California’s leading universities offer world-class academic programs in agriculture. These evolving programs not only reflect the challenges and opportunities of the greater food industry, but are shaping the strategies and perspectives of graduates who may pursue careers in fresh produce. As the range of higher education programs proliferates, students can choose among myriad majors and concentrations, each with highly specialized, complex, and rigorous coursework.

We spoke with a few subject matter experts at three California universities, which many would consider the backbone of the Golden State’s agricultural education system. These faculty members and administrators provided insight into the strengths and emphases of their respective programs and discussed how the academic landscape in ag studies is changing.

UNIVERSITY OF CALIFORNIA, DAVIS

The College of Agricultural and Environmental Sciences at the University of California, Davis (UC Davis), widely recognized as the

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Ag universities steer a course for industry success

BY ELIZABETH HANSON, PH.D.
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world’s premier college of agriculture and forestry, offers a wide range of academic programs in horticultural fields.

Students pursuing careers in produce may be especially interested in plant sciences, viticulture (the study of grapes) and/or enology (the science of wine and winemaking), food science and technology, nutrition, and agricultural economics. Extensive cooperation between the university and the industry keeps both the research and curriculum timely and relevant, and helps connect students with a wealth of career opportunities.

Dr. Roberta Cook, a Cooperative Extension specialist from UC Davis’ Department of Agricultural and Resource Economics, says many of today’s students have a passionate interest in sustainability. “Students who are into math and science topics as they pertain to food and agriculture tend to be really engaged with environmental and sustainability issues.”

Interest in sustainable growing, integrated pest management, organics, and socially responsible labor management has drawn students to the College of Agriculture and begun to shape its courses, including a Sustainable Agriculture and Food Systems major. Current interest in sustainability is so diverse, Cook says it is impossible to “encapsulate it into any particular program.”

However, Cook notes some difficulty in attracting students to fields like plant sciences and entomology in recent years, as many students with strong science, technology, engineering, and mathematics (STEM) backgrounds are often drawn to software development and related careers rather than agriculture.

It has grown especially difficult to encourage students to pursue fruit and vegetable breeding, which requires a level of dedication many students seem unwilling to give.

In her conversations with representatives from seed companies, Cooks says some have expressed concern about the future and who will continue the work after the current generation of breeders retires. To combat the problem, UC Davis’ Seed Biotechnology Center launched its Plant Breeding Academy in 2006, a two-year program designed to train seed industry professionals.

A subsequent outreach program, called ‘Seed Central,’ was created in 2010 and helps connect students and professors with industry experts, who often teach short courses at the university. Cook recommends these courses for working professionals in the produce industry, as well as graduate and undergraduate students.

Cook maintains that for students to be competitive in the admissions process and succeed in the College of Agriculture, a strong math and science background is essential. Success in rigorous STEM-oriented fields of study within the college also translates to higher earnings after graduation, she points out.

Beth Mitcham, director of the Postharvest Technology Center at UC Davis, also urges agriculture students to take some economics and business courses to give them a well-rounded perspective, as well as more postharvest courses: “Selfishly, but also practically, I wish more people knew about postharvest biology, because it’s often an afterthought. The focus is on production and production issues, and yet we lose so much food after it is harvested. It’s starting to gain some recognition in the media, but many...
students leave ag programs without ever hearing a word about it."

Beyond undergraduates receiving superb training for careers in produce, Cook sees opportunities for UC Davis graduate students to respond to industry needs in every field, such as precision agriculture and the application of new technology. Students not only benefit from rigorous coursework, but from professors engaged in targeted, hands-on research. “We’re on the cutting edge.”

**CALIFORNIA STATE UNIVERSITY, FRESNO**

Excitement about new developments in agriculture is also high in the Jordan College of Agricultural Sciences and Technology (JCAST) at Fresno State University, where students interested in produce can study agricultural business, food science and nutrition, plant science, or viticulture.

Like Cook, Dr. Annette E. Levi, chair of the Agricultural Business department, sees the rising national interest in sustainable, organic, and local food production influencing enrollment in the college.

Citing the appeal of a robust job market in agriculture, Levi reports JCAST enrollment has nearly doubled in the last five years, while “the proportion of Hispanic students also increased during the same time period from 10 percent of our students to 33 percent.” This, in turn, represents “a slow change in perception of the stigma that agriculture has had for many years.”

Numerous students enter the college with previous agricultural experience from working on family farms or spending summers harvesting crops, many with parents who are migrant workers. Levi considers the college distinctive for its large population of first-generation college students.

The Agricultural Business department appeals to students seeking careers in the sciences, management, unique finance and banking services, government, logistics, and careers that allow them to work outdoors or in fast-paced sales environments. Some students also go on to pursue master’s degrees in agribusiness or agricultural economics.

“Once in a while we get lucky and have a Ph.D.-bound student in Ag Econ,” says Levi. She believes approximately 10 percent of graduates go on to graduate school. She cites coursework in calculus (and more calculus!), linear algebra, and operations research as important preparation.

Levi, like Cook, stresses the importance of a strong grounding in STEM fields for agriculture students. And although the department has responded to employer needs in recent years by placing more emphasis on student internships, Levi recognizes areas for further improvement: for example, providing more instruction on the regulatory environment and on presentation and communication skills.

As a response to further globalization, the department now requires students to take an International Agricultural Economics course. There are also two-week study abroad electives in China and Chile so students can learn about the food system, agricultural production, and trade in each country.

The department plans to add a third such course in South Korea and is working to
develop a service learning course in India for 2016.

Levi says the college has discussed creating a certificate program for working professionals, which she believes “can be a good way to solve some bottlenecks for the industry in terms of moving people ahead without having to get a four-year degree and all the general education courses.”

In the years ahead, she anticipates more online and distance education access, further industry interaction, more mentorships to find talent and groom future employees, and what she characterizes as ‘streamlined internship opportunities.’ She cautions, however, that with a projected decrease in state funding over the next decade, JCAST will need to rely more heavily on industry-supported endowments for its programs.

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

Like Fresno State, California State Polytechnic University, Pomona (Cal Poly Pomona) has seen a dramatic increase in ag enrollment over the last decade, up to 1,800 students from 1,000 in 2002.

As the only university with a college of agriculture in Southern California (UC Riverside has only a division of agriculture), Cal Poly Pomona is an attractive choice for

BACK TO SCHOOL

The University of California, Davis (UC Davis) offers a rich variety of undergraduate and graduate programs for students interested in produce industry careers. In 2012, the university’s Postharvest Technology Center launched the “Produce Professional Certificate Program.” The first of its kind, the program is designed for professionals working in the industry whose academic backgrounds may have been in fields unrelated to agriculture or postharvest technology. The four-year program aims to educate participants in both the “how-tos” and the “whys” of produce handling.

“The goal is to provide a way for people working in the produce industry to demonstrate a certain level of knowledge and make themselves more marketable in the industry, and then also provide a resource the industry can rely on to find qualified candidates,” comments Beth Mitcham, director of the Postharvest Technology Center.

To earn the certificate, students must complete a combination of required and elective courses, each assigned a point value, for a total of 120 points over a four-year period. Many courses are available online, but several of the required short courses are taught in-person on the UC Davis campus. Students must score at least 80 percent on a quiz at the end of each course to earn the designated points.

Mandatory coursework includes an overview of postharvest technology with coverage of produce safety, fruit ripening and retail handling, and fresh-cut processing. “We spent quite a bit of time thinking about the key knowledge people should have to be produce professionals,” Mitcham explains. In thinking about what would be considered key mandates for the proper handling of produce to maintain quality and safety, she says the program was arranged around several mandatory courses with “a little bit of flexibility for people to focus more on certain topics that fit better with their area of interest.”

Mitcham says student engagement has been high among the initial class, despite the challenges of balancing career and coursework. Industry reaction has also been positive, especially from employers, although Mitcham is eager for the program to gain greater exposure.

To learn more about the Produce Professional Certificate Program, visit http://postharvest.ucdavis.edu/Education/Produce_Professional_Certificate.
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local students, says Dr. Jon C. Phillips, director of the Center for Food Marketing and Agribusiness Solutions.

At Cal Poly Pomona, students pursuing a career in produce would likely major in Agribusiness and Food Industry Management, Agricultural Science, Food Science and Technology, or Plant Science.

According to Phillips, the school prides itself on a hands-on, learn-by-doing approach, although institutional pressure to cut costs and increase class sizes since 2008 has made it challenging to continue offering this kind of education. “Of course, things are getting better,” Phillips adds, “but they don’t turn around overnight or even in one year.”

Phillips, like Cook and Levi, confirms heightened student interest in sustainability. In response, Cal Poly Pomona has emphasized environmentally-friendly practices in its curriculum, such as integrated pest management and “paying attention to where food comes from, all the way from the farm to the consumer’s plate—a holistic approach to food and fiber.”

The background agriculture students bring to the program has also changed.

“In the old days—the 1980s and prior,” Phillips recollects, “we used to get a lot of people who were raised on the farm and wanted to go back and take on the responsibility of running their own family farm.” This, however, is no longer the norm as Cal Poly Pomona attracts many urban students and is making forays into urban agriculture and community gardens.

Although math and science remain important in the study of agriculture, Phillips says these fields alone cannot provide all the answers. Some programs in the college accommodate students whose academic interests lie elsewhere than in the biological sciences, such as the social sciences.

If “the biophysical sciences develop a new variety of some crop, and it seems to be preferable to the original variety but no farmer adopts it,” Phillips posits, “who is going to do the research into how that innovation is going to get diffused into the farming community? It’s going to be the social scientists.”

In the next five to ten years, Phillips anticipates an increased use of technology in traditionally structured classes as well as innovative ways of delivering course content online.

At a curricular level, Phillips expects increased attention to biotechnology and its capabilities, limitations, and ethical implications for agricultural professionals.

He also expects to see a continued emphasis on sustainability, public policy, and globalization. “Becoming more in tune to the globalization of markets, the preferences of buyers in other parts of the world, and the ins and outs of importing and exporting,” Phillips contends, “those are going to be very valuable skills.”

CONCLUDING THOUGHTS

Although many of the strengths and challenges that Cook, Mitcham, Levi, and Phillips discussed are specific to their own universities, several broad trends are clear.

High rates of retirement among ag faculty, are producing instability across the discipline, including replacement of tenure-track professors with temporary faculty, and creating shifts in research and areas of expertise. This changing of the guard may also generate subtle shifts in pedagogical style.

Meanwhile, the popularity of sustainable agriculture and social justice concerns among millennials has been a boon to enrollment and is shaping both course offerings and a passionate cohort of young produce professionals prepared to bring fresh energy to the industry.

Elizabeth Hanson is a freelance editor and writer based in the Chicago area.