Fermentation Science at Oregon State University

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Nor’Wester Professor of Fermentation Science

Oregon State University

• Formerly Oregon Agricultural College
• 27,000 students
• Forestry, Oceanography, Agriculture
  Engineering, Linus Pauling Institute

OSU Food Science
Undergraduate Degree Program

B.S. Degree in Food Science and Technology
  ➢ Food Science  26%
  ➢ Fermentation Science  62%
  ➢ Enology & Viticulture  12%
Undergraduate enrollment

Tapping talent:
Oregon bubbles to the top of the craft beer industry

With one of the nation’s only teaching breweries and an endowed chair in fermentation science, OSU offers students the opportunity to develop new brews while they learn the subtle chemistry of taste and the innovations of business. Jobs on tap.

Agriculture is where food begins.
Learn more at agsci.oregonstate.edu/foodies

Changing the future.
Right here. Right now.

Training students to be brewers

Photo’s courtesy of Lynn Ketchum

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Photo’s courtesy of Lynn Ketchum
OSU Pilot Brewery
2 BBL brewhouse, 6 CCV

Photo's courtesy of Steve Werblow

OSU Pilot Brewery Packaging
Single head filler + tunnel pasteurizer

Photo's courtesy of Chris Meuller

OSU Minimalter

Photo's courtesy of Lynn Ketchum
Employers of OSU Ferm. Sci. Grads

- Anheuser-Busch
- MillerCoors
- Boston Beer Company
- BridgePort Brewing
- Boulevard Brewing
- Deschutes Brewery
- Full Sail Brewing
- McMenamins’
- Stone Brewing
- Widmer Brothers Brewing

Fermentation Science at OSU

- **Brewing** – Tom Shellhammer
- **Barley breeding & malting** – Pat Hayes
- **Hops breeding** – Shaun Townsend & John Henning
- **Hops pathology** – Dave Gent
- **Hops & health** – Fred Stevens
- **Wine** – James Osborne, Elizabeth Tomasino
- **Viticulture** – Patti Skinkis, Laurent Deluc, Walt Mahaffe
- **Specialty cheeses** – Lisbeth Goddik
- **Cereals chemistry & bread** – Andrew Ross

Return of the OSU Cheese

Beaver Classic™ is an Oregon State University original.

An artisan cheese made in the tradition of alpine cheeses from Europe while reflecting the characteristic of the Willamette Valley, Beaver Classic has a subtle, nutty taste with creamy, buttery and caramelized flavors.

Savor Education
Oregon State students work at every stage of production for Beaver Classic. Students care for the university’s dairy herd. In the creamery, students take milk through the separation of curds and whey, then age the cheese for six months in a painstaking affinage process that gives Beaver Classic its unique flavor and texture.

Fermentation Science at OSU

New Positions

• Distillation professor
• Brewing microbiologist professor
• Instructor/Advisor – Fermentation Science

pace.oregonstate.edu/beer
Beer Analytics
Online + Hands-on learning in the lab and pilot brewery

Beer Analytics
Engage with industry experts – Fred Strachan, Sierra Nevada

Beer Analytics
Learn about hops and OSU’s hop breeding facilities

Beer Analytics
Learn about barley/malt and OSU’s barley breeding facilities
Beer Analytics
May 1, June 16 – 20
Beer Proficiency
July 15 – 18

Craft Brewery Startup
April, May, September
Cidery Startup
April, May 12 – 16

pace.oregonstate.edu/beer

Close connection to the brewing industry

• MBAA District NW meetings – 200-300 attendees
• 1st International Brewing Symposium, 2007
  Hop Flavor and Aroma in Beer
• Hop Research Council

OSU Pilot Brewery – Beer Development

Hops
*humulus lupulus*
OSU has a long connection to hops

- 1932
  - Oregon largest hop producing region in the world with 34,594 acres (14,000 ha)
  - Downy Mildew discovered in Oregon hop yards
  - U.S. Department of Agriculture establishes hop breeding program

- 1979
  - Hop Research Council created

- 1996
  - Fermentation Science track created within Dept of Food Science

Hop breeding at OSU

Public hop varieties released by USDA/OSU

- Bianca
- Cascade
- Columbia
- Comet
- Crystal
- Horizon
- Liberty
- Mt. Rainier
- Mt. Hood
- Newport
- Nugget
- Santiam
- Sterling
- Sunbeam
- Teamaker
- Ultra
- Willamette
Shellhammer Lab
Hops research, recent activity

- Isomerization kinetics
- Bitterness research
  - Native and reduced iso-alpha acids
  - Hop-derived polyphenols
  - Impact, time-intensity, quality
- Foam studies
  - Reduced iso’s
- Flavor stability
  - Hop-derived polyphenols
  - Hop acids

Widmer Brewing Company

- Preference Mapping of Widmer Products: Identification of Product Attributes, Consumer Preferences and Psychographics
  McDaniels, Orth, Shellhammer – 2002
- Trained panel (12)
  + Consumers (~300)
- Part of development efforts leading to Drop Top Amber Ale

Sensory testing
Consumer as well as trained panel

Shellhammer Lab
Hops research, current projects

- Investigating the sources of citrus aroma/flavor from hops
- Hop harvest maturity influences on oil quality
- Basic studies on dry hopping
- How hops affect beer flavor stability
- New methods for assessing beer bitterness