Jeffery	Management Information Technician	1989	1992

Horticulture Academic Staff

Name	Latest Title	Start	End	Faculty/Dept. Program
Adams, Leah Nell	Outreach Specialist	—	—	NPM
Anchor, Theodore	Associate Outreach Specialist	—	—	NPM/Stevens Point
Anthony, Warren	Research Specialist	—	1970s	Peloquin
Bamberg, John	Research Program Manager I	1985	1989	U S Potato Genebank, Sturgeon Bay
Baumann, Dana	Associate Research Specialist	1999	2001	Roper
Baumgartner, Cindy	Associate Research Specialist	1989	1995	Curwen, Hancock ARS
Berg, Henry	Senior Research Specialist	1960s	1996	Arlington Hort. Farm, Ogden, Newman, Rossi
Berg, Lois	Lecturer (Floriculture)	1985	1986	Department
Binder, Brad	Assistant Researcher	1994	2005	Patterson
		1998	2008	Sussman, Patterson
Blanchard, Christopher	Associate Research Specialist	1994	1995	Simon
Breitbach, Dwight "Nick"	Researcher	1970	2008	Gabelman, Bliss, Goldman
Brodhagen, Marion	Research Specialist	1992	1994	McCown
Broeske, Michelle "Mimi"	Senior Editor	1996	present	NPM
Brown, Kirsten	Associate Student Services Coordinator	2012	2013	Department
Busse, James	Assistant Scientist	2002	2006	Palta
Cao, Weixing	Assistant Scientist	1992	1995	Tibbitts
Carpenter, Tami	Research Specialist	1988	1992	Vierstra
Cates, Kim	Associate Geologic Survey Specialist	1989	—	—
Christensen, Grace	Associate Research Specialist	2014	present	Endelman
Clausen, Kristin	Research Specialist	1982	1987	Simon
Coffin, Cynthia	Outreach Specialist	1995	1995	—
Connell, Timothy	Researcher	2000	2000	Binning
Del Rio, Alfonso	Associate Scientist	2001	present	Bamberg, Palta
Delahaut-Schneider, Karen	Senior Outreach Specialist	1991	2008	IPM
Dickmann, Leslie	Research Specialist	1995	1997	Sussman
Dogra, Renu	Associate Research Specialist	1988	1988	—
Doumas, Nancy	Researcher	1983	1986	Palta
Drilias, Michael	Researcher	1993	present	Binning, Bussan
Duffy, Kathleen	Outreach Specialist	—	—	—
Durski, Adam	Associate Research Specialist	1999	2002	—
Ebeling, Angela	Associate Outreach Specialist	—	2003	NPM
Ellis, David	Associate Scientist	1988	1996	McCown
Estrella, Reggie	Associate Research Specialist	1996	1997	—
Falbel, Tanya	Assistant Scientist	2008	2010	Patterson
Fitzpatrick, Ann	Research Specialist	1985	1989	Tibbitts
Foster, Tracy	Associate Research Specialist	1992	1993	Havey
Gedye, Charles	Associate Instrument Specialist	1989	—	—
Gemmell, Joann	Associate Research Specialist	1993	1994	Palta

Good, Laura	Senior Outreach Specialist	1990	1998	NPM
Graziano Jr., Franklin	Associate Research Specialist	1993	1995	Tibbitts
Gregos, Jeff	Research Program Manager I	—	2003	Stier
Grisson, Dan	Research Specialist	1984	1988	Simon
Groza, Horia	Associate Scientist	1996	2004	Jiang
Hallanger, Bethel	Associate Research Specialist	1989	1991	Tibbitts
Hatfield, Peggy	Associate Scientist	1985	1995	Vierstra
Heider, Daniel	Senior Outreach Specialist	1996	present	IR-4
Hopka, Chris	Greenhouse Manager	1972	1981	Beck, Hort. Greenhouse Manager
Hoyt, William	Senior Outreach Specialist	1987	2008	Allen Centennial Gardens/Stimart
Hughes, Robert	Researcher	1971	2003	Hopen, Binning
Hummel, Lynn	Research Specialist	1978	1979	Bliss
Jabben, Merten	Research Specialist	1989	1989	—
Jaffee, Daniel	Outreach Specialist	1996	1997	—
Jensen, Bryan	Outreach Program Manager II	1980	present	IPM
Jester, Peter	Research Specialist	2002	2010	Krysan
Jin, Weiwei	Assistant Scientist	2005	2006	Jiang
Jones, Kathryn	Student Services Coordinator	2014	present	Department
Joyce, Peter	Associate Researcher	1989	1991	McCown
Jung, Geunhwa	Assistant Scientist	1999	1999	Stier
Kachadoorian, Roseann	Outreach Specialist	1986	1992	IPM, Binning
Kane, Robert	Associate Research Specialist	1983	1995	Simon
Kao, Laura	Associate Research Specialist	1984	2003	C.E. Peterson, Simon
Karakka, Paul	Senior Programmer Analyst	1991	1993	Tibbitts
Karlsson, Bjorn	Associate Researcher	—	—	IPM, NPM
Kichefski, Don	Research Specialist	1994	2011	Palta, Jull, Goldman
Kienitz, Jonnimae	Research Specialist	~1960	1991	ARS, Peloquin, Starks
Kivlin, Paul	Outreach Program Manager I			Potato Farm, Rhinelander
Klueh, John	Assistant Researcher	1986	1994	Binning
Kmiecik, Kenneth	Associate Researcher	1990	present	NPM
Knuteson, Deana (Sexson)	Researcher	1988	1998	Stang, Roper
Koeritz, Eric	Research Specialist	1988	1998	Bliss, Nienhuis
Krueger, Armand	Senior Outreach Specialist	2000	present	BiolIPM Field Coordinator/NPM
Krysan, Patrick	Associate Scientist	2004	2008	Stier
Kusner, Karianne	Associate Research Specialist	1970	present	L. Peterson, Binning, Roper, Bussan
Lana, Cornelio	Research Specialist	1997	2002	Sussman
Larson, Barbara	Senior Lecturer	1994	1995	Patterson
Leward, Phyllis	Research Specialist	1981	1984	C.E. Peterson, Simon
		1994	1995	Department
		1970s	1983	C.E. Peterson

Lickfeldt, Darin	Research Specialist	1994	1994	Rossi
Light, Tibbi	Outreach Specialist	1996	1996	Stimart, Allen Centennial Gardens
Liu, Jinsheng	Lecturer	1993	1994	Department
Lyon, Edward	Senior Outreach Specialist	2008	present	Stimart, Allen Centennial Gardens
Mahr, Susan	Outreach Specialist	1999	present	Master Gardener Program
Manney, Lorelei	Associate Researcher	1988	1994	Sussman
Marita, Jane	Research Specialist	1994	1996	Nienhuis
Martin, Max	Research Program Manager I	1989	present	Bamberg, U.S. Potato Genebank, Sturgeon Bay
Mather, John	Research Program Manager III	1979	2007	Hopen, C.E. Peterson, Lower, Stimart, D.C. Smith Greenhouse manager
Mesner, Larry	Researcher	1982	1983	Palta
Meyer, Kimberly	Outreach Specialist	2012	present	NPM
Michaelis, Bruce	Researcher	1971	2003	Hopen, Binning
Monson, Sean	Associate Research Specialist	1998	2005	Krysan, Patterson
Most, Ayala	Research Specialist	2002	2004	Patterson
Nagaki, Kiyotaka	Assistant Scientist	2003	2004	Jiang
Navarro, Felix	Associate Scientist	2005	2013	Palta
Nelson, Eileen	Faculty Associate	2007	present	Herbaceous Ornamentals, Short Course
Nelson, Tiffany	Associate Research Specialist	1992	1993	Vierstra
Newenhouse, Astrid	Assistant Scientist	1989	1995	Harrison
Nilmagoda, Ekiriyagala "Upali"	Research Specialist	1992	1994	Simon
O'Malley, Ronan	Assistant Scientist	2004	2006	Patterson
Oosterwyk, Johanna	Associate Faculty Associate	2007	present	Stimart, Jull, DC Smith Greenhouse Manager
Paine, Laura	Associate Research Specialist	1988	1989	Tibbitts
Palmer, Mary	Associate Researcher	1976	1996	C.E. Peterson, Gabelman, Lower, Havey, Simon, Goldman
Pearson, Stephen	Research Specialist	2000	2001	Binning
Pease, Benjamin	Research Specialist	2008	2012	Stier
Perry, Robert "Jack"	Senior Research Specialist	2005	present	Colquhoun
Porter, Pamela	Senior Outreach Specialist	1990	1992	NPM
Proost, Richard	Senior Outreach Specialist	1990	present	NPM
Rake, Leo	Research Specialist	1950s	1990s	Holm, Dana
Rangarajan, Anusuya	Associate Research Specialist	1989	1989	Tibbitts
Rao, Hongyu	Assistant Researcher	2005	2008	Patterson
Reith-Rozelle, Judith	Laboratory Manager	1987	1988	Horticulture Greenhouse manager
Rhodes, Davina	Associate Research Specialist	2000	2002	Patterson
Rice, George	Senior Systems Programmer	1987	2000	IPM, Binning

Rintamaki-Strait, Jenni	Associate Research Specialist	1993	1996	Vierstra
Rittmeyer, Richard	Senior Research Specialist	1993	present	Harrison, Binning, Colquhoun, Arlington Farm Supervisor
Robertson-Smith, Amber	Lecturer	2008	2009	Patterson
Ross, Roman	Research Assistant	1952	1985	U.S. Potato Genebank, Sturgeon Bay
Sass, Michell	Senior Research Specialist and University Business Specialist	1994	2013	Nienhuis, Main Office
Sauban, Maximilien	Instructional Specialist	2013	2014	Jull
Sausen, Amy	Outreach Specialist	1995	2000	Binning, Jull
Schartner, Jesse	Senior Research Specialist	1991	2004	U.S. Potato Genebank, Sturgeon Bay
Schmidt, Herman	Research Specialist	1960s	1970s	U.S. Potato Genebank, Sturgeon Bay
Schmidt, Katherine "Kit"	Outreach Program Manager II	1979	2009	Rowe, Hanneman NPM
Schmidt, Roger	Senior Information Processing Consultant	1988	present	IPM, NPM
Schmitt, William	Researcher	1997	present	Roper, Jull, Bussan
Senalik, Douglas	Associate Scientist	1987	2002	Simon
Serres, Rodney	Senior Lecturer	1994	1996	Department
Shelley, Kevin	Outreach Program Manager I	1992	present	NPM
Siko, Harold	Research Specialist	1950s	~1970	Gabelman, Bliss
Singsit, Chongkhohao	Research Specialist	1996	1996	Hanneman
Smith, Michelle	Associate Lecturer	2012	2012	Department
Stipanik, Luann	Greenhouse Manager	1981	1987	Beck, Horticulture Greenhouse manager
Sturgul, Scott	Outreach Program Manager I	1990	present	NPM
Swiecichowski, Jesse	Assistant Research Specialist	2014	Present	Nienhuis
Talarzyk, Karen	Senior Outreach Specialist	1990	2011	NPM
Tetrault, Daniel	Research Specialist	1999	2000	
Theilman, Darwin	—	1980s	—	IPM
Thoma, Sharon	Associate Visiting Scientist	2002	2003	Vierstra, Patterson
Thompson, Abbey	Student Services Coordinator	2008	present	Science & Medicine Graduate Research Scholars Program, Patterson
Tomesh, Robert	Lecturer	—	2011	Master Gardener Program
Treichel, Barry	Associate Research Specialist	1991	1992	Simon
Vega-Semorile, Sandra	Assistant Scientist	2007	present	Palta
Velguth, Peter	Senior Scientist	1995	2000	Department
Vignali, John	Associate Research Specialist	1989	1989	Tibbitts
Walker, Joseph	Research Specialist	1992	2003	Vierstra
Walsh, Brian	Associate Research Specialist	2002	2007	Patterson
Wang, Wuyi	Assistant Scientist	—	—	Patterson

Weinman, Antonia	Associate Scientist	1963	1991	Gabelman
Weiss, Laurie	Associate Researcher	1985	1993	Palta
Wielgus, Susan	Senior Research Specialist	1989	present	Jiang
Willis, Kevin	Associate Research Specialist	1996	1997	Tibbitts
Wolter, Karl	Senior Scientist	1987	1996	—
Woolsey, Edward	Associate Instruction Specialist	2012	2013	Patterson, Jiang
Workmaster, Beth Ann	Researcher	2001	present	Kosola, Goldman, Harbut, Atucha
Wu, Yufeng	Assistant Scientist	2012	present	Jiang
Yan, Huihuang	Associate Scientist	2006	2008	Jiang
Yost, Susan	Research Specialist	1988	1992	Simon, Havey
Young, Jeffery	Assistant Scientist	1998	1999	Sussman
Zajda, Jeff	Programmer	—	~1992	Binning
Zeldin, Eric	Associate Scientist	1981	2013	McCown
Zhang, Wenli	Associate Scientist	2009	present	Jiang

USDA Support Staff — Administrative

Name	Position	Start	End
Meyers, Kim	Program Support Assistant	2003	present
Milton, Dolores	Program Support Assistant	1996	2001
Mulske, Karen	Office Automation Assistant	2005	2006
O'Brien, Diane	Office Automation Assistant	2006	present
Thiede, Patricia	Program Support Assistant	1987	1996
Zick, Cynthia	Program Support Assistant, Office Automation Assistant	2001	2005

USDA Support Staff — Research

Name	Position	Start	End	Program
Busse, James	Technician	2006	present	Bethke
Crubaugh, Linda	Technician	1983	2013	Peterson, Staub, Weng
Gustin, Emily	Technician	2010	2012	Zalapa
Haider, Kristin	Technician	2013	present	Weng
Hamernik, Andy	Technician	1991	present	Hanneman, Jansky
Hendricks, Scott	Technician	—	1981	C.E. Peterson
Kane, Robert	Technician	2003	present	Simon
Karas, Brian	Technician	1992	1999	Spooner
Kayson, Kathy	Technician	1979	1982	Simon
Kazmierczak, Tim	Technician	2011	present	Bamberg (Sturgeon Bay)
Middleton, Gail	Technician	2006	present	Halterman
Nicolaus, Andrea	Technician	1988	1992	Spooner
Petrashak, Mark	Technician	2001	2012	Havey

Ruess, Holly	Technician	2005	present	Spooner
Ruhde, Richard	Technician	1960s	1990	Rowe, Hanneman
Schartner, Jesse	Technician	2004	present	Bamberg (Sturgeon Bay)
Senalik, Douglas	Technician	2002	present	Simon
Stephenson, Sarah	Technician	1999	2005	Spooner
Stewart, Christy	Technician	2004	present	Brunet, Havey
Stoneman, Sheila	Technician	2007	present	Bamberg (Sturgeon Bay)
Wiesman, Eric	Technician	2013	present	Zalapa

Governance

In 2003, the Department of Horticulture faculty granted the support staff two voting-representative positions at general departmental meetings. Only UW academic staff can serve as representatives, but all horticulture support staff are eligible to vote in departmental meetings. Elections have been held each fall to select these representatives, with alternates, to staggered, two-year terms. These representatives serve as support-staff liaisons to the general department meetings, with voting privileges. Representatives and their alternates also serve as the staff members of the department's Academic Staff Committee, with one person serving as chair.

2003–2005: Kit Schmidt, representative (Eric Zeldin, alternate): two-year term; Michell Sass (John Mather): one-year term

2004–2006: Karen Delahaut (Roger Schmidt, alternate)

2005–2007: Michell Sass (Bill Hoyt, alternate)

2006–2008: Pete Jester (Eric Zeldin, alternate)

2007–2009: Eileen Nelson (Susan Wielgus, alternate)

2008–2010: Johanna Oosterwyk (Ed Lyon, alternate)

2009–2011: Felix Navarro (Susan Wielgus, alternate)

2010–2012: Beth Workmaster (Michell Sass, alternate)

2011–2013: Eileen Nelson (Dan Heider, alternate)

2012–2014: Johanna Oosterwyk (Kirsten Brown, alternate)

2013–2015: Beth Workmaster (Ed Lyon, alternate)



MICHAEL FORSTER ROTHBART, UNIVERSITY COMMUNICATIONS

Dean's Residence at Allen Centennial Gardens.

Thank you

The Department of Horticulture faculty, staff, and students would like to thank the following individuals for their efforts to support our department on its 125th anniversary:

Ted Tibbitts, for his untiring efforts to develop the department history chronicled in this book.

Colleen O'Hara and Ashley Schumacher from the Wisconsin Alumni Association® for their expert assistance with design, editing, and printing.

Tricia Check, Eileen Nelson, Johanna Oosterwyk, Beth Workmaster, Phil Simon, Herbert Hopen, Irwin Goldman, and Mimi Broeske, for their efforts at planning and organizing the many details encompassed in this anniversary celebration.

Mimi Broeske, for designing and producing the beautiful banners inside and outside of the Department of Horticulture and the Allen Centennial Gardens.

COVER IMAGE: JEFF MILLER, UNIVERSITY COMMUNICATIONS



Department of Horticulture
University of Wisconsin-Madison
1575 Linden Drive
Madison, WI 53706

(608) 262-1490
horticulture.wisc.edu

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