Departments Past

In 1929, UH President David Crawford brought the College of Applied Science, the Experiment Station, and the Extension Service together under the university’s umbrella. The College of Applied Science had four departments: Agriculture, Chemistry and Sugar Technology, Entomology, and Home Economics. The Experiment Station had seven rather small departments: Agriculture, Animal Husbandry, Chemistry, Horticulture, Nutritional Investigations, Poultry Husbandry, and Soil Physics. The Extension Service had two large departments: Agriculture, and Home Economics. These 13 departments had their own unique objectives and continued to exist alongside one another even after the Experiment Station was fully administered by the college in 1938. Eventually, split appointments between research and teaching became quite common, as did split appointments between research and extension specialists. Agriculture and home demonstration agents located in the counties were not affiliated with departments.

From an academic perspective, majors did not necessarily correspond to a single department. For example, in 1962 there were three curricula in agriculture: Agricultural Technology, Agricultural Sciences, and Agricultural Economics; there were nine options, or majors, some of which cut across departmental and college lines. Human Resources, a single department, had five curricula (Clothing Design, General Home Economics, Institutional Management, Home Economics Education, and Foods and Nutrition), with each leading to the BS degree. During the period between creation of the College of Agriculture in 1947 and its reorganization in 2000, some of these curricula became separate departments and, like the college, changed their names to reflect current needs and opportunities. The various departmental and college reorganizations did not make it easy for some authors to trace their departmental histories for this book.

Finding the best photographs to illustrate the many activities, projects, and programs associated with each department was difficult. Some departments left a large number of pictures, while others, perhaps because of the nature of their work, left only a few. Research-oriented departments frequently utilized the services of the university’s professional photographer, Masao Miyamoto, to take photos for stories in the Hawaii Farm Science magazine, college or university annual reports or catalogs, scholarly publications, or press releases. It was not until the proliferation of personal cameras in the 1960s that faculty and staff began taking their own pictures. Unfortunately, many of their photos were quite candid, poorly composed, improperly stored, or otherwise of limited use.

By 1999 there were 11 departments in the college. For many of our senior faculty and emeriti, these are known as the “old” departments. Some of our past and present faculty members provided brief histories of these former departments for this book. Readers are encouraged to leave their own recollections and photographs of the past on the college’s Wiki site on the Internet.
A year after its founding, UH's first college offered a field of study in Rural Engineering, which included courses in Farm Mechanics (care and repair of farm machinery), Irrigation, Drainage, and Road Making. Beginning in 1912, John McTaggart's Shop Work was the only course related to agricultural engineering until General Irrigation Practices was added in 1927.

A separate department of Agricultural Engineering was created in 1945 when HSPA and PRI made a financial contribution and salary commitment to the university to create the Agricultural Engineering Institute. Its first home was an office building and machine shop at the corner of Dole Street and East-West Road where the East-West Center's Burns Hall now sits. Agricultural engineers from all three institutions used the department's facilities to design, fabricate, and test machinery and irrigation equipment for Hawai’i’s crops.

Although they worked closely with HSPA and PRI engineers, the college's engineers always focused on the mechanization, irrigation, and processing of diversified crops, with environmental concerns added later.

Academic goals aimed to “transmit technical knowledge concerning the application of engineering to industries associated with the production, processing, and handling of food and fiber.” Its research and extension contributions are described in more detail in this book’s Engineering Breakthroughs.

The department’s first courses in agricultural engineering, Agricultural Machinery and Advanced Agricultural Machinery, were taught by Rene Guillou in 1946. Over the next decade, Irrigation Practices, General Shop Practices, Metal Shop Practices, Agricultural Power, and Irrigation Practice were added to the curriculum and initially taught by Guillou, Robert Strohman, and Lawrence Larson. John Cykler and Roy Tribble were researchers with no teaching responsibilities. In 1955, Donald Kinch joined the department to teach Agricultural Machinery, which was later taught by Bessel van’t Woudt (1958) and Jaw-Kai Wang (1960).

By late 1960, the department’s academic programs gradually expanded to include biosystems modeling, aquacultural engineering, bioenviromental engineering, and tis-
sue and cell engineering. In cooperation with Agricultural Economics faculty, a systems analysis option was offered under the Agricultural Economics PhD program. An undergraduate program in bioengineering was also added.

The department moved into more modern facilities in the current Agricultural Engineering building on Maile Way in 1973. Additional research and office facilities were housed in Gilmore Hall, built three years later. In 1999, the department merged with Plant Molecular Physiology and Environmental Biochemistry to become the Department of Molecular Biology and Biosystems Engineering.

Contributors: Jaw-Kai Wang and Tung Liang.
The Department of Agricultural Economics, established in 1951 in the College of Tropical Agriculture, represented a merger of agricultural economics extension, initiated in 1928; research in farm management and marketing, begun in 1948; and undergraduate instruction, started in 1950. In due course, the scope of the department’s programs broadened to include land and water use, forestry, alternative energy, marine resources, and environmental quality. In 1972, it was renamed the Department of Agricultural and Resource Economics (AREC).


The mission of agricultural and resource economists was to develop innovative and responsive programs in economic research, instruction, and extension with recognized expertise in Hawai‘i and Pacific Basin agriculture and resources, and to create well funded and user-oriented research programs to serve a broad-based clientele. Integral to the department’s mission was offering rigorous instructional programs in applied economic analysis to attract superior students, nationally and internationally, and to provide extension programs designed to develop timely information and relevant training.

The department’s bachelor of science program involved marketing, production economics, econometrics, agribusiness, natural resources, international development, and general agricultural economics. AREC’s MS and PhD programs encompassed production economics, agricultural marketing, energy and environmental economics, natural resource...
economics, marine and aquaculture economics, agricultural policy, agricultural systems analysis, applied econometrics, and international development and trade. The department awarded its first MS to John Rasmussen in 1962 and its first PhD in 1966 to Howard Hogg.

Integrating research and extension functions in an applied program focusing on client needs, AREC’s work has been carried out along disciplinary specialties for a variety of agricultural commodities and related industries, and natural resources such as land, marine, and water, with an overall focus on statewide economic development. Projects have ranged from cost-of-production studies for major crops and market assessments for cut flowers and nursery products to taro product development and an economic assessment of the value of agricultural open space. The department has also provided technical assistance to county governments; various state departments, including agriculture, health, DLNR, and DBEDT; federal agencies such as NRCS and ERS/USDA; and UN agencies.

The substantial research output of AREC faculty can be gauged from the large body of faculty publications, which includes an estimated 163 scholarly works published from 1993 to 2000 alone. The publications run the gamut from books, mostly in natural resource economics and policy, to journal articles, research reports, and extension bulletins that have covered virtually all areas of production, marketing, natural resources, development economics, consumer economics, and sustainable agriculture. Several research papers have been published in highly regarded journals and cited by other researchers. Supported by both intramural and extramural funding, faculty research activities have also provided financial support for the research contributions of graduate students.

AREC faculty’s outstanding research, teaching, and extension achievements have been the driving force behind fulfilling the department’s mission. Included among the major contributors are Philipp, an important player in advancing the cause of diversified agriculture in Hawai’i; Harold Baker, a significant contributor to systematizing Hawai’i’s land classification system; Davidson, who broadened the research focus to include marine economics and policy; and Scott, whose pioneering work in market development, market potential, and consumer demand provided guidance to the development of the macadamia nut and various fruit product industries. During his chairmanship, Scott also started the department’s PhD program in 1962, helping to increase graduate enrollment by 1980 to 67 students, 50 of them doctoral candidates.

In the natural resources field, especially in marine resources, alternative energy, and water, Chennat Gopalakrishnan’s work includes original studies on coastal zone management, alternative energy sources (especially biomass), sectoral (agricultural, residential, urban-commercial, and visitor industry) demand for water, and water institutions and policy, all with a focus on Hawai’i. Cox’s important and sustained contributions to community development have focused on consumer economics and natural resource management and conservation. Other faculty members have contributed to sustainable agriculture (Richard Bowen), production economics (Yanagida, Peter Garrod, Gary Vieth), agricultural marketing (John Halloran, Stuart Nakamoto, James Hollyer), farm management (Herbert Marutani, Kent Fleming), agricultural policy (Carol Ferguson), water economics and policy (Hirosi Yamauchi) and fisheries and aquaculture economics (Karl Samples, PingSun Leung, and Eugene Shang).

For over four decades, the collective impact of the department’s contributions in research, extension and instruction can be seen beyond the college’s walls in helping to improve and enhance community and economic development in Hawai’i and the Pacific.

Contributor: Frank S. Scott, Jr.
In the college’s early years, chemical, soil, and agronomic studies were conducted by HAES staff holding titles of Chemist and Agronomist. There were no departments or chairs as we know them today. By 1915, five divisions (forerunners of present-day departments) had evolved: agronomy, horticulture, entomology, soil chemistry, and plant pathology. Studies reported in this period included soil-plant relationships; pasture and forage crops; cereals, fiber, and other diversified crops; processing and preserving; and analysis of the chemical and physical properties of soils.

In 1936, HAES had nine departments, including Agricultural Chemistry and Soils, and Agronomy. The former focused on chemical compounds in tropical crops such as cassava, papaya, coconut, pineapple, and kukui nut. Various taro products, including taro flour, were prepared for study. Koa haole was evaluated as an abundant source of protein for ruminants, and its toxic effect on non-ruminants was studied. The chemists conducted routine analyses of poultry and animal feeds, as well as plant tissues.

During World War II, faculty analyzed and processed garbage as a possible source of animal feed; they also analyzed feeds for the Hawai‘i Department of Agriculture. The department and the Cooperative Extension Service promoted soil and water testing for farmers, ranchers, and homeowners, and made liming and fertilizer recommendations. This program was the forerunner of today’s Agriculture Diagnostic Service Center.

The department developed processing procedures for guava, papaya, and passion fruit, creating value-added products. Its soil physicists investigated water retention, movement, and repellency; colloidal properties effects on aggregate stability; soil strengths in relation to compaction; and influences of organic matter on soil physical behavior. Pedologists laid the foundation for strong programs in soil mineralogy, genesis, and classification. Progress was made in the study of tropical soil weathering. The survey and classification of Hawai‘i’s soils, led by USDA’s Soil Conservation Service, was begun in the 1930s, interrupted by World War II, and completed in the 1950s. Other important studies were on soil-plant relationships, including the role of exchangeable ions, soil nitrogen, and organic matter dynamics; the role of manganese; soil phosphorus availability; soil acidity...
and liming requirements; the importance of micronutrients; and the hazards of heavy metal toxicity.

The Department of Agronomy focused primarily on pasture, forage, and cover crops (85 percent of the agricultural land in Hawai‘i was devoted to pasture at that time). Cooperative studies with USDA were conducted on feed and food crops including root crops, sweet corn, and soybeans. Parallel work focused on agricultural machinery, irrigation designs, processing, ensiling, and green manuring. Popular legume crops included crotalaria, pigeon pea, soybean, and velvet bean. Among the popular cereals and grasses, sudangrass, cattail millet, molassesgrass, paragrass, rhodesgrass, barley, oats, rye, and wheat proved relatively successful.

The Department of Agronomy and Soil Science (AGRSS) was formed in 1957 when soil scientists from Agricultural Chemistry and Soils joined with faculty from Agronomy. During the 1960s, the number of faculty increased, as did the scope of the department’s functions. Sugar and pineapple, facing an uncertain future, inspired concerted efforts on alternative cropping systems and enterprises. Broader departmental perspectives were also realized with statehood in 1959, resulting in closer ties with mainland land grant institutions, establishment of the East-West Center, UH’s emergence as the lead educational institution in the American Pacific, and growing USAID interest in providing agro-technology transfer to under-served tropical countries. Through creative leadership and enterprise, department faculty obtained significant extramural funding for international programs.

The disciplinary framework of AGRSS’s teaching, research, and extension consisted of widely diverse areas, including soil genesis, classification, mineralogy, physics, chemistry, fertility, microbiology and biochemistry, salinity, and irrigation water quality; soil-water conservation and management; plant introduction and breeding; nutrition, physiology, and production management of diverse crops; intensive grazing management; forest ecology; agroforestry; weed control in natural areas; and agrichemical effects on environmental quality. AGRSS faculty were instrumental in improving soil quality assessment and management recommendations for optimum crop performance through quantitative modeling. The college’s extension and international programs efforts built successfully on this modeling approach. Faculty established two major international programs (the Benchmark Soils Project and NifTAL, described elsewhere in this book). After demolition of the original Gilmore Hall, which housed most of the AGRSS faculty, administration, and research facilities, the programs were reunited in the newly constructed G. Donald Sherman Laboratory in 1985.

Beginning in the 1980s, decline of the sugarcane and pineapple industries in Hawai‘i led to decreased enrollment of international students to study the agronomy of these crops. But this was also a period when Hawai‘i’s communities grew increasingly conscious of the need to balance profitable production from agricultural enterprises with natural resource protection and environmental sustainability. Various AGRSS programs capitalized successfully on Hawai‘i’s natural attributes: diversity in soils, ecologies, and climates; a compressed scale over which these diversities occur; and dynamic changes in land use. These situations presented opportunities for systematic identification of needs, orderly design of investigations and hypotheses, modeling, and high potential for transferability of research results. The college’s 1998–99 strategic plan acknowledged these opportunities and affirmed the need for a formally committed program to address them in a multi-disciplinary fashion. The outcome was creation of a new department, Natural Resources and Environmental Management.

Contributor: Yoshinori Kanehiro

3. Installing a soil tensiometer in a field plot to measure moisture.
4. Students examine layers of a tropical soil to determine its scientific classification, form, and structure as they related to crop production.
With chickens and pigs accompanying the ancient Polynesians on voyages to the Hawaiian Islands, animal sciences were an obvious choice to rank among the earliest areas of research and instruction in the college. Animal Husbandry Professor Briggs Porter was one of the first 13 faculty hired by the college’s first president, John Gilmore, and its first curriculum in 1909 included two courses, Breeds of Livestock and Breeding and Management of Livestock. New courses in Poultry Husbandry and Dairy Husbandry were added in 1911, and an extension course was offered in Poultry Culture. By 1913, courses included Dairying, Poultry Keeping, Livestock Management, Animal Nutrition, and Stock Feeding.

By 1920, when the addition of the College of Arts and Sciences helped establish the university, the college had already created Animal Husbandry and Poultry Husbandry divisions. In 1953–1954, these became the Departments of Animal Science and Poultry Science, respectively, until the mid-1960s when they were merged to form the Department of Animal Sciences.

During the 1920–1930s, Hawai’i island’s dairy demonstration farms and forage utilization saw considerable work by college researchers. Louis Henke, later acting director (1937–1938) and assistant director (1941–1954) of HAES, was originally hired in 1932 to evaluate locally-produced forages and by-products. Parasitologist Joseph Alicata came on board in 1935 to study cattle and poultry parasites.

New hires in the early 1950s included Harry Vollrath, Oliver Wayman, Isaac Iwanaga, James Koshi, Samuel Work, and Kenneth Otagaki; they focused on beef and dairy cattle management and dry-lot feeding/finishing, including use of sugarcane by-products. By 1950, researchers were assessing continued research projects optimizing rations for livestock and poultry, and additional by-products, including pineapple bran, dehydrated lilikoi and guava fruit, and macadamia nuts. Research also increased on pasture improvement through new grasses, incorporation of legumes (particularlykoa haole), and the control of insect pests.

In the early 1960s, the addition of beef cattle geneticist Estel Cobb and dairy nutritionist Richard Stanley enhanced the department’s research on consumer preferences for yellow fat color from grass-fattened beef and the impacts of
shipping from Hawai‘i to Honolulu on growth and dressed-beef carcass quality. Wayman, Deidrich Reimer, and Charles Campbell also studied reproductive efficiency and cross-breeding on beef improvement.

The work of Robert Nakamura, Stanley, and later James Carpenter and Chin ‘CN’ Lee demonstrated the department’s national research leadership on the impact of environmental stresses on livestock, which continues today to focus on alleviating heat stress through facilities and diet modifications. Stanley Ishizaki was also instrumental in establishing and managing the feed and forage analysis program through the Agricultural Diagnostic Service Center.

Construction of the East-West Center necessitated moving the livestock and poultry facilities to the newly-created Waialee Livestock Research Farm. A revolving fund allowed the department to keep the earnings from the sale of milk and livestock to support research activities. Research on nutrition, reproduction, animal disease, production management, heat stress reduction, pasture establishment (grass variety and fertility studies), rotation and intensive grazing management, confinement feeding of cattle, and optimizing use of by-products in all livestock rations has played a major role in the improvement and efficiency of livestock production throughout Hawai‘i.

Contributing to the college’s tropical animal husbandry research are many Animal Sciences researchers and extension staff whose groundbreaking work has supported Hawai‘i’s livestock industries. They also include Ernest Ross, Anastacio Palafox, Raymond Herrick, Allen Miyahara, Paul Patterson, and Tokushi Tanaka (poultry); Coy Brooks, Williams Hugh, Guillermo Gomez, and Halina Zaleski (swine); Koshi, Steve Olbrich, Lee, and Larry Fox (dairy); Spencer Malecha (aquaculture); and Joseph Tritschler, Douglas Vincent, Kimiaki Maruyama, Charles Weems, Rich Early, Brent Buckley, and Yong-Soo Kim (beef). (Much of their work is described elsewhere in this book.) The department has also been well served by two outstanding technicians, Wayne Toma and Steven Spielman.

Several department chairs have also greatly influenced and shaped the department’s history and direction, including Henke, Cobb, Stanley, Brooks, Herrick, Weems, Carpenter, and Vincent.

The department offered a BS and MS in animal sciences and, until 1991, a BS in animal technology. From 1970 to 2000, the average number of undergraduate majors (50) and graduate students (15–20) remained fairly stable. This period saw a big shift toward greater numbers of undergraduate and graduate female students in the program. A favorite of pre-veterinary students, the Animal Sciences curriculum got a major boost through the efforts of Nakamura and Miyahara to obtain an endowed scholarship from Charles Reid for pre-veterinary students (see Pre-Vet Club).

While Animal Sciences curriculum and degree programs remain today in the college, the department ceased to exist in 2000 when it merged with the Department of Food Science and Human Nutrition to form the Department of Human Nutrition, Food and Animal Sciences under the leadership of department chair Vincent. It was also moved from Henke Hall to new offices and laboratories in the Agricultural Sciences Building.

Dating back to the founding of the college, the study of animal sciences was among the earliest pacesetters for the college’s legacy of a century of research, instruction, and extension to Hawai‘i’s industries and communities.
As part of UH since its inception, Entomology was listed as a course offering in the original prospectus of the College of Agriculture and Mechanic Arts, with the first lectures given by Territorial Entomologist Jacob Kotinsky in 1908. The university’s first professor of entomology was Henry Severin, hired in 1910, followed by James Illingworth in 1912 and David Crawford, later UH president, in 1919. Collaboration with the U.S. Agricultural Experiment Station’s Entomology Department (created in 1914) was informal until 1929, when the station became part of the university.

In 1912 the college’s first graduating class, of four students, included William Hartung, who received the first BS degree in entomology. In 1914, Alfred Warren received the school’s first MS degree in entomology. The first PhD in entomology was awarded to John Phillips in 1933.

The discipline’s first courses were listed under Zoology from 1930 until 1960, when Entomology, a separate research department in the college, assumed instructional responsibility. During the early years, most of its teaching and graduate faculty, including the distinguished entomologists Royal Chapman, Walter Carter, Otto Swezey, Cyril Eugene Pemberton, David Fullaway, and Elwood Zimmerman, also held positions with the state, the Bishop Museum, HSPA, or PRI. Carter was UH’s first professor emeritus in entomology.

When the College of Agriculture was formed in 1947, Entomology was a research department, and its courses were still listed under Zoology. Leonard Tuthill served as its first chair, followed by Henry Bess in 1948 and D. Elmo Hardy in 1958. Hardy, best remembered for documenting the incredible adaptive radiation of picture-wing flies in the Hawaiian Islands, initiated studies in evolution that are still ongoing under the interdisciplinary Ecology, Evolution, and Conservation Biology Program led by UH entomology graduate Kenneth Kaneshiro.

Research and outreach also grew as Entomology expanded as a department. Insect ecologist Toshiyuki Nishida, hired in 1942, worked with Bess and Frank Haramoto to develop a successful biocontrol program that greatly reduced damage caused by the Oriental fruit fly, accidentally introduced to the islands in 1946. A mite specialist, Haramoto contributed significantly over the next 40 years to their identification and management.

Ronald Mau, extension entomologist responsible for insect and mite pest management.
Martin Sherman joined the department in 1949 to study the environmental fate, mode of action, and efficacy of DDT and other “new” insecticides. Minoru Tamashiro, who replaced Yoshinori Tanada as insect pathologist in 1957, developed novel methods of termite control that brought international recognition to his laboratory. Tamashiro’s impact extended beyond his own work, with three of his graduate students, Harry Kaya, Po-Yung Lai, and Nan-Yao Su, subsequently honored as CTAHR alumni of the year.

In the early 1960s, Ryoji Namba confirmed that aphids were responsible for transmitting papaya mosaic virus. His recommended management tactic of rogueing and burning provided other researchers with time to develop a long-term solution—the genetically modified papaya.

After receiving his PhD from UH, John Beardsley joined the department in 1963 as an insect systematist. He was recognized and respected for his remarkable understanding of Hawai‘i’s insect fauna and was admired by his colleagues for sharing his vast knowledge at the Hawaiian Entomological Society’s monthly meetings.

Wallace Mitchell’s extensive experience with pesticide field trials and USDA biological control programs made him a firm believer in integrated pest management, which combines use of pesticides, cultural practices, and biological agents to manage pests. While successful in developing IPM strategies, Mitchell, an accomplished instructor, was also known for his leadership skills and buoyant personality.

While all entomology faculty members participated in teaching and outreach activities, it was not until 1965 that an extension entomologist, Albert La Plante, was hired. Five years later, insect physiologist Franklin Chang became the department’s first full-time instructor since Severin, 60 years earlier.

Ronald Mau, an ornamentals entomologist, became the extension IPM specialist. Together with Marshall Johnson, Bruce Tabashnik, Vincent Jones, and Mark Wright, Mau studied the ecology and impact of agricultural pests and developed new management methods to improve agricultural yields. Insect geneticist Stephen Saul’s research contributed to the successful use of sterile fruit flies in management programs in Hawai‘i and other parts of the world.

The work of Russell Messing and HDOA collaborators on the potential impact of parasitoids on non-target species has been instrumental in demonstrating the safety of this method of non-chemical pest control. Systematist Dan Rubinoff discovered a web-spinning caterpillar that fed on snail pests, and Arnold Hara demonstrated the effectiveness of heat and hot water sterilization quarantine treatments for agricultural products, which opened export markets for Hawai‘i’s producers.

The human dimension was also present in the work of CTAHR entomologists. M. Lee Goff initiated groundbreaking research in forensic entomology and served as advisor to the popular crime scene investigation television show, “CSI.” Following Tamashiro’s retirement as the college’s expert on termites, J. Kenneth Grace and Julian Yates III continued an internationally known program to understand and manage these gnawing pests.

As CTAHR moves into its second century, entomology, now a program in the college’s Department of Plant and Environmental Protection Sciences, will continue to move forward with the department’s mission, to document the wonders of the Hawaiian biota and to combat the pest enemies of Hawai‘i’s agriculture and natural beauty.

Contributor: Barry M. Brennan
Agricultural Biochemistry was established in 1957 when the Department of Soils and Agricultural Chemistry was reorganized as part of a wider reorganization of the College of Applied Science. One of the new department’s first major projects was to help address the problem of Hawai‘i as the “dumping ground” for substandard animal feeds. After an HDOA-funded program to analyze imported feed for the poultry and hog industries was initiated, the quality of feeds improved. Over the next five years, this contract funded construction of department laboratories and offices in Henke Hall.

Founding members of the department were Giichi Fujimoto, Yoshihiko Kawano, and biochemist Hiromu Matsumoto, who served as its first chairman. Fujimoto analyzed the chemical composition of Hawai‘i’s soils, while Kawano conducted proximate and pesticide formulation analyses. Following Fujimoto’s retirement, John Hylin joined the department in 1959.

The department made many important contributions to the college’s research in discovering chemical effects on Hawai‘i’s agricultural commodities. The presence of mimosa in koa haole, introduced as cattle feed, was found to be linked to hair loss in some animals. Researchers also found that its toxicity could be reduced by adding iron salts to the feed. The college cancelled the planned release to ranchers of creeping indigo, a forage crop, when researchers accidentally discovered that the plant contained a neurotoxin that made animals walk in circles.

Matsumoto identified a powerful plant carcinogen (cycasin) found in the seed of a cycad nut constituent, which the National Institutes of Health suspected as being the cause of amyotrophic lateral sclerosis (Lou Gehrig’s Disease). Although studies by department researchers failed to indicate the presence of a neurotoxic substance, Matsumoto’s surprising discovery started a worldwide search for carcinogens in food plants. NIH continued to fund Matsumoto’s research for the next 22 years.

By the early 1960s, the department’s far-reaching work prompted the college (and state) to recognize the need for a modern analytical laboratory. Industry support from PRI, HSPA, HDOA, and others helped persuade the Legislature to approve three new department positions (filled by Art
Bevenue, James Ogata, and Jan Teichman) and operational funds to start a pesticide residue program (see Managing Our Pests page 112 for additional details).

When Bevenue retired in 1975, responsibility for the residue research lab was assumed by Hylin, whose early work focused on plant toxins and the environmental fate of pesticides. Hired in 1969, Chung-Shih ‘CS’ Tang had developed a strong program in allelopathy, the beneficial or harmful effects of one plant on another plant. He shared his considerable expertise in plant biochemistry with faculty in many other departments. Harry Ako started his research career in 1975 looking for enterokinase inhibitors, but became renowned for his contributions to aquaculture biotechnology and fatty acid metabolism studies.

During the 1980s, the department’s work continued to attract talented researchers. Dan Doerge, an accomplished biochemist, joined the department in 1985 to study the metabolism and environmental fate of biologically active molecules. The following year, Josef Seifert arrived to establish a biochemical toxicology program. Hylin’s retirement brought Carl ‘CJ’ Miles to coordinate the department’s pesticide residue lab and environmental fate studies in 1987. Both Miles and Doerge were recruited elsewhere shortly after becoming tenured associate researchers.

In 1991, in keeping with its revised mission “to determine the interactions, importance and fate of naturally occurring and man-made chemicals and biochemicals,” the department's name was changed to Environmental Biochemistry.

Nearly 30 years after Matsumoto discovered a naturally occurring plant carcinogen, Roderick Dashwood came from Oregon State University in 1990 to initiate research on anti-carcinogens found in plants. Returning to OSU in 1998 to join the Linus Pauling Institute, Dashwood continued his very successful research on cancer chemoprevention. Qingxiao Li (1995) worked with the departments of agriculture and health to develop the state’s groundwater protection program and expand the college’s analytical capabilities.

Although the department had a strong research orientation, it taught several courses, starting with its first course (1962), Principles of Metabolism, taught by Hylin. In 1969, Tang began teaching Plant Biochemistry. Four years later, Francisco Montalvo taught Carbohydrate Chemistry and Biochemistry. Hylin also taught Pesticide Use, Regulation and Environmental Interaction (later revised by Seifert).

Principles of Biochemistry, first taught in 1981 by Hylin and Ako (and later Ako, Dashwood, and Seifert in alternate semesters), became a core course for most pre-professional degree students. Seifert taught courses in the chemistry department (Organic Chemistry), as well as the entomology department (Insecticide Toxicology). A large percentage of the students who worked as student help in the department went on to medical, dental, and veterinary schools, attesting to their excellent caliber.

The department's extension program began in 1976 when Barry Brennan, the extension pesticide coordinator, assumed responsibility for the pesticide safety training program. Michael Kawate, hired in 1988, developed an outstanding program coordinating pesticide efficacy and IR-4 field trials.

Through it all, the faculty and staff enjoyed an unusual degree of esprit de corps, a feeling many attributed to the department's secretary, Lorraine Ichiyama, and three exceptional technicians, Karl and Joan Yanagihara and Gladys Leong. Today, the department is gone and Henke Hall labs are empty again. Still, the memories linger. It was a good ride!

Contributors: Hiromu Matsumoto and John W. Hylin

1. John Hylin, chair, enjoys the challenge of fabricating needed instrumentation.
2. Arthur Bevenue, Hawai‘i’s first IR-4 Coordinator, ponders results from pesticide residue experiments.
With increased awareness of the importance of foods and nutrition in human health, the Department of Food Science and Human Nutrition was formed from a merger of the departments of Food Science and Technology and Food and Nutritional Sciences. In 1979, FST’s Hilmer Frank, James Moy, and Wai-Kit Nip joined Doris Hilker, Ira Lichton, Bluebell Standal, Robert Van Reen (who also served as first chair), Audrey Maretzki, Laurel Weddle, Nao Wenkam, and Franklin Young from FNS to form the new department (see Foods and Nutrition for programs and accomplishments of many of these individuals). Research facilities and teaching labs were located in the Food Technology building and Henke Hall.

FSHN was designed to prepare students for career opportunities arising from local, national, and international concerns for an adequate supply of nutritious food and for good nutrition as a factor in human health. Its curricula offered five defined fields of study: community nutrition, dietetics, food science/nutritional science, food service systems management, and food technology. Students could also plan an individualized curriculum to meet specific career objectives.

Instructional faculty Teresa Aleshire, John Baranowski, Jill Burt, and Majorie Cho Sue were hired soon after the merger to expand course offerings. FSHN offered both undergraduate and MS degrees in food science and nutritional sciences.

By the mid-1980s, the department saw the retirement of many of its founding members. Extension Specialist Nancy Johnson began a long-lasting and influential career as the new FSHN chair, responsible for hiring a significant number of new faculty members and for expanding the department’s research and extension components.

FSHN initiatives during this period responded to many growing community and industry concerns. Food technology specialist Aurora Saulo assumed responsibility for the food safety program begun by Roy Moser in the late 1960s. Alvin Huang and Wayne Iwaoka developed research programs in product development. In addition to studying food composition, Huang helped create community kitchens on Moloka‘i and Hawai‘i. Michael Dunn added a biochemistry component to FSHN’s nutritional and trace-element research efforts.

Changes in FSHN’s academic fields of study included community nutrition and dietetics becoming clinical and...
community dietetics and addition of a new field of study, foods and nutrition. By 1990, human nutrition had replaced food science/nutritional science, and food science replaced food technology, reflecting changes in career opportunities and research and extension needs.

Rachel Novotny, whose interests lay in international nutrition, and Dian Dooley, whose focus was on diet and behavior, taught many of the nutrition courses. Anne Shovic directed the dietetics program, initiated by Carey Miller in 1939, and Brigitte Campbell was responsible for food service courses. Later, Alan Titchenal created a program option in the increasingly popular field of sports and wellness nutrition.

By the beginning of the 1990s, Joda Derrickson was appointed the Expanded Foods and Nutrition Education Program coordinator and Patricia Britten became the food and nutrition extension specialist. Frank and Lichton retired after many years of service to the college. Johnson also retired as chair and was succeeded by Saulo by the mid-1990s.

With the department’s academic program’s greater emphasis on building a strong science base and developing critical thinking skills, students were strongly encouraged to take chemistry and biological science courses. As a result, students majoring in any of FSHN’s four academic options (dietetics, human nutrition, food science, and foods and nutrition) were prepared for diverse and emerging careers in the food industry, health-care and fitness facilities, hospitals, nutrition education, government, and scientific research.

Food Science and Human Nutrition and its many predecessor departments have had an illustrious history that can be traced back to 1920, when early UH academic courses were taught in elementary food preparation and nutrition, food economics, nutrition, and food investigations. Together with providing timely and relevant research and extension programs (many of which are described elsewhere in this book), members of FSHN have made significant contributions to education, economic development, and the scientific basis of foods and human nutrition.
The Department of Horticulture’s origin, like that of the college, predates the university. The Experiment Station established in 1901 under the direction of Jared Smith took over one created by the Hawaiian monarchy in 1893 to evaluate fruit, nut, and fiber crops for the kingdom. The new station also focused on the introduction and improvement of crop plants.

In 1908, the College of Agriculture and Mechanic Arts included a four-year, three-term Agriculture Course of Study. The first year of study had core courses in horticulture and agriculture. The agriculture courses were in agronomy and included crop propagation, seed selection, and irrigation. The initial course offerings expanded in 1910 with three courses: Horticulture 1 (plant propagation), Horticulture 2 (nursery, orchard, gardens), and Horticulture 3 (classification of fruits, varieties, selections of varieties, harvesting, packing, and marketing).

The courses were taught by John Gilmore, university president and professor of rural economy and agronomy, and Vaughan MacCaughey, assistant professor of botany and horticulture. The following academic year saw significant changes in instruction, with courses in Plant Propagation, Principles of Horticulture, Tropical and Subtropical Fruits, Olericulture, and Floriculture being offered (the latter two courses were taught in alternate years).

In 1920, when the College of Hawaii became the University of Hawaii, it had twenty-eight faculty members. Louis Henke was professor of agriculture, Joseph Rock was professor of systematic botany, John Howard Midkiff was assistant professor of agriculture. Henke taught Soils, Crops, Sugar Cane Production, and Agricultural Thesis, although his specialty was animal husbandry.

By the early 1950s, course offerings had been significantly expanded to include Tropical Pomology, Flower Production, Truck Crop Production, Plant Propagation, Principles of Plant Breeding, Farm Management, Principles of Agronomy, Soil Analysis, Soil Diagnosis, Systematic Vegetable Crops, Tropical Crop Production, Principles of Genetics, Advanced Genetics, and Soils. Lecturers included William Storey (fruit), Henry Nakasone (fruit), James Gilbert (vegetables), G. Donald Sherman (soils), Haruyuki Kamemoto (floriculture), Donald McGuire (vegetables), Perry Philipp...
(farm management economics), Otto Younge (agronomy), Richard Hamilton (tropical pomology, plant propagation), Art Lange (tropical pomology), Jimmy Bob Smith (genetics), Charles Poole (plant breeding), Wallace Holmes (soils), Edward Britten (genetics), and John Beaumont (horticulture). By the late 1950s, courses were no longer listed as agriculture but separated into departments of Agriculture, Genetics, Horticulture, Soils, Vegetable Crops, and Agronomy.

The Department of Horticulture was created in a 1961 merger of the departments of Floriculture, Olericulture, and Pomology. James Gilbert served as chair of the new department. His first faculty hire was James Brewbaker, a geneticist. Toshio Murashige and Haruyuki Kamemoto were among the department’s outstanding faculty. Murashige and his former professor at Wisconsin developed a nutritional recipe for plant tissue culture that is used worldwide.

Additional faculty hired in the late 1950s through the 1970s included Makoto Takahashi (vegetables), Warren Yee (fruits), Robert Warner (fruits), Roman Romanowski (weeds), Richard Hartman (vegetables), John Kunisaki (propagation), and Yoneo Sagawa (orchids). Later appointments included Richard Criley (ornamentals), Bernard Kratky (vegetables), Philip Ito (fruit), Terry Sekioka (vegetables), Philip Parvin (ornamentals), Kenneth Takeda (vegetables), Charles Murdock (turf), Fred Rauch and Kenneth Leonhardt (ornamentals), and Roy Nishimoto (weeds). Cathy Cavaletto, a food technologist, joined the department in 1979.

The 1980s and 1990s was a time of transition, with many retirements. New faculty hired included H.C. ‘Skip’ Bittenbender (fruits), Chian Leng Chia (fruits), Joseph DeFrank (weeds), Kent Kobayashi (physiology), Adelheid Kuehnle (ornamentals), Richard Manshardt (fruits), Mike Nagao (fruits), and Hector Valenzuela (vegetables).

Over the years the department and its predecessors continued HAES’s mission to introduce and improve crop plants. The department made significant contributions to the development of new plants and production practices. Hybrids, traditional crossbreeding, and selections eventually led to the release of new papaya and macadamia cultivars. Improved sweetpotato, green bean, lettuce, tomato, and pepper cultivars were also tested and released. New fertilizer practices for coffee production were developed. Genetics research led to new cultivars of guava, litchi, longan, mango, avocado, and pineapple. The Department of Horticulture left a proud legacy for its successor, the Department of Tropical Plant and Soil Sciences.
The Morrill Act of 1862 linked home economics to land grant colleges and helped initiate the Human Development phase of the college’s current Department of Family and Consumer Sciences. From that early Morrill-mandated home economics unit established in the college, the Board of Regents, many years later in 1968, approved the creation of four departments, collectively called the Division of Human Resource Development, with Hazel Kraemer as assistant dean. The departments were Food and Nutritional Sciences; Human Development (HD); Fashion Design, Textiles and Merchandising; and Home Economics. They were separate departments until 1980, when the university and college mandated a merger of the latter three, forming the Department of Human Resources in 1983. Food and Nutritional Sciences became Food Science and Human Nutrition.

As part of university reform in 1984, the program continued while Chancellor Marvin Anderson imposed a stop-out of HD majors, pending curriculum review, which was lifted in 1987. HD was then restructured into a single integrated degree program, called the bachelor of science in family resources; in 1992 the undergraduate degree in FAMR was made permanent, and it continues to today. John Chantiny was the first chair of the Department of Human Development, followed by Sylvia Yuen. During the 1960s, the department first worked in an old home that is now an inn at 2000 Vancouver Drive. HD then moved to the Quarry portables before moving to George Hall.

We were a colorful and interesting group in HD, and our faculty and students have made a large impact through our research, teaching, and outreach in our communities and worldwide.

Between 1978 and 1982, a hiring flurry brought in a number of young, promising faculty members, many of whom have contributed significantly to the department’s growth and are still with the college. They include Donna Ching, known for her agricultural and community leadership development; Dana Davidson, a teacher in child development and co-leader of the master’s degree in early childhood; John Engel, a recognized family sciences expert and chair of Human Resources for a time; and Ron Wall, known for his work in family financial planning. All became familiar figures in the college and the community.
Some former faculty moving on to new pursuits have extended the reach of the department into the community. Richard Kappenberg went on to become a private-practice psychologist. Stella Wong, an alumna, HD academic adviser, instructor for the Leadership class, and active with the college’s Alumni Association, is currently vice president of programs with Catholic Charities Hawai‘i. Housing expert David Foster moved to work on Moloka‘i. Emogene Yoshimura, who taught human development, is a veterinarian. Shirley Weeks, who joined the department in 1969 as an extension specialist, has written the Human Development Letter, which included a variety of timely topics and issues impacting families and communities throughout the state. Vivian Halverson developed the nationally used Keiki ‘O Hawai‘i newsletter. Tony Lenzer became director of the university’s Center on Aging.

Ken Tokuno is the assistant dean for the UH-Mānoa Graduate Division. Nani Larson, a popular adviser and teacher, is retired on Kaua‘i, busy with family. Ruth Finney, who emphasized the role of culture, went on to work with UNESCO in Italy. Joseph O’Reilly, one of the most beloved teachers in the college, taught HD research methods. Connie Meredith is a practicing attorney.

Many alumni are also doing well in the community and have made an impact in their fields, including important roles in the Hawai‘i Departments of Health and Human Services and in City and County of Honolulu positions. Still more are in key positions in nonprofit and private industry, working hard for the community, including Mae Mendelssen, Marja (Takaichi) Levo, and Lily Bloom Domingo. Allene Chun is now the student services specialist in the college. Liz Bailey returned to the department to serve as a lecturer for fifteen years.

Sadly, some of our valued colleagues have passed on. The late Jim Allen was loved by students and known for his knowledge of family theory. John Chantiny taught community development and was known for walking the hallways with a steaming cup of tea. Jean Fargo was a visionary regarding family sciences research. Ken Kiyuna was a well-known, highly regarded instructor. We miss them and share memories of the Junior and Senior Block, research week, advising, and the steps of George Hall.
Academic and extension programs in family resources have touched the lives of tens of thousands of families and communities throughout Hawai‘i. Like many other academic programs, the name of the department has changed throughout the past 100 years, although it has remained true to its mission of supporting the development of healthy families and providing important life skills, such as healthy lifestyle, good nutrition, functional and fashionable clothing, financial literacy, professional careers, and apparel design from conception to merchandising. The founders might not recognize some of today’s programs because they have evolved to meet the challenges faced by people, families, businesses, and communities across Hawai‘i, the Pacific Region, and the nation.

In 1908, the Department of Household Economics, one of four departments in the college, offered a BS degree as the department’s first faculty member, was hired to teach domestic science. Two related programs were offered: domestic science, addressing the problems of food, clothing, and shelter; and art and design, applying the principles of art and design to home and industry. Extension agents, often referred to as “home demonstration agents,” conducted practical demonstrations and informal courses in home economics.

Graduating classes from the Department of Home Economics were small in the early years, with only one student graduating in 1921. Carey Miller, recruited in 1922 to head the department, was responsible for its rapid growth. By 1939, Home Economics had outgrown its original Hawai‘i Hall space and relocated to a new Home Economics Building, built under the federal emergency agency for the Territory of Hawaii and the Public Works Administration of President Franklin D. Roosevelt. When Miller retired in 1958, the Home Economics Building was renamed the Carey D. Miller Hall to honor her many contributions to the university and the citizens of Hawai‘i.

By 1960, five program options existed in Home Economics: general home economics, clothing and design, institutional management, home economics, and foods and nutrition. Shortly thereafter, Foods and Nutrition became a separate department with two options: food science, and nutrition. The four remaining options became depart-
ments in 1968 within the Division of Human Resource Development. In 1971, Hazel Kraemer was appointed assistant dean for human development.

A proposal to develop a School of Human Resources Development was approved by the college’s faculty senate, and the following year Chancellor Wytze Gorter forwarded the proposal to the UH president’s office. The proposal also received support from the Western Association of Schools and Colleges. The Hawai‘i Legislature provided a supplemental budget in 1975 to establish the school, but the funds were not released by the UH-Mānoa administration.

When the college was renamed the College of Tropical Agriculture and Human Resources in 1978, responsibility for Human Resources was subsumed under the associate dean for academic affairs. In 1983, the Board of Regents approved a new Department of Human Resources, consolidating the departments of Textiles and Clothing, Home Economics, and Human Development into one administrative unit. The Board of Regents approved consolidation of the home economics and human development degree programs into a single BS in family resources in 1987. The new degree was granted permanent status in 1993.

In the college’s reorganization of 2000, county extension agents became departmental faculty, providing better integration of the land grant missions of instruction, research, and extension. The name of the department was changed from Human Resources to Family and Consumer Sciences in response to changes in the field. FCS has two undergraduate programs: apparel product design and merchandising, and family resources.

Miller’s legacy continued through scholarships established by her students in 1957 in honor of her contributions. A trust she endowed in 1985 was dissolved in 2005, with the proceeds going to twelve Hawai‘i organizations. In 2007, the Hawai‘i Association of Family and Consumer Sciences donated their Miller trust funds to establish two Centennial Scholarship Endowments for students in apparel product design and merchandising and family resources.

Today, graduates of human resources programs are working as home economists, educators, researchers, service providers, 4-H leaders, legislators, social policy makers, and volunteers. The Human Resources faculty, staff, and students truly provided a rich legacy for its successor, the department of Family and Consumer Sciences.

2. Home Economics students learning clothing design and construction.
Understanding how plants function in a year-round tropical environment has been increased by work done in the Department of Plant Physiology, with benefits to Hawai‘i’s agriculture industry. The department, officially established in 1939 within HAES, was merged with the Department of Botany in the College of Arts and Sciences in 1973, when Noel Kefford came to serve as chair of both departments.

This was a mutually beneficial arrangement for a period, with the Plant Physiology academic program offered under the Botany academic program and its faculty positions funded by the college. Jointly held meetings took place from 1954 to 1986, and the departments collaborated on an annual Plant Physiology in Hawai‘i symposium, with additional leadership provided by HSPA’s Andy Maretzki. When the Plant Physiology department name was changed, during this time, to Botany HAES, this led to confusion as to which department was making contributions to Hawai‘i agriculture.

In 1986–87, Botany HAES “broke free” of Botany amicably, due to the friendship of the respective department chairs, Sanford “Sandy” Siegel and Harry Yamamoto. It was renamed Plant Molecular Physiology (PMP), giving it new visibility and credibility within the university. The “new” department’s development of MS and PhD programs led to a landslide of applications from prospective students. The faculty had originally hoped to name the department Plant Molecular Biology, but this met significant resistance from those newly involved with molecular biology in other campus sectors. The name PMP was suggested by H. Michael Harrington, following a sabbatical in a “molecular physiology” laboratory at the Howard Hughes Medical Institute.

The department flourished with the addition of new faculty and outstanding graduate students, many of whom garnered honors in the annual CTAHR Research Symposium. The department grew in size with new faculty members, grant funds, APTs, post-docs, and graduate assistants. In addition to Kefford and Yamamoto, the department chairs were Bruce Cooil, John Stiles, Harrington, and Sam Sun. Robert Paull served as chair until the PMP merged with the departments of Environmental Biochemistry and Biosystems Engineering to become today’s Molecular Biosciences and Bioengineering. James Deputy, Theodore Goo, and Robert Suehisa were long-serving APTs who made valuable contributions to the department.
Over the years, PMP contributions to Hawai'i agriculture were many. Cooil provided much-needed research on macadamia nutrition that is still used today. CTAHR Outstanding Alumnus Ernie Akamine developed a hot-water treatment to control papaya decay; this led to today’s so-called vapor-heat treatment, which controls both fruit flies and decay. Harry Clements and Kobe Shoji made major contributions in sugarcane physiology and nutrition.

Groundbreaking research on the mechanisms by which plants tolerate the high-light environments found on land was done by Yamamoto. Paull’s many contributions to postharvest handling of tropical fruits and flowers allowed them to be shipped to the mainland. Sun’s and Stiles’ labs developed new methods for cloning important genes from tropical plants. Harrington’s lab made new contributions to plant stress physiology and signal transduction. Other faculty members included Minoru Awada, Shigeru Nakata, Edison Putman, and John Bowen.

This nucleus of faculty developed collaborations across the campus and, indeed, around the world, with sabbatical leave guests from Europe and the mainland. Many UH faculty and students visited PMP laboratories for training in new techniques or to use specialized equipment. It was not uncommon to encounter students from the cancer center, medical school, SOEST, and several Natural Sciences departments working in PMP labs.

The department was also blessed with outstanding secretarial staff: Betty Someda, who joined Plant Physiology in 1946, was followed by Doris Victor in 1980. An expert in purchasing and other university administrative matters, Victor was often sought by other departmental secretaries for her advice and know-how. Because of her leadership, the department was able to develop and take advantage of new ordering procedures that allowed faculty to “call in” orders for supplies needed quickly. Instrumental in organizing annual secretarial conferences, Victor was honored in 1996 with the Willard Wilson Award for Distinguished Service to the University.

Work continues today to build on the department’s legacy of industry-benefiting research. Dulal Borthakur, a transfer from the molecular biology program, continues his work on compounds in luecaena (haole koa) and their relationships to the nitrogen-fixing bacteria that enhance that plant’s growth. David Christopher, the last faculty member to join the department before the merger, has been very successful in advancing understanding of the function of plant cells at the molecular level and the application of plant biotechnology to solve practical problems faced by local agriculture. These include genetic manipulation of aging and senescence in anthurium, the molecular responses to pathogen attack in pineapple and papaya, and the biochemistry of protease inhibitors from pineapple.

Contributors: Harry Y. Yamamoto, Doris L. Victor, Betty Someda

1. (Left to right) Robert Paull, University President Fujio Matsuda, Wesley Hillendahl (FoodSource, Inc.) and Dean Ned Kefford during a $50,000 check-receiving ceremony for a post-harvest research project (ca. 1982).
Early plant disease research in Hawai‘i predates the formation of the college and was conducted by notable plant pathologists, including Nathan Cobb at the Hawaiian Sugar Planters’ Association and others at the U.S. Agricultural Experiment Station. In 1915, Plant Pathology was one of five divisions of the federal experiment station. It became a separate department (Bacteriology, Pathology, and Histology) in 1936, seven years after the federal experiment station was transferred to the university.

Plant Pathology became one of the first casualties of World War II, in August 1941, when its senior faculty member, Keith Paris, on a trip to the mainland wrote, “The more I read of conditions, the more I wonder if I want to go back to work in Honolulu. The latest idea in the minds of the authorities seems to be a carrier slipping thru on a suicide mission, the bombing of the oil tanks and general disablement of Pearl Harbor.” After Paris decided to stay on the mainland, remaining department members Kazuo Kikuta and Minoru Matsuura were transferred to the vegetable crops department at the Kamuela experiment station. Plant Pathology was reactivated in 1945 with the hiring of Walter Hendrix and James Lyle.

Over the next 15 years, Plant Pathology played an important role in the development of agriculture in Hawai‘i. Mamoru Ishii, Oliver Holtzmann, and Minoru Aragaki conducted research and extension activities focusing on controlling diseases of fruit, ornamental, and vegetable crops. Faculty working out of cramped quarters in Henke Hall detailed the etiology of many tropical diseases. The department also benefited from the short-term contract services of distinguished plant pathologists James Hunter, Harry Murakishi, and Robert Raabe.

The boom in educational resources between 1960 and 1970 enabled the department to triple faculty to 13 and develop a strong program in fungal pathogens, nematology, virology, bacteriology, epidemiology, and host-pathogen interactions. Led by Ivan Buddenhagen, the department moved toward an international perspective, with projects throughout tropical Asia and Africa. Buddenhagen founded the first plant disease clinic in the Pacific region and staffed it with an experienced diagnostician, Albert Martinez. The faculty designed modern laboratories and moved into the St. John Plant Sciences Laboratory in 1970. In 1973, the department
took a daring step by hiring Anne Alvarez as the first female extension plant pathologist in the US. During the 1970s, to meet neighbor islands’ needs, the department hired John Cho (Maui), Jeri Ooka (Kaua‘i), and Wayne Nishijima (Hawai‘i).

Pioneering research on the biology and control of fungal, bacterial, and viral pathogens was conducted by Wen-Hsiung Ko, Franklin Laemmlen, Donald Meredith, and Faustino Obrero. Ko did important research on the sexual reproduction of oomycetes. Using fungal pathogens, Eduardo Trujillo discovered unique ways to control invasive weeds in forests and grazing lands. Walter Apt and Kenneth Rohrbach joined the department with the closing of the Pineapple Research Institute, bringing expertise on nematodes and fungal diseases.

The nematological contributions of the department are disproportional to its size. Holtzman identified a number of unique tropical nematode diseases. Apt pioneered development of chemigation with nonfumigant nematicides. Donald Schmitt and Brent Sipes focused on developing environmentally sound chemical practices and pesticide alternatives, including biological controls. Schmitt spearheaded the use of resistant rootstock for control of a devastating nematode disease of Kona coffee.

Host-pathogen interactions took a molecular turn under the leadership of Suresh Patil, who was instrumental in establishing the Molecular Biology Core Facility, later called the Greenwood MBCF. Patil also inspired alumni like Marty Dickman and Robert Birch (an Outstanding CTAHR Alumnus), who now lead major research programs in Texas and Australia. Alvarez led plant bacteriologists in generating monoclonal antibodies for tracing the movement of bacterial strains in field epidemics. John Hu pioneered engineered resistance to viral diseases in tropical crops like banana.

While maintaining a strong international presence, the department never lost focus on meeting local needs. Working with Aragaki, Janice Uchida helped identify new fungal pathogens on ornamental and fruit crops and worked to develop sustainable control options. Stephen Ferreira oversaw deployment of papaya ringspot virus–resistant papaya, the first commercially available transgenic crop modified for disease resistance. Thomas German and Hu solved the 60-year mystery of pineapple mealybug wilt by identifying a virus key to disease development. Scot Nelson undertook the diagnosis, etiology, and control of diseases on ethnically important crops like ‘awa and noni.

Integral to the mission of Plant Pathology, instruction offered an MS degree in 1962 and the PhD in 1971. The 120 students awarded graduate degrees in plant pathology have gone on to successful careers in academia, state and federal agencies, and private industry in Hawai‘i and around the world.

Throughout its history, the department has attracted top-notch plant pathologists, who were quickly courted by larger institutions. Department Chair Paul Teng became director of the International Rice Research Institute. Jonathan Yuen, Edward Caswell, and German came to the department, made significant contributions, then left to lead major programs at other universities. In 2000, the plant pathologists pooled resources with entomologists, weed scientists, and agricultural biochemists to form the Department of Plant and Environmental Protection Sciences.

Contributor: Anne M. Alvarez
For CTAHR, the millennium brought with it more than just a new calendar—it brought six new, multidisciplinary departments totally unlike the discipline-based departments that were common prior to creation of the College of Agriculture in 1947, or even in the reorganized College of Tropical Agriculture of 1960. Not everyone was pleased with the idea of abolishing the traditional departments of agricultural engineering, agricultural and resource economics, agronomy and soil science, animal sciences, entomology, food science and human nutrition, horticulture, human development, human resources, plant molecular physiology, and plant pathology.

Yet change was needed to cope with severe budget cuts, diminished or stagnant student numbers that suggested shrinking demand for the kinds of educations we had been providing, and the dynamic changes occurring across the agricultural and human resource disciplines. Land grant colleges across the nation, which historically had focused on agriculture and rural family disciplines, were changing their names and reorganizing their administrative and departmental structures. They were also seeking new ways to support traditional clienteles and find new opportunities to contribute to fields as diverse as environmental sciences, energy, public health, medicine, business, teaching, and molecular engineering.

Students are interested in disciplines that are relevant to their lives. Faculty are interested in making an impact on real-world problems, as well as understanding the science needed to address those problems. The reorganization of the College of Tropical Agriculture and Human Resources was unlike any previous attempt in terms of size, cross-disciplinary linkages, and administrative changes. Extension agents joined departments, some teaching on-campus courses for the first time. New faculty were given split appointments involving combinations of teaching, research, and extension. Some faculty felt the loss of disciplinary identity when their old departments disappeared. Department chairs found themselves dealing with unfamiliar problems, such as recruiting and evaluating personnel with skills that were necessary to the new units and transcended the old disciplinary boundaries. The transition from small departments to larger, more inclusive units meant that managing a department became nearly a full-time responsibility. The role of a county administrator also became more challenging, as they accepted shared responsibility with department chairs for programs and faculty evaluation.

Change came quickly, and while some faculty found it difficult, many others accepted the new challenges and quickly made adjustments and identified opportunities. As CTAHR begins its second century, it has made the administrative and disciplinary changes needed to successfully address the challenges before it.
Family and Consumer Sciences

Marlene M. Hapai

The Department of Family and Consumer Sciences (FCS) is guided by its vision to be a leader in the development and dissemination of information that supports individuals, families, businesses, and communities in Hawai‘i and the Asia-Pacific region. The department’s instructional, research, and outreach programs focus on family resources and apparel product design and merchandising, and include 4-H youth development programs; agricultural, family, and community leadership programs; and the Center on the Family, a research and outreach unit.

An integral part of the land grant system and UH since 1907, FCS offers BS degrees in family resources and in apparel product design and merchandising. It also partners with the College of Education in the inter-college MEd in early childhood education.

The family resources (FAMR) program focuses on the study of child, adolescent, and adult development. Its curriculum encompasses family development (such as marriage and parenting); family resource management (such as consumer and family economics and management); community needs; and leadership in human services occupations. Students are prepared for bachelor-level careers in human and family services and for graduate training in child and family studies, early childhood education, human development, family-life education, family and consumer sciences, and marriage and family therapy. To provide important real-world experience, the program requires a supervised student internship. With supplemental course work, students can go on to graduate training in other social science disciplines (i.e., social work, educational counseling, public health, or psychology). Students find FAMR courses practical and relevant to their own personal development and family lives.

The apparel product design and merchandising (APDM) program integrates theoretical and applied knowledge regarding apparel design, consumer textiles, historic costume, and apparel production with fashion marketing and merchandising theory and practice, both domestic and international. Students can specialize in apparel design, apparel merchandising, and fashion promotion, or they can develop individualized programs in consultation with an adviser. Fostering the development of professionals prepared for management-level positions in business and industry, APDM prepares students for fashion industry roles that include apparel designer, buyer, merchandise manager, sales representative, costume designer, manufacturer, and store owner.
1. Family and Consumer Sciences
   Mānoa campus faculty and staff
   Back row: Pamela Kusara, Gary Tanimitsu, John Engel, Grace Fong, Rick Caulfield
   Front row: Mary Martini, Barbara Yee (Chair), Sandy Miyashiro, Diane Chung, Dana Davidson
   Not pictured: Abby Cristo, Carol D'Angelo, Michael Cheang, Donna Ching, Carol Anne Dickson, Lori Goodman,
   Shu Hea Lin, Diane Masuo, Marcia Morgado, Andrew Reilly, Ronaile Whittington, Loriena Yancura
   Faculty and staff located in counties (see Our Statewide Campus for additional photos)
   Joan Chong, Myla Gumayagay, Carol Ikeda, Doreen Ikeno, Laura Jean Kawamura, Tom Mason, Ethel Murata,
   Claire Nakatsu, Christine Nanogawa, Rose Saito, Maryknoll Spotkauff, Rebecca Settlage, Norman Takioka,
   Esther Yap, Rhoda Yoshino, Jean Young
   Graduate Students (not pictured)
   Meiko Arai, Christine Crosby, Peter Hsu, Tomas Oberding, Aisha Rathina Pandi, Reuel Reyel, Alyssa Watanabe

2. Center on the Family
   Mānoa campus faculty and staff
   Back row: Shi-Jen He, Ann Tom, Barbara DrBaryshe, Dana Gorecki, Prabode Illukpitiya.
   Third row: Cyndy Kahawale, Naomi Kahikina, Elsie Matsuoka, Angela Choy, Grace Fong
   Front row: Sylvia Yuen (Director), Yueh-Chuen (Carol) Lin, Noriko Shiratori, Melanie Ho, Quamrun Nahar,
   Sarah Yuan, Harumi Karel, Maw-Ying Yuan
   Not pictured: Natalie Crespo, Melissa Fujimoto, Tonima Hadi, Anies Kadir, Lisa Kam, Ji Yoon Kim,
   Hosik Min, Lori Mishima-Young, Lana Nakamura, Marika Ripke, Heather Trundle
The HNFAS program brings together the disciplines of its component sciences to promote humans and animal health and well being. The department offers BS degrees in animal sciences and food science and human nutrition (FSHN) and MS degrees in animal sciences, nutritional sciences, and food science.

Focusing on pre-veterinary training, the animal science program emphasizes the study of swine, sheep, beef and dairy cattle, and pond aquaculture production and management systems. Students face the challenges of proper care, welfare, and management of pets and companion animals (including horses), marine mammals, exotic wildlife, and zoo animals. Unlike most mainland U.S. institutions, the college’s current program’s emphasis is on tropical production systems with particular reference to the Pacific Basin and other subtropical regions.

A strongly science-based program in FSHN distinguishes these undergraduate curricula. Options for students in FSHN include dietetics, human nutrition, and science education. The dietetic option has been approved by the American Dietetic Association. The human nutrition option can be directed toward nutrition education, sports nutrition, or other interests, and can also serve as a pre-professional program in medicine, dentistry, nutrition, or other scientific graduate programs. The science education option provides students with a curriculum that fulfills the academic requirements for a chemistry, biology, or general science certification as a secondary school science teacher.

HNFAS’ master’s programs attract students seeking careers in academics and research, among other professions. The MS in animal sciences is offered in both the basic and applied areas of genetics, nutrition, physiology, animal diseases, molecular biology of growth and metabolism, and animal muscle biology.

Students in the nutritional sciences MS program study the scientific basis of nutrition, its application to health and fitness, and the skills needed to conduct basic and applied nutrition research.

HNFAS’ food science MS program offers areas of concentration in food safety and quality, food processing and engineering, food chemistry and biochemistry, food biotechnology, and product development.

In addition to the academic programs, other departmental programs focus on the greater-than-ever interest today in nutrition, food, and the relationship of food to human health and fitness.
1. Human Nutrition, Food and Animal Sciences
   Mānoa campus faculty and staff
   Back Row: Jinzeng Yang, Steve Spielman, Alan Titchenal, James Carpenter (Chair)
   Middle Row: Yong Li, Yong-Soo Kim, Wayne Toma, Chin Lee
   Front Row: Sahar Zaghloul, Halina Zaleski, Anne Shovic, Joannie Dobbs
   Not pictured: Carrie Asuncion, Colleen Bird, Brent Buckley, Barbara Carloo, Yhe Daida, Nicky Davison, Dian Dooley, Michael Dunn, Alvin Huang, Wayne Iwadaka, Soojin Jun, Soo Lee, Laurel Leslie, Spencer Malecha, Stuart Nakamoto, Rachel Novotny, Cory Tausan, Patricia Tscheda, Vinutha Vijayadeva, Charles Weems, Yoshie Weems, Beth Zhao
   Faculty and staff located in counties (see Our Statewide Campus for additional photos)
   Lincoln Ching, Michael DuPonte, Glen Fukumoto, Naomi Kanehiro, Lynn Nakamura-Tengan, John Powley, Mathew Stevenson, Mark Thorne, Julia Zee

   Graduate students (not pictured)
   Food Science: Jade Fukuda, Donald Hawn, Hongfei He, Monglan Hsieh, Padmasai Kandukuru, David Pirazzini, Vinod Singh
   Nutritional Science: Mele Fernandez, Louise Irafuku, Cheryl Koide, Bradley Krzykowski, Jennifer Lai, Lonny Lee, Yvette Paulino, Margaret Pulver, Minakshi Roy, Cara Sandovaal-Iversen, Hui-ysun Wang, Mihoko Yacavone, Tate Yoshitama
Recognizing the importance of the multidisciplinary approach to problem solving, the Department of Molecular Biosciences and Bioengineering (MBBE) was established in 1999, bringing together faculty from three existing departments: Plant Molecular Physiology, Environmental Biochemistry, and Biosystems Engineering. As part of reorganization within the college, the department combines strong basic and applied research programs and an active, internationally recognized faculty to provide students with exciting learning opportunities.

MBBE’s multidisciplinary faculty offers a broad spectrum of interests in biotechnology, molecular biology, biochemistry, and bioengineering. The department houses degree-granting programs in bioengineering (BS and MS) and molecular biosciences and bioengineering (MS and PhD) and participates in the interdepartmental plant and environmental biotechnology program (BS).

The mission of the MBBE bioengineering program is to provide engineering students with a unique opportunity to study biological systems from the engineering perspective. The program introduces undergraduates to the systems approach to problem solving.

The MBBE graduate program includes research and graduate training in molecular biology, biochemistry, bioinformatics, cell biology, and biotechnology. Also included are bioengineering aspects of plant science, tropical agriculture, aquaculture, environmental bioremediation, bioengineering, and biomedical sciences.

With the expansion of the scope of the graduate program, MBBE also gained the unique expertise of many faculty from other UHM departments, as well as scientists from other scientific institutes in Hawai’i who have joined the program as cooperating and affiliate graduate faculty. Currently, MBBE graduate students are supervised by faculty from the John A. Burns School of Medicine, Cancer Research Center, Pacific Biomedical Research Center, Queens Medical Center, Hawaii Agricultural Research Center, Oceanic Institute, Sea Grant College Program, School of Ocean and Earth Science and Technology, and College of Engineering.

Also participating are faculty from several UH Mānoa departments, including Microbiology; Zoology; Human Nutrition, Food and Animal Sciences; and Plant and Environmental Protection Sciences. As a result, MBBE has become an interdisciplinary graduate program involving tropical agriculture, natural sciences, engineering, and biomedical sciences.
1. Molecular Biosciences and Bioengineering
Mānoa campus faculty and staff
Back row: Charles Nelson, Daniel Pasquin, Jon-Paul Bingham, Daniel Jenkins, PingSun Leung
Middle row: Chuan-Chi Chien, Jian Liang, Run Yu, Karl Yanagihara, Shan Su
Front row: Samira Fares, Joanne Kurosawa, Ping-Yi Yang, Gladys Leong, Lotus Kam, Loren Gautz
Not pictured: Harry Ako (Chair), Dulal Borthakur, David Christopher, Samir Khanal, Qing Li, Pratibha Nerurkar, Kristie Matsumoto, Gemot Presting, Goniul Schara, Winston Su, Ardı Vesmeıski, Joan Yanagihara

2. Molecular Biosciences and Bioengineering Graduate Students
Back row: Yingyot Chanthawornsawat, Edwin Phillips, Kevin Schneider, Zach Bergeron
Middle row: Kuei-Ferg Lin, Sandro Jube, Khugen Dirh Phan
Front row: Glamar Marrero, Anupma Sharma, Kewei Kutin
The mission of the Department of Natural Resources and Environmental Management is to discover and help CTAHR's clients learn how better to use, manage, and conserve Hawai'i's natural—and especially renewable—resources for optimum benefits and enhanced environmental quality. The department was established with the purpose of emphasizing the scientific understanding and management of natural resources and their interlinks to environmental quality, with focus on the natural resources of land, soil, water, air, forestry, rangeland, and aquaculture systems.

Reflecting the interdisciplinary approach of its mission, NREM's establishing faculty and staff came from the former departments of Agronomy and Soil Science, Agricultural and Resource Economics, Plant Molecular Physiology, and from county extension programs. Samir El-Swaify (AGRSS), Richard Bowen (AREC), Carl Evensen (AGRSS), and Carol Ferguson (AREC) led the formation of NREM as a steering committee, with El-Swaify serving as the department's first chair. Subsequent hires added expertise in soil and watershed hydrology, remote sensing and global information systems, forest ecosystems, forestry extension, and wetland ecosystems.

To effectively meet its mission and objectives, NREM embraces holistic, inter- and multi-disciplinary systems approaches for understanding and managing tropical (especially whole-island) terrestrial ecosystems. The wide spectrum of expertise among NREM faculty and staff allows such a holistic approach by inclusively addressing the physical, chemical, biological, economic, social, and policy elements of natural resource management.

Significant initial strides have been accomplished in instruction and research programs, combining faculty expertise in technical and socioeconomic arenas and conforming to multidimensional conceptual models for productive and sustainable agro-ecosystems. This approach has proved to be appealing to students and granting agencies. As a result, NREM is experiencing significant growth in student majors, with 50 undergraduate majors and 54 graduate students in the college's centennial year. It has also been successful in attracting extramural grants to serve both local and global communities.

NREM offers BS, MS, and PhD degrees, with BS specializations in resource management and conservation or resource development and policy. A multitude of graduate specializations are also offered.
1. Natural Resources and Environmental Management

Mānoa campus faculty and staff
Back row: Carl Evensen (Chair), Chennat Gopalakrishnan, Travis Idol, Greg Bruland
Third row: Ali Fares, Steven Nagano, Samir El-Swaify, John Yanagida, Tomoaki Miura
Second row: Shirling Au, Carol Ferguson, Susan Yamane, Linda Cox, Sanjit Deb
Front row: Farhat Abbas, Katherine Chauston, Catherine Chan-Halbrendt, Ekhlass Jarjees
Not pictured: Lois Agena, Richard Bowen, Lawrence Chan, Servillano Lamer, Christopher Lepczyk, Creighton Litton, Josephine Smith

Faculty and staff located in counties (see Our Statewide Campus for additional photos)
James ‘J.B.’ Friday, Patricia Macomber, Dennis Matsuyama, Steven Nagano

2. Natural Resources and Environmental Management Graduate Students

Back row: Matias Boll, Dean Meason, Meris Bantilan-Smith, Rodolfo Martinez-Morales, Dan Williams
Front row: Toby Wood, Mohammad Safeeq, Thomas Decker, Tadayoshi Matuda, Alan Mair
Not pictured: Amjad Ahmad, Bob Alexander, Mery Apple, Katya Boehele, Chad Browning, Chui Ling Cheng, Mele Chillingworth, Gwen DeMient, Cheryl Geslani, Silvia Gianetti, Greg Grigson, Michelle Harman, Ilima Hawkins, Mason Holmes, Su Kwan Jung, Varanthy Kandeepan, Lara Kozloff, Jyotsna Krishnakumar, Benjamin Laws, Ruyian Mamit, Bernard Matatumua, Rebecca Mitschele, Cynthia Nazano-Leary, Tomas Oberding, Dana Ogle, Dana Okano, Caleb O’Kray, Svetlana Port, Adam Rosenberg, Merissa Sakuda, Lasha-Lynn Salbosa, Melanie Saucier, Nicole Scherman, Gwendalyn Sisox, Hiromasa Suzuki, Tom Swenarton, Grant Takayesi, Lynna Thomas, Nghia Dai Tran, Fang Yang, Adel Youkhana

Faculty and staff located in counties (see Our Statewide Campus for additional photos)

Effectively managing invasive and disease-causing organisms that severely affect agricultural, urban, and natural environments, while remaining responsive to societal concerns about protecting our natural resources and the environment, is at the core of the Plant and Environmental Protection Sciences (PEPS) program. Because management of pests and pathogens is essential to preserve the economic and ecological future of lands in Hawai‘i and the Pacific, the college’s plant- and resource-protection approach emphasizes biological control, integrated pest management, and genetically based methods.

Hawai‘i’s location in the Pacific Basin has proved to be a blessing by providing students with an ideal setting for tropical environment studies. Our unique island ecosystems encompass many cropping niches, from humid tropical to arid temperate conditions. And the multitude of agricultural and landscape plants provides a natural laboratory to study a diversity of urban and agricultural inputs. The multicultural aspect of the human population further adds to the intriguing plant, human, and pest interactions that are a part of PEPS academic and research programs.

A BS in PEPS offers a multidisciplinary science degree that promotes the understanding of complex agricultural and urban problems created in the global ecosystem. Students receive an interdisciplinary foundation in entomology, plant pathology, weed science, and environmental science that provides a focus for upper-division studies. This holistic approach gives each student—from early on—the opportunity to learn about pest management, crop protection, biotechnological approaches, environmental regulations, toxicology, and rural and urban sociology, as these relate to their focus areas. PEPS is also a partner in the multidisciplinary BS in the plant and environmental biotechnology program.

The entomology program offers MS and PhD degrees, with courses including acarology, biological control of insect and weed pests, biotechnology, insect genetics, insect ecology, insect physiology, insecticide toxicology, insect transmission of plant pathogens, medical and veterinary entomology, pest management, systematics, urban entomology, and tropical pest management.

The tropical plant pathology program offers MS and
PhD degrees in the study of plant diseases, their causes, and their interactions with the environment, focusing primarily on agricultural crops of economic importance. Opportunities exist, however, for discovery research in natural ecosystems and the laboratory. The field consists of several sub-disciplines, including phytomycology, plant virology, bacteriology, nematology, epidemiology, crop protection, and molecular biology of host-pathogen interactions.
Tropical Plant and Soil Sciences

Marlene M. Hapai

The Department of Tropical Plant and Soil Sciences (TPSS) explores plant and soil issues important to Hawai‘i and other tropical areas. The work of its researchers has contributed to sustaining agriculture both here and in many developing countries in the Pacific and other regions. TPSS is currently involved in adapting and applying biotechnology and production technologies to enhance and sustain food production, ensure a safe food supply, and develop environmentally sound crop production and soil restoration systems.

For students, the department’s curricula focus on the interactions among plants, soil, water, and air in different settings. An appreciation of these interactions leads to an understanding and integration of fundamental biological, chemical, and physical processes with the goal of responsibly managing land, water, and crops.

TPSS offers a BS degree with options in plant sciences and genetics, plant production and management (Horticulture), and Environmental soil sciences. TPSS is also a partner in the multidisciplinary BS in plant and environmental biotechnology.

Its graduate study, leading to MS and PhD degrees, provides three options: plant science, horticulture, and soil science. All three options emphasize development of problem-solving skills that integrate molecular, biochemical, physiological, chemical, genetic, and ecological approaches to collaborative research in plant and soil sciences.

The plant science option develops adaptations and applications of biotechnology to tropical crop plant production and emphasizes fundamental biological processes, molecular and organism biology, genetics, plant physiology, and crop production systems.

The horticulture option includes many facets of tropical food and ornamental crop production and emphasizes agricultural systems, plant production, soil fertility, and protection of the environment, while supporting disciplines that include crop ecology, plant physiology, and molecular biology.

The soil science option embraces the whole system of crop production through development and application of knowledge about soil fertility, chemistry, physics, and microbiology. Soils’ intrinsic properties are studied, as well as their fundamental roles in crop growth and as environmental resources.
1. Tropical Plant and Soil Sciences

Mānoa campus faculty and staff
Back row: Craig Okazaki, Adelheid Kuehnle, Susan Garner, Mark Blimline, Robert Paull (Chair)
Third row: Teresa Amore, Gail Uhuu, Aurora Saulo, Andrew Kaufman
Second row: Richard Criley, Helen Turano, Kenneth Leonhardt, Carol Tran, Mitiku Habto, Steven Fukuda
Front row: Susan Takahashi, Nancy Chen, Nguyen Hue, Kent Kobayashi, Joseph DeFrank
Not pictured: H.C. ‘Skip’ Bittenbender, James Brosnan, James Brevbaker, Neal Chang, Jonathan Deenk, James
Deputy, John Griffis, Theodore Goo, Gayle Hori, Shirley Ishihara, Richard Kablan, Mieko MacLachlan, Richard Man
shardt, Ronald Matsuda, Richard Ogoshi, Guy Porter, Theodore Radovich, Yoneo Sagawa, Agnes Shimamura, Elsie
Sun, Brian Turano, Gordon Tsuji, Goro Uehara, Hector Valenzuela, Doris Victor, Ania Wieczorek, Russell Yost
Faculty and staff located in counties (see Our Statewide Campus for additional photos)
Alton Arakaki, Rogerene “Kali” Arce, Rommel Corrales, Kent Fleming, Steven Fukuda, Thomas Jewel, Andrew
Kawabata, Bernard Kratky, Joanne Lichty, Ty McDonald, Janette McEwen, Cathy Mello, Susan Miyasaka, Mike Nagao,
Patricia Nakao, Melvin Nishina, Glenn Sako, Terry Sekioka, Paul Singleton, Virginia Easton Smith, Glenn Toevs, Melvin
Wong, Roy Yamakawa

2. Tropical Plant and Soil Sciences Graduate Students

Back row: Elizabeth Huppman, Shawn Steiman, Gaoussou Diarra, Orville Baldos, Peerapong “Git” Sangwanagkul
Front row: Martha Coleman, Peter Toves, Yawadee Sirimake, Tanuchai Smitasiri, Siwaporn “Pla” Thumdee
Not pictured: Kyle Barber, Andrea Blas, Mathias Boll, Ray Camacho, Oranuda Chinnasri, Aminata Diarra, Yu Huang,
Beth Irikura, Franklin Johnson, Ivan Kawamoto, Michelei Kikuchi, Erik Kling, Hamidou Konare, Tranq Le, Tai McCollan,
Tilden Miguel, Melinda Moata, Margaret Oyangos, Gabrielle Ortega, Archana Pant, Kauahi Perez, Antonio Querido,
Ayami Shiraishi, Kekaha Spencer, Nellie Sugii, Jennifer Wai