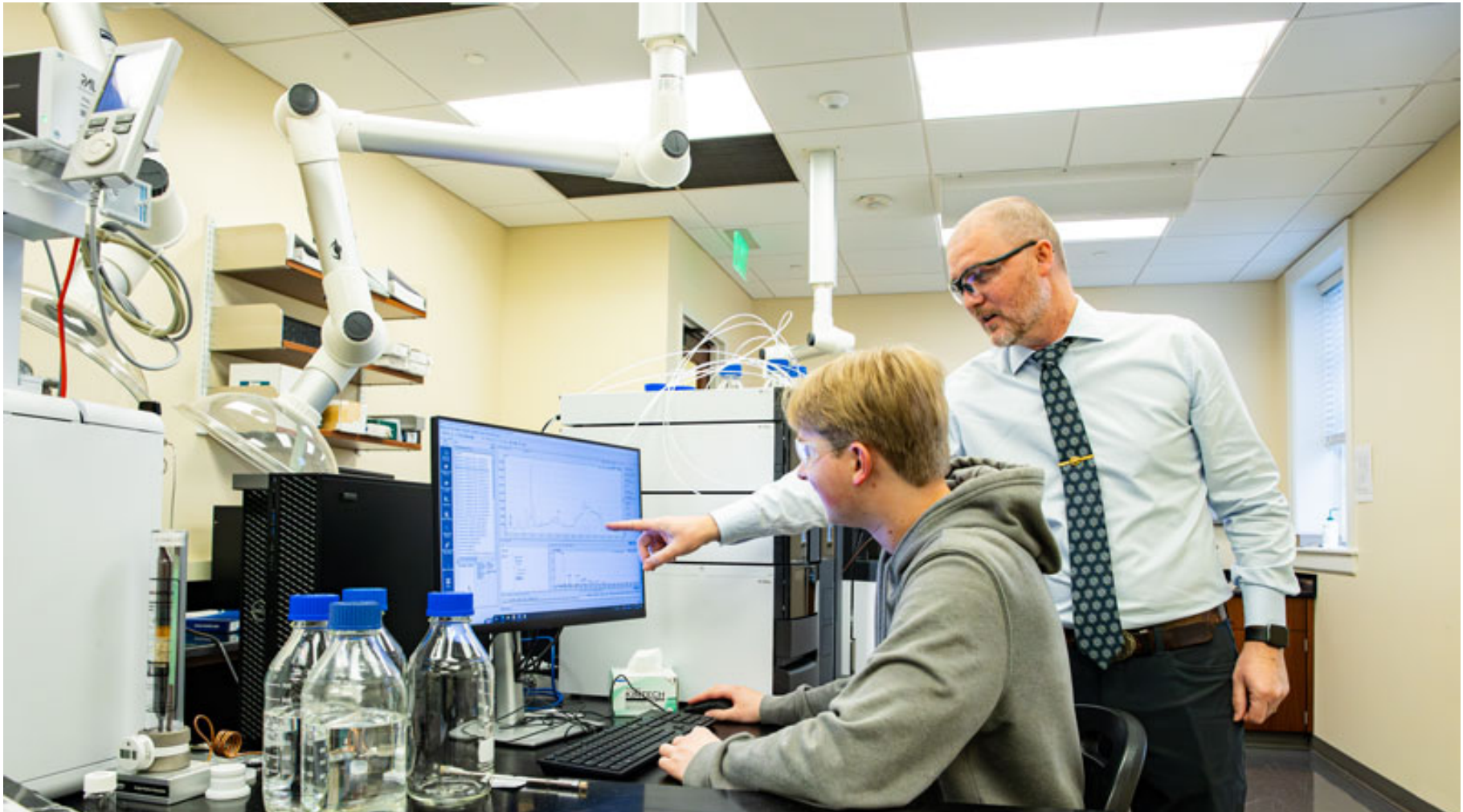


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PROJECT

STUDENTS USE SCIENCE TO FIND WAYS TO IMPROVE BREWS

by [Kelli Caplan](#) | January 29, 2024*Read time: about 3 min*

Chemistry students are pouring their scientific knowledge into making better beer. As a result, they're gaining the reputation of being the go-to lab for techniques and research that help local breweries perfect their offerings.

Dr. Ronald Quinlan, associate professor in the [Department of Molecular Biology and Chemistry](#), started the beer project at CNU in 2020, and it has developed over the years into scientific deep dive into the brew, creating multiple opportunities for students to fortify their chemistry know-how and their career plans. They use cutting edge lab instrumentation coupled with their chemistry skills, to probe all aspects of beer, from its ingredients, to the brewing process, to its alcohol content, to how it looks and tastes.

"I have learned a lot since starting to work with the beer project," said Sofia Valinote, '25 Biochemistry. "I have become more confident with simple lab techniques like pipetting and measuring, but have also learned so much about how the scientific field works."

Valinote got involved with the beer project in 2023 after being in Dr. Quinlan's chemistry writing intensive class.

"I would say overall, working with the beer lab has really enriched my college experience and allowed me to become a more well rounded student," she said.

Valinote and Hannah Gifford, '24 Biochemistry, are currently working on "salting out" the alcohol from beer in

order to determine a highly accurate alcohol content level. The research is helpful to small brewers who want to accurately measure the alcohol content in their beer.

“Our goal is to find a method of extracting the alcohol properly for analysis that could be used by small businesses that would not be able to afford instruments to do it themselves,” Valinote said.

The research, Quinlan said, has elevated CNU to be a widely-known source of beer science.

Students fan out to breweries, sharing their expertise and knowledge they have gained from the research. They are able to scientifically analyze different factors of each beer, allowing the brewers to use the findings to tweak their liquid creations.

“Brewers want us to run it and we are happy to do it,” Quinlan said.

It turns out that beer is multi-dimensional with many aspects that lend themselves to robust research.

“I have learned a lot about method development, analytical chemistry, and persevering through a lot of failure throughout this research,” Gifford said. “I have always been interested in how chemistry has such a major role in flavors and food production, especially fermentation processes, so the beer lab was right up my alley.”

Delving into beer has expanded students’ horizons and accomplished much to add scientific dimension to a drink that is associated with college life in other ways.

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The beer is not consumed by the students, but rather used as a way to advance their chemistry prowess.

“The original research on beer was a way to get 17-to 22-year-olds interested in analytical chemistry,” Quinlan said. “Most college students have had some interaction with beer.”

It worked. Quinlan’s project has attracted numerous students since its inception.

Undergraduate research is one of the [four pillars of a Christopher Newport education](#), along with study abroad, leadership and service. It has proven to be a way for students to hone their skills and prepare for their next chapters.

“I am interested in going to grad school and undergraduate research is important for grad school,” said Ian Kriel, ‘25 Biochemistry, who recently joined the beer project research team.

Recently, Quinlan and his research students had a chapter published in the book, Chemistry of Alcoholic Beverages, entitled “Science of Brewing: An Introduction to the Impact of Local Regions on a Favorite Fermented Beverage.” The book was published by the American Chemical Society.

“It’s my first book chapter ever,” Quinlan said.

The students researched what happens to beer when certain aspects of the environment in which beer ingredients, such as hops, barley, water and yeast, are grown are altered either on purpose or by the impact of climate change. Where an ingredient is grown and under what conditions can impact the flavor and aroma profile of beer, Quinlan said.

“Currently, developing research efforts are just starting to scratch the surface of the effects the local environment has on beer,” the research states. “The individual results provide an understanding of compounds of interest and importance for brewers, maltsters, farmers and beer enthusiasts. Taken together, these results highlight an exciting and interesting pathway for introducing the role terroir can have on individual ingredients and providing brewers unique opportunities to create new flavors and even new styles of beer.”

Being able to conduct research as an undergraduate, Gifford said, has significantly enriched her education.

“I am very grateful to have been able to start on a project so young, and this undergrad research is a blessing and can be a help in experience and a great test of patience, since research comes with lots of ups and downs,” she said.

