## People & Places

# Irrigation at its most precise

## Alan Campbell, **Hector Dominguez** develop system for monitoring water tension in soil

By MATEUSZ PERKOWSKI Capital Press

Though agricultural sensors are becoming less expensive and more precise, plant physiologist Alan Campbell realized farmers still face a stiff challenge.

Installing sensors, collecting data and interpreting the information often isn't intuitive, hindering growers from effectively applying the new technology.

'People can buy them but that just creates more problems," Campbell said. "They don't want to buy it and create a hundred new problems to solve.'

To simplify decision-making in a crucial realm of agriculture — irrigation — Campbell deploys sensors that measure the tension of water in the soil

Greater water tension in the soil means that crops are using more suction to draw water from the ground, which stresses them. By monitoring soil water tension, farmers can then adjust irrigation to increase or decrease that plant stress.

For example, a vineyard manager may want to reduce plant stress during bloom to ensure healthy fruit set in the grape vines.

Once that's accomplished, increasing stress can prevent the leaf canopy from growing too vigorously. Withdrawing irrigation can achieve this result more cheaply and efficiently than mechanical pruning.

"There are many things you want to control by applying stress," Campbell said. "Depending on the preferences of the winemaker, you may apply more or less stress."

SmartVineyards, a company co-founded by Campbell, sells sensors and related equipment that collect and



Mateusz Perkowski/Capital Press

Hector Dominguez, left, chief technology officer of SmartVineyards, and Alan Campbell, the firm's chief executive officer, display a water tension sensor and transmitting system developed by their company. The system helps farmers make decisions about irrigation.

## Western Innovator

## Alan Campbell

**Occupation:** Co-founder and chief executive officer of SmartVineyards

Age: 65

Hometown: Tualatin, Ore.

Family: Wife and two grown children

Education: Bachelor of science in botany from the University of Michigan in 1974, master's degree in horticulture from Michigan State University in 1989, Ph.D. in plant physiology from the University of California-Davis in 1991

## Western Innovator

## **Hector Dominguez**

Occupation: Co-founder and chief technology officer of SmartVineyards

Age: 44

Hometown: Portland, Ore.

Family: Wife and young daughter

Education: Bachelor of science in electrical engineering in 1996, master's degree in mechanical engineering design in 1999, both from the National Polytechnic Institute of Mexico City; master's degree in mechanical engineering controls from the University of California-Berkeley in 2004. Ph.D. in mechanical engineering from the National Polytechnic Institute of Mexico City in 2011.

transmit soil water tension data to the "cloud," a network of computer servers, which relays the information to personal computers and cellular phones.

Relying on the concept of computer "machine-learning," the startup's software interprets data to guide irrigation decisions that influence various stages of the crop life cycle. The hardware is outfitted with a miniature weather station as well as a solar panel to power the devices.

sured at three depths —1 foot,

Water tension Soil water tension is mea2 feet and 3 feet — to better inform growers how hard the plant is working to draw water.

"There's a very repeatable pattern here," Campbell said, referring to the connection between water tension, plant stress and physiology. "We could teach a computer to manage irrigation.'

The system developed by SmartVineyards doesn't automatically make irrigation decisions. That would take too much authority away from the grower, who can fine-tune water availability based on goals for the wine grapes.

Instead, the company makes it easier to analyze the dynamics of a crop's water

"We can help people manage complicated situations." Campbell said.

The idea for SmartVineyards was hatched when Campbell was working as an adjunct professor at the Northwest Viticulture Center in Salem, Ore.

With his children leaving the nest, he embarked on a new project in 2013 of comparing the water tension in grape vines to the water tension in soil.

Traditionally, measuring a plant's water tension required a pressure chamber to gauge

the strength of vacuum within the plant needed to suck water through its roots. 'Each measurement ends

up costing you about \$5, and that's a very expensive data point," Campbell said.

The experiment would ultimately cost more than \$30,000 in hardware and analytical tools, but he was successful in demonstrating a strong correlation between water tension in the plant and the soil.

### Next step

Campbell's next step involved developing a system that would rely on the more easily measured soil water tension to steer irrigation management.

Since his career was devoted to plant physiology, Campbell needed to recruit an engineer who understood the process of collecting and analyzing data with computers.

At a networking meeting of engineers, Campbell met his co-founder, Hector Dominguez, who specializes in mechanical engineering and robotics.

Dominguez, who has worked on many projects during his career, said he was intrigued by the dirt on Campbell's jeans.

"This is actually someone going into the field. I can work with that," he remembers thinking.

The company has since installed its systems in several vineyards in Oregon, California and Washington, and is applying the technology to hops, blueberries, onions, potatoes, cherries, apples and hazelnuts.

In 2017, SmartVineyards received a \$250,000 grant from Oregon BEST, a nonprofit that invests in new technology, to team up with researchers from Oregon State University and Washington State University to validate and improve its system.

Smartvineyards is also seeking a \$580,000 grant from the Oregon Innovation Council, a public-private partnership, which will facilitate the company's expansion into other crops.

Randy Kameshige told Cap-

ital Press his father is "pretty

low key about accolades. He

just liked to do his part and

help out where he could. He's

always inquisitive, always try-

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> An independent newspaper published every Friday.

Capital Press (ISSN 0740-3704) is published weekly by EO Media Group, 1400 Broadway St. NE, Salem OR 97301.

Periodicals postage paid at Portland, OR, and at additional mailing offices.

POSTMASTER: send address changes to Capital Press, P.O. Box 2048 Salem, OR 97308-2048.

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Capital Press P.O. Box 2048

Salem, OR 97308-2048

Visa and Mastercard accepted

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## Clarification

A story in the Feb. 9 Capital

Press about the Red Bluff Bull Sale did not mention the owners of the two cattle dogs that were sold for \$30,000 each. One dog, BC Gurdy, was consigned by Jeff Clausen of Melba, Idaho. The other, ZBC Rose, was consigned by Mandi Post of Wallowa, Ore.

dogs can be found in the catalog, which is online at http://bit. ly/2Ehql4o.

More information about the

### Correction A graphic on page 14 of the

Feb. 9 edition incorrectly displayed the monthly precipitation percent of normal instead of the snow water equivalent percent of normal. The corrected version of the graphic can be viewed at www.

## Idaho-Oregon Onion Hall of Fame inducts two farmers farming career. workers around the farm.

By SEAN ELLIS Capital Press

ONTARIO, Ore. — Garry Bybee and Isao "Kame" Kameshige are the newest members of the Idaho-Oregon Onion Industry Hall of Fame.

Kameshige, 92, has grown onions in the region for 68 years, while Bybee, 79, has farmed onions in this area for They were inducted into the

hall of fame Feb. 6 during the 58th annual meeting of the Idaho and Malheur County, Ore., onion growers' associations.

Both men have served on numerous onion industry committees and boards.

'Garry and Kame are a couple of highly deserving people for this award," said Clint Shock, director of Oregon State University's agricultural re-

To submit an event go to the

Community Events calendar on the

home page of our website at www.

capitalpress.com and click on "Submit

an Event." Calendar items can also be

mailed to Capital Press, 1400 Broad-

way St. NE, Salem, OR 97301 or

emailed to newsroom@capitalpress.

com. Write "Calendar" in the subject

Field-to-Market Workshop. 9

a.m.-12:30 p.m. North Willamette

Research and Extension Center,

15210 NE Miley Road, Aurora,

Ore. How to produce value-added

food products, and where to start.

Cost: \$25 person or \$40 per couple.

http://smallfarms.oregonstate.edu/

Oregon Blueberry Conference.

8 a.m.-7:30 p.m. Salem Convention

Center, 200 Commercial St. SE, Salem.

Program includes a blueberry produc-

tion summary and trends, industry

Saturday, Feb. 10

field-market

Monday, Feb. 19



Isao "Kame" Kameshige, left, and Garry Bybee, right, are welcomed into the Idaho-Oregon onion industry's joint hall of fame Feb. 6 by Malheur County Onion Growers Association President Paul Skeen.

search station near Ontario.

The southwestern Idaho and eastern Oregon onion industries are closely linked. They established a joint hall of fame in 1986.

Bybee has turned over operation of his farm in the past

speakers and research updates, trade

show and reception. Website: oregon-

few years to his son, Marc, and his wife, Tamara.

"To be honored by the onion industry after 45 years is indeed an honor," said Bybee. "It's been a hell of a ride."

He credited others for any success he has had during his

"I've seen the highs, I've seen the lows, I've seen the middle, I've survived and it's because a lot of friends, a lot of business partners and a lot of growers have helped me survive through all these years," he said.

Bybee said it's hard for him to digest the amount of change that has taken place in the onion industry over the past five

"When we first started, everything was manual," he said. "Everything was done by hand. Now, virtually the only thing that is still done by hand is sorting. Technology is changing every day and I can't imagine what's going to happen in the next 45 years.

Kameshige's two sons, Randy and Brian, run the family farm while Kame helps taxi

ing to learn and not afraid to try something different and always open to learning something

from somebody else, too."

The family farm has faced a lot of tough times over the decades but the key to Kame's success has been hard work and not incurring a lot of debt, Randy Kameshige said.

"His philosophy was, stay away from debt," he said. "He didn't over-extend himself and when times were tough, we didn't have a lot of debt.'

Kame started growing onions in the Ontario area in 1949 on 37 acres. His farm has grown to 700 acres today.

1-800-765-9055

## Calendar Sponsored by:



GASES / WELDING / SAFETY / FIRE

Thursday, Feb. 22

sion Planning Workshop. 6-8:30 p.m.

one-on-one business counseling. A complimentary light dinner will start each evening at 6 p.m. To register, call 503-594-0738. Cost: Free. Website: http://bit. ly/2CX1jvl

20 Northwest Locations

Agriculture Career and Internship Fair. 10 a.m.-2 p.m. University Farm Pavilion, Chico, Calif. More than 40 leading agricultural companies will be represented. Students and alumni from all majors are invited to attend and are advised to dress professionally and bring a resume. Prior registration is not required of job seekers.

### Thursday-Friday Feb. 22-23 Logging, Construction, Trucking &

Heavy Equipment Expo. Lane County Fairgrounds and Convention Center, 796 W 13th Ave., Eugene, Ore. The exhibits, demonstrations and log-loading competition are sponsored by the Oregon Logging Conference, which is celebrating its 80th year. Included is the Oregon Women In Timber annual dinner and auction.

## Family Farm Alliance Annual Conference, Eldorado Resort Casi-

Friday, Feb. 23 Screening of the film "Food Evo-

grounds, 520 SW Highway 99W, Rickreall, Ore. This documentary, narrated by Neil deGrasse Tyson, takes a close look at the facts associated with genetically modified foods. It was directed by Academy Award nominee Scott Hamilton Kennedy. This presentation will include an introduction by Helle Rudenklau and is sponsored by the Polk County Women for Agriculture. Cost: Free. Online: foodevolution-

## blueberry.com Feb. 20-22

Meeting. Oregon Department of Agriculture, 635 Capitol St. NE, Salem, Ore. The full board meeting begins at 4 p.m. Feb. 20 with a presentation on water quantity issues from the Oregon Water Resources Department, with a focus on Columbia River water reservations and Oregon minimum stream flows. On day two, the board will participate in a roundtable discussion of key legislative issues with agriculture industry representatives. The board will also receive an update on the ODA's legislative issues. Day two concludes with board members meeting with individual legislators at the Capitol to discuss priority issues concerning agriculture. On day three, board members will receive an update from Oregon OSHA on the Worker Protection Standard and a presentation of a land use http://oda.direct/BoardAgriculture

Clackamas Šmall Business Development Center, 7726 SE Harmony Road, Milwaukie, Ore. Register now for the four-part Farm and Ranch Succession Planning Workshop Series. No need to attend in person. You can take this workshop remotely from anywhere in the state. This program is offered and taught by the Clackamas Small Business Development Center, along with guest presenters such as attorneys and CPAs. In addition to informative topics and experienced ag professionals, courses include confidential,

Website: www.oregonloggingconference.com

no, 345 N. Virginia St., Reno, Nev. The theme of this year's conference is "One year in: What's changed and where are we going in Western water?" Website: http://bit.ly/2hGieJU

lution." 3-5 p.m. Polk County Fair-

## **Tuesday-Thursday** Oregon Board of Agriculture

study conducted by Portland State University. The board will conclude its meeting by reviewing resolutions and providing subcommittee reports. Public comment periods are scheduled for 11:45 a.m. on Feb. 21 and 10:45 a.m. on Feb. 22. Website:

Part 1: Farm & Ranch Succes-

California State University-Chico

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