

FST Integrates Sustainability into Program

Encompassing all parts of FST's mission -
Teaching, Research, Outreach



Oregon State
University



From post-harvest to post-consumption, our food manufacturing systems are complex. It follows that the challenges and opportunities to change these systems to be sustainable are also complex.

OSU Food Science & Technology believes it has the responsibility and the opportunity to be a leader in evolving our food systems to better incorporate sustainable practices, technologies and information, and to catalyze impactful connections across stakeholders.

To fulfill this role, we are integrating Sustainability into all parts of our mission – Teaching, Research and Outreach.

This strategic shift has been endorsed by OSU’s College of Agricultural Sciences’ leadership, our FST Advisory Board, and our faculty and students.

Sustainability in Teaching

Over the past years, our student cohort has consistently suggested a shift of FST undergraduate curriculum towards sustainability. Such a shift is also recommended by our alumni as well as the FST Advisory Board.

Led by Dr. Glen Li, a team of FST faculty surveyed subject area experts and identified 10 pertinent sustainability learning outcomes that our students should gain from our new curriculum.

These learning outcomes include:

- Describe environmental impacts for a given food processing system (pre-production and post-production) in terms of carbon footprint, water footprint, water/soil health, animal/plant health, food loss/waste, biodiversity, and environmental toxicity.
- Apply chemistry and engineering principles in identifying sustainable practices in food processing.
- Evaluate, using data and evidence, the environmental, social, and economic impact of regulations and certification programs related to food production systems.

For a full list of the learning outcomes go to: [OSU FST Sustainability Learning Outcomes](#).

Based on these learning outcomes, we identified corresponding curricular changes that include adding existing OSU courses offered through the Sustainability Double Degree, and our own new courses.

Most notably, Dr. Yanyun Zhao is creating a new course, titled “Introduction to Sustainable Food Processing”, which will be offered via Ecampus Spring 2021.

We have also added a course titled “Food and Climate Change” that will be offered for the first time this winter quarter.

We are confident that the new curriculum will prepare our students to step up and help the food and beverage industry introduce changes and drive implementation of diverse sustainability initiatives.

New [FST Ecampus Courses](#) which focus on sustainability:

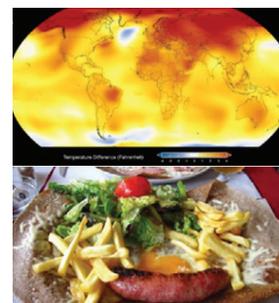
FST 327 - Introduction to Sustainable Food Processing

- Examines principles and assessment of sustainable food processing
- Develops concepts of sustainable food processing technologies and food manufacture operations
- Explores sustainable processing of various food commodities and products



FST 455X/555X - Food and Climate Change

- Focuses on traditional regional recipes, exploring and documenting how global change has affected food production and demand until today, and how projected climate change will affect it in the future by analyzing the ingredient lists.



Sustainability in Outreach

Being actively connected with local, regional and global stakeholders is essential to drive the right change and to do so in concert across the diverse food and beverage and sustainability ecosystem.

FST will do this in two ways – first, acting as a hub and convener bringing information, opinions and capabilities together to identify areas of collaboration as well as a catalyze conversations through fact- and science-based communication. This will serve to enable stakeholder learning and influence decision making and engagement.

A key example of the hub and convener role is the first **Annual FST Sustainable Food Manufacturing Forum** planned for September 2021.

Conference objectives, design and attendees will be influenced by stakeholder input including that of FST Advisory Board members Sam Tannahill (Founder A to Z Wineworks), David Gremmels (President, Rogue Creamery), Sarah Beaubien (Director US Operations, Quantis Int'l) and Rebecca Field (consultant), who also serve as FST's Sustainability Committee.

The intentions of the Forum are threefold:

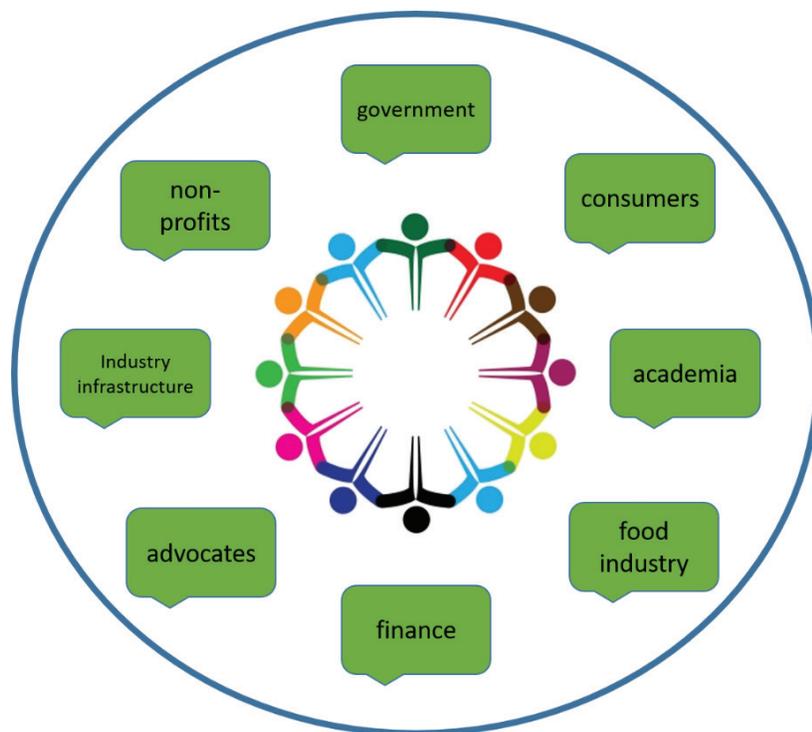
1. Further connect stakeholder groups to expand and strengthen relationships in this ecosystem,
2. Create a common knowledge base that extends and deepens our understanding, and
3. Identify priorities and potential collaborators to define and drive the resulting outcomes.

The intention is to host the Forum in person on campus in Corvallis.

The second area of focus is on fact-and science-based communication. One example is the [OSU FST Farm 2 Fork Fridays](#), a webinar series focused on bringing stories of the people, technologies and collaborations that are enabling positive change to make our food systems more sustainable.

COVID created a unique opportunity to foster conversations about how our food is made, how it gets to our tables and the ways in which that is changing.

People around the globe all experienced disruptions in their food supplies, fear of scarcity or the need to find new means of getting what they needed.



These circumstances created the opportunity to bring relevant stories to a broad and attentive audience.

The F2F series features stories from across FST, elsewhere in OSU and outside our walls. And though it's based in science, it's important to note that people don't have to be a scientist to understand the stories that are shared.

Lastly, the F2F series comes from a place of service to the community we intend to engage. It's not about us, but about what people are interested in learning more about.

FST Farm 2 Fork webinars began in in September with topics ranging from how science is influencing a more sustainable dairy industry, hop terroir in Oregon's Willamette Valley and the journey of a food ingredient to the table.

The 2021 calendar is in development and we encourage you to visit the [Farm 2 Fork Webinar Series](#) site and register for your favorites!

For more information about the **Sustainable Food Manufacturing Consortium, Annual FST Sustainable Food Manufacturing Forum, or the Farm 2 Fork series** please contact:

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Research Spotlight:

Dr. Yanyun Zhao Research Lab - Food Processing and Sustainability



Members of the Zhao Sustainable Food Processing and Packaging Lab Fall 2020, (top row, left to right): C. Sonar (Postdoc), Yi-Ting Shih (GRA), Sam Wang (Postdoc), Dr. Yanyun Zhao (PI), Taoran Wang (Postdoc), Chieh-Yi Lin (GRA) (bottom row, left to right): Rachel Rosenbloom (GRA), Clara Lang (GRA)

Dr. Yanyun Zhao has been an internationally recognized researcher in Food Technology for many years, specializing in food processing and sustainability areas.

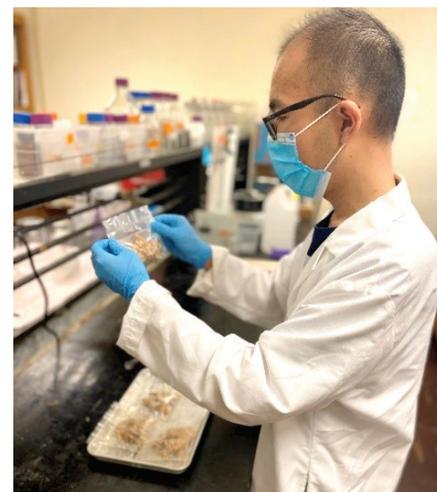
Her work is focused on four different areas. We've included some highlights from her "Sustainable Food Processing and Packaging Lab".

Area 1: Reducing food loss during production, postharvest storage and processing using a novel edible coating technique.

Dr. Zhao's lab is continuously studying novel edible coatings for 1) decreasing postharvest senescence and prolonging storability of a wide range of fruit crops, 2) delaying quality deterioration and extending shelf-life of tree nuts, and 3) retaining anthocyanins, quality and nutritional value of thermally and non-thermally processed blueberries and cherries in aqueous media.

Dr. Zhao just received a USDA NIFA Foundation grant for "Investigation of principles and technologies to stabilize fruit anthocyanin pigments for retaining integrity, nutritional and sensory qualities of processed whole fruit".

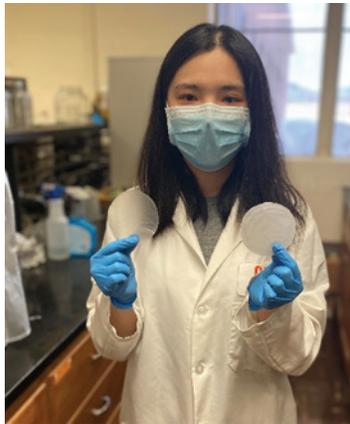
Right, Postdoctoral Scholar, Dr. Sam Wang is developing active coatings and active packaging for delaying lipid oxidation and extending shelf-life of tree nuts.





Above, three of Dr. Zhao's Graduate Research Assistants at the laboratory bench (left to right): Clara Lang, prepares compostable packaging materials using fruit pomace; Rachel Rosenbloom, produces edible, antioxidant, and heat sealable films as edible oil pouch; Yi-Ting Shih, develops edible films as water resistance and edible muffin liners.

Area 2: Develop environmental-friendly (sustainable) food packaging to reduce impact to the environment.



Above, Postdoctoral Scholar, Dr. Taoran Wang, produces high quality celluloses from fruit pomace and makes into biodegradable films.

Dr. Zhao's lab is emphasizing on scale-up the technology of developing compostable packaging containers using fiber-rich food processing byproduct (fruit pomace).

Dr. Zhao recently received an ODA Specialty Crop Block grant for building up a pilot-scale mold-pulp machine and using the patent pending technology to manufacture various packaging containers and evaluate their performance and applications.

Dr. Zhao's lab is also continuing development of edible packaging with targeted applications, such as edible, active oil pouches and edible muffin liners for not only reducing single use packaging, but also extending product shelf-life and providing convenience to consumers.

Area 3: Valorize food-processing byproducts for novel food and packaging applications.

Dr. Zhao's lab is continuously studying value-added utilization of fiber-rich food processing byproducts (pomace, Brewer's spent grains, hemp fibers, etc.)

as functional food ingredients in a wide range of food products, extract cellulose for novel packaging applications, and as bulk materials to produce biodegradable and compostable packaging.

Area 4: Investigate emerging green food processing technology for saving energy and reduce greenhouse gas emission.

Zhao's lab recently obtained financial support from the Oregon Hazelnut Commission to purchase a pilot scale radio frequency heating equipment for continuing the research and development of using this novel technology for drying and potentially pasteurizing hazelnuts.

This technology is environmental-friendly and has high-energy efficiency. This equipment also provides huge potential for processing other food commodities and will be used for teaching food processing courses and student lab activities.

Right, Postdoctoral Scholar, Dr. Chandrashekhar R. Sonar, works on sustainable radio frequency heating technique for processing Oregon hazelnuts.

