

Who we are



UC Davis: No. 1 or 2 globally in Plant and Animal Sciences

UC Davis: No. 1 nationally in Agricultural Sciences

UC Davis: No. 2 globally in Agricultural Sciences

Who we are

People

68 Faculty

650 Staff, Affiliates, Students

125 Ph.D. and M.S. students

Facilities

1,000 acres (400 hectares) of research cropland

90,000 sq. feet (8,300 sq. meters) of lab, greenhouse, work space

Funding

~ \$30-50 million: Average amount of grant funding received annually

Commodity boards, state and federal, income from endowments and plant varieties

Undergrad Majors

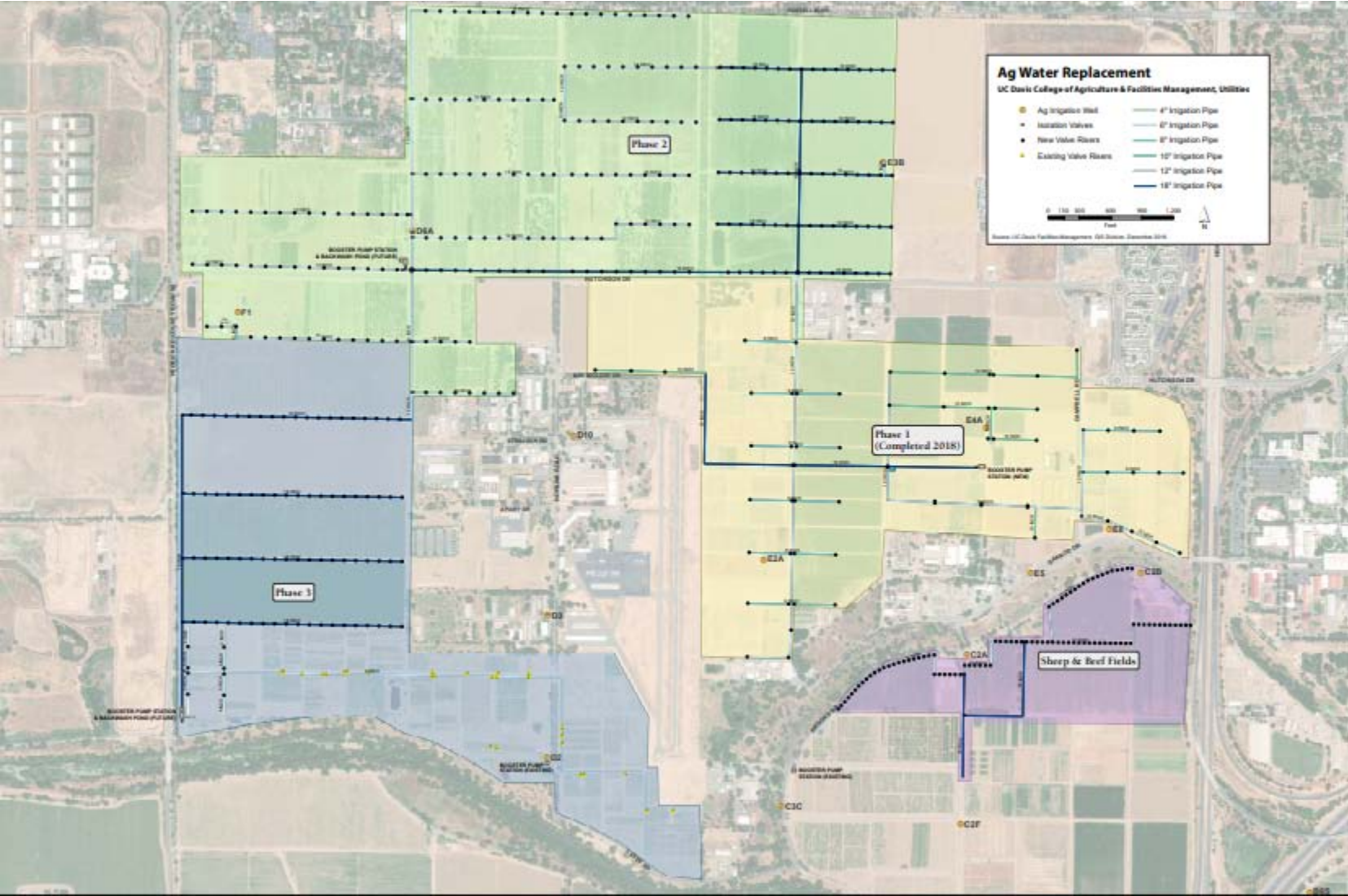
Biotechnology

Plant Sciences

Environmental Horticulture and Urban Forestry

International Agricultural Development

Ecological Management and Restoration



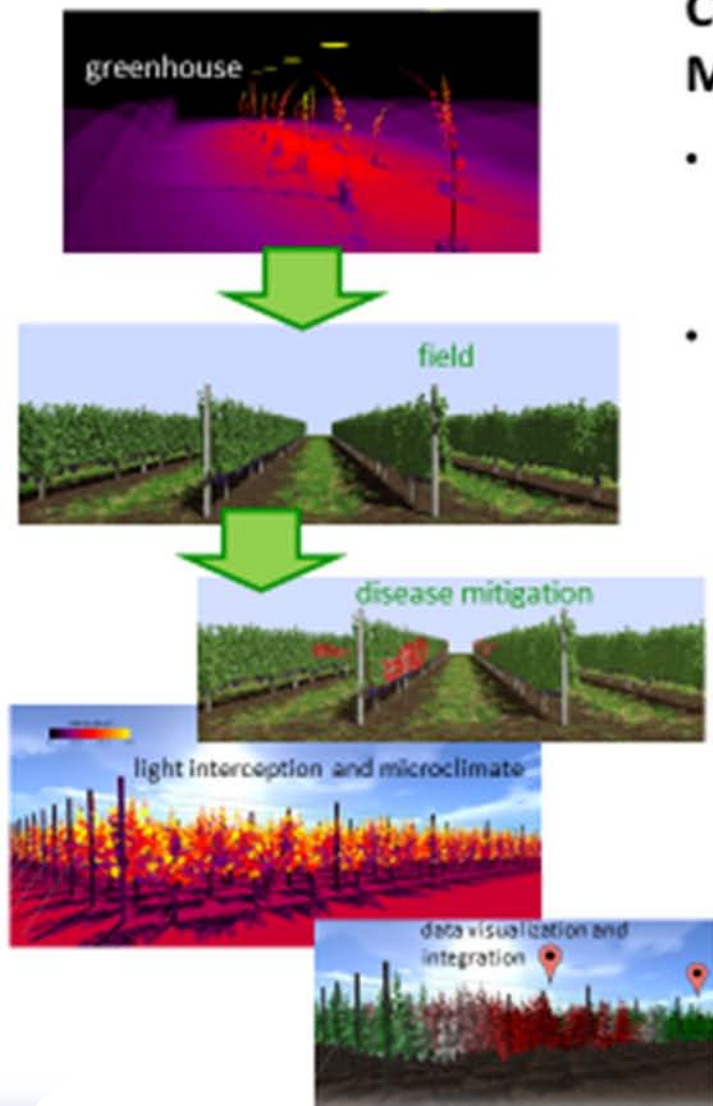
What have we achieved with current facilities?

Amongst the most diverse public plant breeding effort, globally



Decoding the Redwoods

As threats to California's giant redwoods grow, the key to their salvation might be in their complex genetic code.



Computer-Aided Design and Management

- 3D computer-aided design (CAD) and analysis tools have been revolutionary in many industries (but not so much in agriculture).
- **We are seeking to develop the next generation of crop models that:**
 - Fill in the gaps between field measurements
 - Accelerate agricultural innovation by allowing for simulated analysis of proposed design and management practices
 - Provide growers with additional information to support decision-making in the field



Professor Brian Bailey
Plant Sciences

Top-5 Agricultural States in Crop Cash Receipts, 2016

State	Crop Cash Receipts, \$1,000
1. California	\$46,041,467
2. Iowa	\$26,840,363
3. Nebraska	\$21,558,070
4. Texas	\$20,878,502
5. Minnesota	\$17,054,672
U.S. total crop cash receipts	\$357,252,284

- > 1/3 of U.S. vegetables grown in California
- > 2/3 of U.S. fruits and nuts grown in California

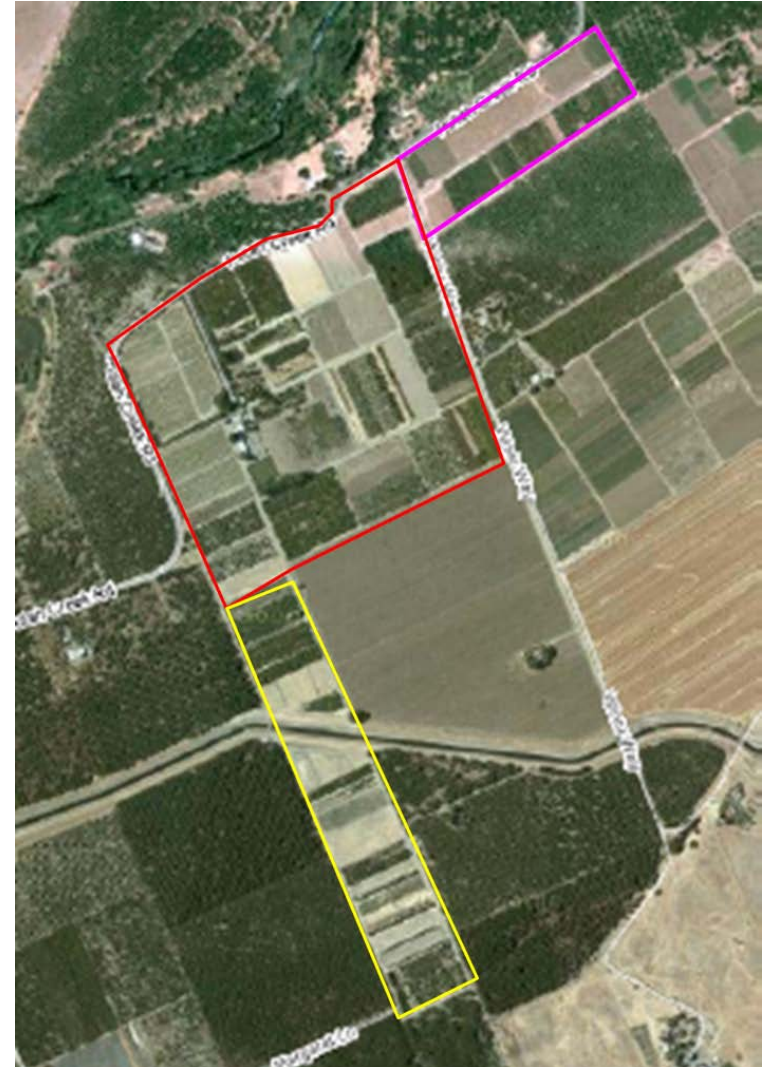
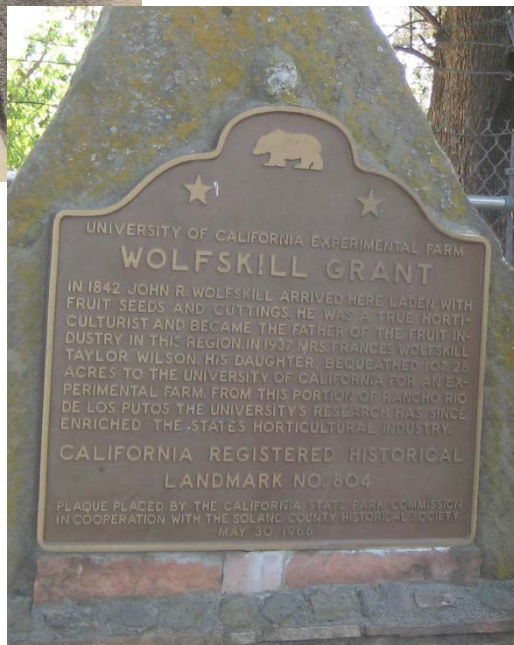
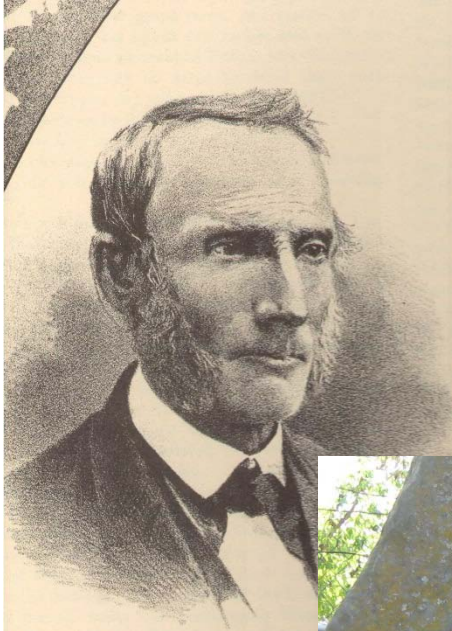
Walnuts

- Global production worth \$6 billion USD/yr
- U.S. production worth \$2 billion, **all from California**
- Global exports dominated by UC Davis scion releases ('Chandler')
- Clonal walnut rootstocks first developed here, now adopted worldwide ('RX1' USPP #2011179)
- Rich in polyunsaturated fatty acids
- Walnut tannins implicated in obesity
- Global production projected to reach 100 million tons by 2025; new planted acreage worldwide dominated by UC Davis releases

Much of our research is in close cooperation with industry



Wolfskill Contributions to Horticulture



Development of new cultivars

- Strawberries

- Salinas
- Aliso
- Sequoia
- Aiko
- Hecker
- Brighton
- Aptos
- Vista
- Fern
- Soquel
- Selva
- Chandler
- Yolo
- Muir
- Mrak
- Seascape
- Capitola
- Sunset
- Cuesta
- Gaviota
- Aromas
- Diamonte
- Pacific
- Camino Real
- Albion
- Palomar
- Monterey
- San Andreas
- Portola

What facilities do we need for the next three decades?

Ideas already discussed vision for a new facility?

- Field facilities – in partnership?
- Field equipment – in partnership with suppliers?
- Drone port, greenhouse, seed vault, high capacity computing, wifi, sensed environment





Controlled environment infrastructure for research and education on food, water, energy, and health in a changing world

A request submitted to NSF for funding

Requested funds: \$47,433,336

*PI: Professor Gail Taylor, Chair and Professor, Plant Sciences
Co-Is: Professor Luca Comai, Plant Biology
Professor Heiner Lieth, Plant Sciences,
Professor Karen McDonald, Chemical Engineering
Professor David Slaughter, Biological and Agricultural Engineering,*



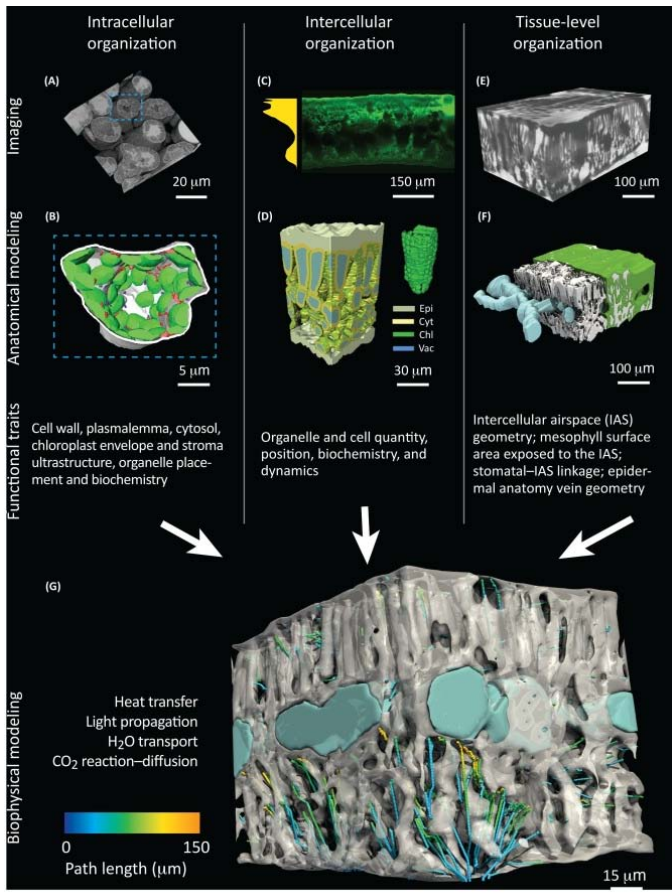


FUNCTIONAL ZONING

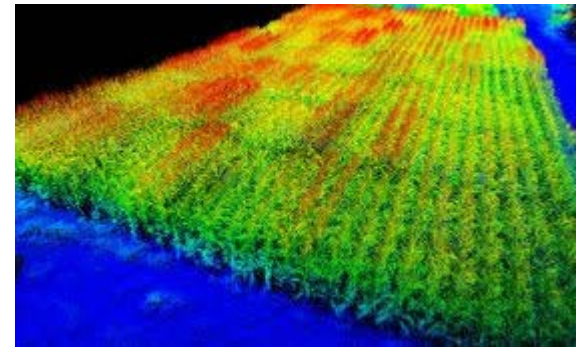
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Figure 1. Proposed layout of the four zones to be developed in relation to existing greenhouse and controlled environment facilities at UC Davis.



Trends in Plant Science



Zoned Facility for multidisciplinary working

- i. **The phenotyping zone** to accommodate a custom-made High Throughput Phenotyping (HTP), automated system equipped with remote sensing stations that can handle a 500-plant experiment, to be used for understanding genotype-phenotype relationships and to develop Artificial Intelligence approaches for understanding plant behavior and manipulation.
- ii. **The innovation zone** will provide flexible space (twelve 1,200 ft² units) and 2,700 ft² of warehouse space for cyberphysical projects that accommodate the next generation of co-robotics; the nexus of plant sensing, robotics and data analytics
- iii. **The vertical agriculture zone** will provide 2,700 ft² of warehouse space (1,725 ft² for enclosed AI control) to be used for testing novel environmental and control technologies alongside new plant phenotypes for exploring novel concepts in vertical and indoor plant growth.
- iv. **The flex greenhouse zone** will be a dynamic space (seven 1,200 ft² units) that will be used to respond to the needs of the research community for time-sensitive projects where the focus is on plant growth – for example to follow-up plant phenotype leads, undertake experiments on gene edited plants or test new technologies and predictive algorithms emerging from the Innovation Zone

Questions For Today

- What should UC Davis be investing in to keep us in a world leading position?
- Would partnering opportunities be valuable?
- What is of value to industry?
 - training students for a new workforce?
 - Research expertise?
 - Innovative new ideas? Cutting edge?

Department of Plant Sciences

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- Gail Taylor, Professor and Dept. Chair
gtaylor@ucdavis.edu

Vice chairs

- Brad Hanson, Outreach and Extension
- Dan Potter, Teaching and Curriculum

Section chairs

- Valerie Eviner, Crops and Ecosystems
- Jeff Ross-Ibarra, Agricultural Plant Biology

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