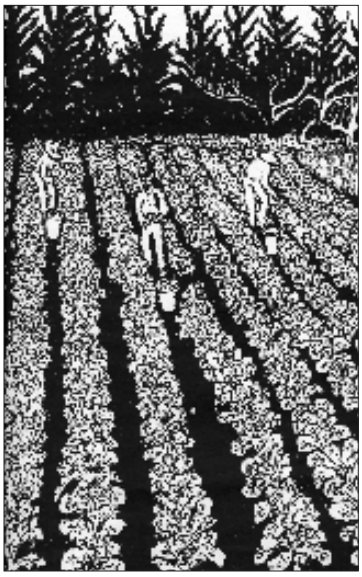

Forrest Cook

News & Notes of the UCSC Farm & Garden

Issue 148, Winter 2016

Dispatches from the Farm Orchard

A Little Distant & Recent History, and a New Approach to Controlling Apple Replant Disease

– Orin Martin

Fruit trees have always played an important role in the biodiverse cropping systems we demonstrate and teach about at the UCSC Farm & Garden. The first of the UCSC Farm's orchards was planned and planted in 1972–1974 (the farm itself was founded in 1971) by Steve Kafka, a trusted apprentice of Alan Chadwick who stayed on to manage the farm after Chadwick departed. Kafka then went on to earn a PhD and became a UC Agricultural Extension agent. The orchard was ushered into production by Jim Nelson, who served as farm manager from 1977–1984. Jim supplemented the original plantings, and also mastered and in turn taught us all the science and art of fruit tree growing.

The original plantings consisted of a small block of apricots, a smattering of towering Asian pears, a block of majestic Asian plums, a row of "better behaved" (it's genetics) European prune plums, a block of 20–30 European pears, a larger block of 15–20 apple varieties, a kiwi block, and some persimmons, along with a line of table grapes.

These trees were planted on the best available size-controlling rootstocks of the era, which is to say—not very. The trees ranged in size from 15–25 feet tall, and while marvelous specimens in the landscape, they required 12–16 foot ladders as well as the mindset and skills of the Flying Wallenda family to prune and harvest. It was not uncommon to take 5–6 ladder sets (moving and placing the ladder) and an hour and a half per tree for an accomplished pruner to prune a single tree.

Fast Forward: The New Millennium

In 2000–2002 we planted a small block of apples on truly semi-dwarfing rootstock (M7, M26, and M111) that includes four rows totaling 57 trees on 8–10 foot centers. The varieties are–

- Arlet (M7) – A cross between Golden Delicious and Cox's Orange Pippin.
- Auvil Fuji (M111) – September ripening Fuji, but a weak grower.
- Belle de Boskoop (M111) A robust European apple; good eating, cooking, juicing.
- Chehalis (M26) – A found seedling "escaped" from a Golden Delicious orchard. It's everything you like about Golden Delicious, but bigger and ripens 6 weeks earlier (mid August).
- DeCoster Jonagold (M7) – When all is said and done, probably both the best-performing and (one of) the best-tasting varieties for the Santa Cruz area.
- Early Gold (M26) – An earlier Golden Delicious with a narrow harvest window (about 10 days).
- Gale Gala (M7) – A redder Gala.
- Ginger Gold (M26) – An early, slightly tarter Golden Delicious. Sounded promising, tastes only okay – pretty though.
- Hudson's Golden Gem (M111) – A russeted chance seedling of Golden Delicious that is truly outstanding.
- Mollie's Delicious (M7) – A cross between Golden Delicious and Gravenstein—true to both parents.
- Mutsu (M7) – A tried and true variety these days, but "back in the day" it was virtually unknown.
- Valstar (M7) – A redder Elstar, which in turn is Gala with gusto; an apple for people who aren't afraid to tangle with a slightly tart apple (though it's also got plenty of sugar).

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The aim with this block was to create a "pedestrian" (i.e., ladderless) orchard using both dwarfing rootstocks and pruning and training techniques, and to produce fruit from trees with (mostly) Golden Delicious parentage. Mission accomplished.

More Recent Fruit Tree Plantings

In 2014–15 we established a new block of pears on dwarfing rootstock (OHxF333) that keeps the trees at 9–12 feet. Most are fireblight resistant and all were selected with taste foremost in our minds. The varieties include –

- B. P. Morettini (B=butera/butter, P = precoce/early) – One of the best early pears (ripens in late July), and in fact one of the best pears ever. It fruits early, regularly, and profusely; sweet, juicy, melt-in-your-mouth taste. A light green-yellow, classic-shaped pear with a red blush on the sunny side.
- Bosc – The classic russeted late season pear. Elongated, brown skin, sweet, juicy taste with a little of that pear grit sensation (pleasing with pears, not so much with salad mix).
- Comice – One of the sweetest pears, in a rich and silky manner. Flesh is creamy white.
- Kieffer – Planted mainly as a pollen source for the Warren (below), which often sets a "shy" crop without an extra infusion of pollen. It's a small, fireblight-resistant variety that eats okay but cans and cooks well.
- Seckel, a.k.a "Sugar Lump" – A naturally dwarf tree (6–8 feet).
- Warren – The funniest-looking, most homely but oh so comely when it comes to the sugar quotient.

In 2014 we also planted a new line of apples that I dubbed "homage to Golden Delicious." It features 5 Golden Delicious, 5 Golden Gem, and 5 Grimes Golden. And in 2015 we added two rows of plums and pluots on semi-dwarfing Citations rootstock. The plums are Beauty, Inca, Late Santa Rosa, Mariposa, and Santa Rosa. The pluots are Flavor King (a natural dwarf), and Flavor Sugar Grenade (the flavor explodes in your mouth).

This year we're adding an additional line of pears:

- Bartlett – The world's best-known pear, it was discovered growing in England about 1770. Medium-large yellow-skinned fruit with a distinctive look and a smooth, sweet flavor that lets you know it's definitely a Bartlett. Ripens in mid–late August. The old cannery at the base of Seabright Ave. in Santa Cruz where Pacific Edge climbing gym now resides used to feature canned Bartletts grown in the Santa Cruz Mountains. It closed in 1989.
- Beurre de Hardy (a.k.a French Butter pear) – From Boulogne, France, about 1820. Medium/large russeted green-yellow fruit with buttery, melting flesh. An annual heavy cropper with complex flavors featuring sugar and lemon in the foreground. Great for fresh eating or cooking.

Students plant new apple trees at the UCSC Farm.

- Blake's Pride – A joint release by Ohio State University and the USDA (1998). Fireblight resistant. Glossy yellow skin with tan-russet hues. Aromatic, juicy, sweet, with a buttery flavor and texture. Ripens in September. Fresh eating, cans well, and makes an excellent pear butter.
- Conference – First brought to light at a big English pear conference in the 1880s (hence the name); very fire blight resistant. Medium to large fruit, slightly elongated and bell shaped. Green-yellow skin with russeted marking. Excellent as a dessert pear but also cooks/poaches well. It is the leading production pear in both Belgium and the Netherlands. At full ripeness it is rich, sugary, buttery soft, and aromatic. Late harvest (October–November).
- Forelle – A small fruit that blushes red. White, melting flesh, complex taste with a faint cinnamon aftertaste. Some folks call them "sweet and petite." Harvest late September–October.
- Harrow's Delight – From Ontario, Canada (1982). Fireblight resistant. The fruit is similar to Bartlett, yellow skinned with a red blush. Flavorful, smooth textured, fine-grained flesh. Early August harvest.
- Magness – A modern (1968) introduction from the USDA that is a cross between Comice and Seckel. Medium-sized fruit with a short neck. Resistant to fireblight. Soft, sweet and juicy with a honey-like taste.

Addressing Apple Replant Disease

A syndrome referred to as apple replant disease is common in all soils in apple growing regions. If an established apple tree is pulled out of the soil, the recommendation/conventional agricultural wisdom dictates not to plant apples again on that site for 5–8 years or longer.

It's difficult to pinpoint the disease's etiology. It is thought that root detritus from the old tree gives rise to a

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Winter/early Spring Calendar

Winter Pruning of Stone Fruit Trees

Saturday, February 6, 9:30 am – 12:30 pm

Louise Cain Gatehouse, UCSC Farm

Join Orin Martin and Sky DeMuro of the Alan Chadwick Garden for a lecture and demonstration workshop on pruning stone fruit trees (apricots, peaches, plums, etc.). Information on varietal selection, tools, timing, techniques, and more.

Pre-registration costs: $30 general public; $20 Friends of the UCSC Farm and Garden; $15 limited income, $5 students. *Register online or by check—details at*: tinyurl.com/workshops2016, or call 831.459-3240.

Fruit Trees 101: Bare Root Fruit Tree Selection and Care

Saturday, February 20, 9:30 am – 12:30 pm

Louise Cain Gatehouse, UCSC Farm

Learn the basics of bare root fruit tree selection, planting, irrigation, fertility, and pest management with Orin Martin and Sky DeMuro of UCSC's Alan Chadwick Garden. Learn about which varieties work best for your microclimate.

Pre-registration costs: $30 general public; $20 Friends of the UCSC Farm and Garden; $15 limited income, $5 students. *Register online or by check—details at*: tinyurl.com/workshops2016, or call 831.459-3240.

Home Grown: Citrus Selection, Planting, and Care

Saturday, February 27, 9:30 am – 1 pm

Louise Cain Gatehouse, UCSC Farm

Add some zest to your garden or small-scale farm with citrus. Join Daniel Paduano of Abounding Harvest Mountain Farm and Orin Martin of the Chadwick Garden to learn about citrus varieties (lemons, limes, tangerines, oranges, and more) that perform well in the Monterey Bay region, and how to select a site, plant, and care for a range of citrus trees. The workshop includes a tasting of citrus varieties.

Pre-registration costs: $50 general public; $40 Friends of the UCSC Farm and Garden; $20 students/farmers/limited income. *Register online or by check; details at*: tinyurl.com/workshops2016, or call 831.459-3240.

Note: You can also pay at the door for the above workshops. Cash or check only, add $10 to pre-registration fee.

Garden Cruz: Organic *Matters!*

Saturday, March 5, 12, & 19, 9:30 am – 3:30 pm

Alan Chadwick Garden & UCSC Farm

Garden Cruz is back! Learn the art and craft of organic, French-Intensive gardening in the Garden Cruz workshop, offered the first three Saturdays of March. Sign up for all three days, or choose the "à la carte" option and sign up for one or two workshops (see details, next page). Christof Bernau, Orin Martin, and Sky DeMuro will teach this lecture and hands-on workshop series.

First Sunday Farm Tour

Sunday, April 3, 2:00 –3:30 pm

Louise Cain Gatehouse, UCSC Farm

The first monthly guided tour of the 2016 season takes place on Sunday, April 3. Join a docent for a walking tour of the 30-acre organic UCSC Farm and learn about the many research, education, and outreach activities taking place on this campus landmark.

Free tour, no reservations necessary. Free parking available at the corner of Coolidge Drive and Carriage House Road, just inside the main entrance of the UCSC campus. *Note: Heavy rain cancels.*

Also coming up –

February 11 and 12: Opening and tour of the *Collective Museum* project. This innovative participatory exhibition by the artist group Public Doors and Windows (PDW) is spread across 50 sites at the UC Santa Cruz campus, including a number of sites at the UCSC Farm. It was developed under the leadership of Harrell Fletcher, a graduate of the Farm & Garden Apprenticeship program who is now a professor at Portland State University. Learn more at ias.ucsc.edu/events, or call (831) 502-7252.

February 21, *The Craft of Fermentation*, and February 24, *Viticulture and Regional Terrior*. These workshops are offered through UCSC's Office of PE and Recreation as part of their Food Systems Learning Journeys series and are open to the general public. See more at casfs.ucsc.edu/news-events/events/index.html

If you'd like more information about these and other upcoming events, need directions, or have questions about access, please call 831.459-3240, email casfs@ucsc.edu, or see our web site, casfs.ucsc.edu.

For more 2016 events, see Upcoming Events at casfs.ucsc.edu.

Save the Date – Sustainable Agriculture Education Association Conference Coming to UCSC, July 29–31

The seventha annual National Sustainable Agriculture Education Association (SAEA) conference will take place at UC Santa Cruz on July 29–31, 2016, hosted by the Center for Agroecology and Sustainable Food Systems (CASFS) with major support from UC's Global Food Initiative.

The conference invites participants from across the agriculture and food system who are engaged in adult education: students, teachers, trainers, and faculty, independent scholars; farmers, cooks, and community organizers; professionals in health, business, the arts, law, and the media. Participants will represent colleges, universities, farmer training organizations, and a range of professional and civil society organizations. To encourage flexible and interactive learning, the format will be highly participant-driven, featuring Open-Space sessions, workshops, panel discussions, and diverse presentations.

For more information, see sustainableaged.org/conferences/2016-santa-cruz-ca, or email saea2016conference@ucsc.edu.

New Grants Support Education & Outreach

The Clarence E. Heller Charitable Foundation granted $100,000 for the Center for Agroecology and Sustainable Food Systems (CASFS) project entitled "Agroecology and Sustainable Food Systems Curricular Integration and Enhancement at UCSC."

The Heller Foundation's support is aiding CASFS in its work on sustainable agriculture curriculum, courses, internships, and training for undergraduate students, with integration of courses and activities at the CASFS Farm and the Chadwick Garden. Please see next page for information on new UCSC undergraduate internship programming at the Farm & Garden that has been supported in part by past Heller grants.

The UNFI Foundation has granted $25,000 in general support of the sustainable and organic agriculture education, outreach, and research work at CASFS. This much-appreciated support wll be used to fund staff salaries and other essential operating costs that are the foundation of our educational programming and support of organic research efforts.

Many thanks to the Heller Charitable Foundation and the UNFI Foundation for their support.

Garden Cruz – Organic Matters 2016

Join Christof Bernau, Sky DeMuro, and Orin Martin of the UCSC Farm & Garden to learn the art and craft of organic, French-Intensive gardening in the Garden Cruz workshop, offered the first three Saturdays of March (March 5, 12, and 19). Sign up for all three days, or choose the "à la carte" option and sign up for one or two workshops (see details, below).

Topics covered will include garden bed preparation, technique to ensure soil health and fertility, seed propagation and proper care of seedlings, planting plans, direct seeding and transplanting practices, intercropping, and raised bed philosophy. Get an overview of spring vegetable and flower crops, with a "sneak preview" of summer favorites.

- **Workshop 1,** March 5: Soils, Cover Crops, Compost, and Cultivation (bed preparation)
- **Workshop 2,** March 12: Greenhouse Skills, Starting Plants from Seeds, and producing your own vigorous seedlings to transplant in the garden
- **Workshop 3,** March 19: Seeding and Transplanting into Garden Beds (crop spacing, intercropping, crop planning); irrigation with an emphasis on water-conserving techniques

Cost for all 3 workshops: $300 (general), $250 (Friends of the UCSC Farm & Garden), $175 (Farm & Garden Docents and Educators), $150 (students and limited income)

Cost for individual workshops: $125 (general), $100 (Friends), $75 (docents/educators), $60 (students and limited income).

Get additional details and register online at gardencruz2016.bpt.me. Registration deadline is March 1.

Please note: If you are interested in signing up for one or two individual workshops please call Pam Dewey at 831.459-3240 or contact Pam by email at casfs@ucsc.edu for registration details.

Internships Support New Agroecology Concentration

As their peers settle into lecture hall seats, two dozen UC Santa Cruz interns grab a harvest bucket, a set of pruners, or a digging fork and head out to the fields and orchards of UC Santa Cruz's organic farm and gardens. They'll spend the morning working at whatever the season demands: planting, harvesting, pruning, making compost, or packing crops for the campus dining halls.

The interns are part of an evolving effort by UCSC's Center for Agroecology and Sustainable Food Systems (CASFS) to integrate undergraduates into the seasonal work of the campus's 33 acres of organic farmland and market gardens. With support from the Clarence E. Heller Foundation (see page 3) and a U.S. Department of Education Higher Education Challenge Grant, CASFS staff and UCSC faculty have crafted an internship program that complements UCSC's Environmental Studies major's new concentration in agroecology and sustainable food systems.

Food Systems Focus

Beginning in Fall 2015, Environmental Studies majors were able to add a concentration in agroecology and sustainable food systems to their undergraduate major. The major academic objective is to provide students with a depth of expertise within the environmental studies major. Students will learn about ecological concepts that can be applied to the development of sustainable agricultural systems and will also develop their understanding of social, political, and economic aspects of agriculture. Students will also have access to hands-on experiences, and obtain skills in research, fieldwork, production, and communication.

Internships aren't a new concept for CASFS; UCSC students have been seeking opportunities to get their hands dirty since Alan Chadwick arrived to start the Student Garden Project (now the Alan Chadwick Garden) nearly 50 years ago.

"What's new about this internship program," said Stacy Philpott, environmental studies associate professor and CASFS interim executive director, "is the coordination, and 'scaffold' programming. We hope interns will take a 2- or 5-unit internship for a few quarters to take in some basic information, and then those students who are really engaged will continue to do individual project-based senior internships, or be hired as student assistant field managers."

Interns in the program spend three four-hour sessions a week working on UCSC's organic farm. They also discuss readings about sustainable agriculture and meet with their faculty sponsor to talk about how the internship may help them shape their career interests.

Adding Context to the Classroom

Darryl Wong, a CASFS farm manager and instructor, sees the internship as a way to give students a broader context for their classroom education. "It provides hands-on experiences in the concepts they learn about in many of their environmental studies classes, things like water quality, soil biology, pest and disease issues, and biodiversity," Wong said. "Our focus is for them to be moving and learning to support the academics."

Just as important, he says, is to provide students with a realistic sense of what it takes to produce food. "Especially these days we're bombarded with glossy media about how sexy and romantic organic farming is. When the students see what's involved, they understand the real work that goes into it — the knowledge and skill set it requires as well as the physical demand."

The chance to work outside is what attracts many interns to the program, which accepts up to 25 students per quarter. Environmental studies student Miguel Peña said he sought out the internship because, "I knew it would serve as a venue for experiential learning. The ability to practice what one learns is important to me because it helps solidify my knowledge on the given subject."

Much of the teaching takes place in a question and answer format as the students work alongside CASFS farm and garden managers. "Today, for example, we were laying plastic mulch for next year's strawberry crop," said current intern Charlotte O'Brien, a junior. "We were able to ask about why we were preparing the beds that way, why a crop rotation was important, what diseases were a problem. For me, it's a lot more effective than sitting in a classroom."

Veronica Thao, a 2014 intern, echoes that thought. "The internship helped me to better understand the material I was learning in my classes because I was actually out there experiencing some of the work myself."

Delivering Real Food

That work includes being part of a team of undergraduates who plant, grow, harvest, and deliver organic food to their own dining halls and to supply a weekly "pop-up" produce stand in the heart of campus. For students it creates a direct connection to the campus food system, and as Wong explains,

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Ryan Duncans's internship experience led to his current job as a student field manager at the UCSC Farm.

Orchard Update, from page 2

proliferation of a complex of pathogens (fungi/bacteria/nematodes) that compromise the feeding root tips of the newly replanted apple tree. The effect radically reduces the young tree's ability to grow and establish itself; if it does establish, yields are substandard.

There are a number of remedies for this malaise, but none are consistently reliable. They include not replanting apples for 5–8 years or more; using a more vigorous rootstock to compensate for the disease; growing a cover crop of mustard prior to planting; excavating the soil 3'x3'x3' and replacing it with "clean" soil that hasn't grown apples; planting in the alleys between the trees (if you have an orchard), or—with young or dwarf trees—planting in the gaps between the trees in the rows.

Fortunately there is now a developing remedy referred to as biofumigation that works, and works well enough that it's being adopted by both organic and conventional growers in Washington state orchards. It is basically a bio-rational pesticide, and an example of organic growers harnessing biology—in this case soil biology—and the natural chemical agents in plants to suppress fungal pathogens and soil-borne insects (in this case, nematodes). The soil treatment involves applying mustard seed meal at a rate of 3 tons/acre, working it thoroughly into the soil, then saturating the soil and covering it with a tarp for a *minimum* of 3 weeks before trees are planted

The mustard seed meal (white and yellow mustard) when mixed with water causes soil microbial populations to plummet. After the treatment, as soil microbes rebound, the soil's ecology has been altered, or as the soil scientists refer to it, the rhizosphere (root area) biome has been transformed. And while they don't know exactly why this is so, the effects are evident. It is probably that in their resilient rebounding, more either neutral or actively beneficial microorganisms establish at a greater rate than pathogenic species. These microbes are opportunistic, that is they "occupy space" more quickly and aggressively than the pathogens (disease-inducing microbes), and monopolize the niches—sites on the soil aggregates' air, water, and feedstock (the mustard seed meal and other sources of organic matter). Some also predate on pathogens, particularly lesion nematodes.

It is interesting to note that in trials comparing the mustard seed meal treatment to methyl bromide (a conventional soil fumigant), both treatments suppress pathogens. But with methyl bromide the pathogens repopulate the soil after two years, while the mustard seed meal keeps detrimental organisms at bay for at least four years.

The mustard seed meal is a byproduct of biodiesel fuel, and is being grown organically for use in farm tractors. Farm Fuel Inc. in Watsonville processes and sells the product. The meal contains high levels of glucosinolates—the same chemical compounds that give brassicas their spicy flavors. In low concentrations they are what makes broccoli healthy for humans and act as an anti-carcinogen. At extremely concentrated levels the compounds act as allelochemicals, with toxic effects on other organisms.

Originally, farmers and researchers tried to solve the Rubik's Cube of apple replant disease by using mustard as a green manure cover crop, growing the mustard and tilling it into the soil before replanting apples. And while the principles and process were sound, the concentration of allelochemicals was insufficient. The mustard seed meal is incredibly more concentrated.

In addition to suppressing pathogens, other benefits of the mustard seed meal include its ability to kill off weed seeds, build soil structure, and act as a fertilizer containing 4% nitrogen, 1% phosphorus, and 1% potassium.

We've treated 25' x 60' of soil in the back of the big Mutsu apple row with the mustard seed, in an area where two large apples were removed in 2013 and which has since been fallow. We'll replant apples into this block when the soil dries out, and will document the progress of the new trees as part of a grant funded by the California Department of Food and Agriculture to develop information on specialty crop production for emerging organic growers (more on this project in a future *New and Notes*).

The new apple varieties we'll be following are –

- Alkemene – A much more attractive Cox's Orange Pippin offspring (seedling). Aromatic, honey-flavored flesh (a little spicy too) with a pleasing texture. More complex than Cox's Orange Pippin. Almost disease free. Ripens mid–late July. Red skin with some russeting. One of my top five favorites.
- Blondee – An excellent early season (late August), yellow Gala apple with more "gusto." A chance seedling from Ohio.
- Lodi – Sometimes called "the orchard early bird," it ripens the last week of June – 4th of July! Yellow–light green skin, soft, melting flesh. Good for eating (fresh off the tree), excellent for cooking, especially sauce. Tart over sweet flavor.
- Pristine – Basically a "wannabe" Golden Delicious, maturing in mid–late July. Immune to scab, thus the name. Flesh is pale yellow, crisp yet melting and spicy-sweet, it "eats well."
- September Wonder Fuji – Full Fuji flavor and fruit size on a naturally dwarf tree, but 6–7 weeks earlier than the standard Fuji variety.

We are mimicking local pre-eminent Pajaro Valley apple grower Jim Rider's planting design, which features double rows offset on 8-foot center, dwarf trees 6–7 feet tall, and a very simple version of the modified central leader training system. It's a long way from our original plantings from over 40 years ago, and another step in our efforts to test varieties and model fruit-growing techniques for local organic growers and home orchardists.

Apprenticeship Updates

It was great to see so many Apprenticeship alumni both attending and making presentations at the recent Ecological Farming Conference at the Asilomar Conference Center. **Teresa Kurtak** (class of 2004), **John Vars** (2002), and **Mike Irving** (2002) were selected for the annual Successful Organic Farmers plenary presentation, where Teresa and John gave an impressive talk about the ever-evolving Fifth Crow Farm in Pescadero, California.

Also at Asilomar, **Zoe Hitchner** (2010) of Front Porch Farm in Healdsburg, California, and **Hedda Brostrom** (2012) of Full Bloom Flower Farm in Sebastapol, California gave a standing-room-only presentation on growing and marketing cut flowers, moderated by **Sky DeMuro** (2010), who helps manage the Alan Chadwick Garden. Look for Sky and Zoe to team up for a public workshop on specialty bouquets and other cut flower arrangements on June 25 at the new Hay Barn at UCSC. Sky also gave a workshop about on-farm and vocational training programs, where she discussed the Apprenticeship and its teaching philosphy and techniques.

Ken Foster (1985) of Terra Nova Ecological Landscaping gave a workshop on stormwater management and the use of bio-swales and rain gardens, as well as hosting the annual Landscapers Unite! mixer.

Ana Rasmussen (2010) presented her work on bringing communities together through community gardens. Ana's Mesa Verde Gardens project, based in south Santa Cruz County, has launched eight community gardens, three community orchards, two community donation gardens, and 10 early childhood development gardens.

Dan Tebes (2013) and **Robert DuBois** (2013) were at the conference to present information abou the new Tend application, designed to help diversified organic growers with crop planning, task management, record keeping, and other work. Learn more at www.tend.ag.

And catching up with other alumni ...

Caroline Martin (2015) has joined the flower-growing team at Pescadero's Blue House Farm, owned and managed by **Ryan Casey** (2001).

James Nakahara (2013) is Pie Ranch's new integrated crops and livestock manager, working with the ranch's expanded organic row crop operation.

On the East coast, **Maddie Morley** (2012) has launched Grass + Grit Farm in New Paltz, New York, raising and marketing high-quality, pasture-raised meat and eggs to consumers in the Hudson Valley region.

Internships, from page 5

Education coordinator Damian Parr with interns at the UCSC Farm.

"It's helping to meet the goals of the campus's Real Food Challenge," a commitment to source 40 percent of UCSC Dining's food from local, sustainable sources by 2020.

The internship revolves around the seasonal work at the CASFS Farm and Alan Chadwick Garden. In spring, interns spend time in the greenhouses, and prepare and plant beds; in the fall they harvest and pack crops for delivery to UCSC's dining halls and sow cover crop seeds, and in the winter they pitch in with fruit tree care and making compost.

Damian Parr, education coordinator for CASFS, says the internship program is designed to complement the annual Apprenticeship in Ecological Horticulture, a six-month, full-time residential training in organic farming and gardening offered by CASFS.

In place for nearly five decades, the apprenticeship has laid the groundwork for the thriving educational and research farm and gardens that are available to UCSC students and faculty. Interns benefit by working directly with the CASFS Farm and Garden apprenticeship instructors, who have decades of experience in teaching both the theory and practice of agroecology and sustainable agriculture, as well as a background in what it takes to grow organic food on a commercial scale.

Thanks in large part to the apprenticeship, the environmental studies students who are drawn to the campus's farm and gardens, and UCSC's ground-breaking agroecology research and education efforts, the campus is a leader in agricultural studies and training despite its lack of land grant status or a formal agriculture major. Parr recently received funding from the University of California's Global Food Initiative to document best practices for experiential learning to share with other universities and colleges.

Expanding Opportunities

UCSC's reputation as a center for sustainable agriculture drew Mike McDonald, now a senior environmental studies major, from his home in Bethlehem, Pennsylvania. "I'd heard great things about UCSC's agriculture education from friends and strangers all across the country,

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Internship Opportunities — from page 7

and I knew this was where I wanted to complete my undergraduate studies," McDonald said. "The CASFS internship gave me time outdoors learning new skills, and opened doors for new opportunities I hadn't even considered. My expectations were high, but the internship still exceeded them."

Ryan Duncans, a senior, shares a similar story. "I was working at an organic learning center at Santa Monica Community College," he said. "When people heard that I was interested in sustainable agriculture they pointed me to UCSC. "

Duncans found the internship to be a good way to combine his class work with the practical workings of the farm and gardens. "Being on a functioning farm and garden and seeing food being produced by people who really knew how to do it was the best part for me. I hadn't worked with people with those sorts of skills and in a setting with this intensity of food production."

McDonald and Duncans are both part of the first class of environmental studies majors who will graduate with the new concentration in agroecology and sustainable food systems as part of their transcripts. And they've both benefited from the "pipeline" effect of the internship, with McDonald now working with Philpott's research group, where he's helping with a garden-based biodiversity study, and Duncans landing a job as a student farm manager.

Careers and Engagement

For senior Eric Brunschweiler, the internship also led to a job on the campus farm and solidified his plans to make farming a career. "I've been working as a student manager with Darryl [Wong] and Kirstin [Yogg], and have been rising early to set gopher traps, run irrigation sets, and harvest to meet dining hall orders. I wouldn't have been hired if I hadn't interned for two quarters, and neither would I be as sure about where I want to take the rest of my life."

Parr envisions that the CASFS internship will continue to evolve, and with 40 or more students per quarter interested in the program it's clear that student demand for such opportunities is strong. "We provide one of the best chances to get field experience in both production and research," says Parr. "We're now moving toward more upper division internships and senior exit internships as we build the capacity at the introductory level."

Wong acknowledges that although only a minority of interns is likely to pursue a career in agriculture, he sees the chance to expose students to the realities of farming as a critical way to create a more informed and engaged populace.

"Whatever fields our interns enter, we're giving them a way to link policy with practice and a larger understanding of agriculture's impacts," Wong says.

– Martha Brown