

Housed in the sleek Stephenson Life Sciences Research Center on Jenkins Avenue, a University of Oklahoma laboratory maintains an ancient craft that began in the Middle East around 300 B.C. Although the equipment has evolved, the specifications and tolerances in glassblowing, specifically scientific glassblowing, are still so precise and often so unusual that a robot or computer-driven, 3-D printer are not yet the best tools for the job. The work needs the keen eye and fine motor coordination of a Homosapien.

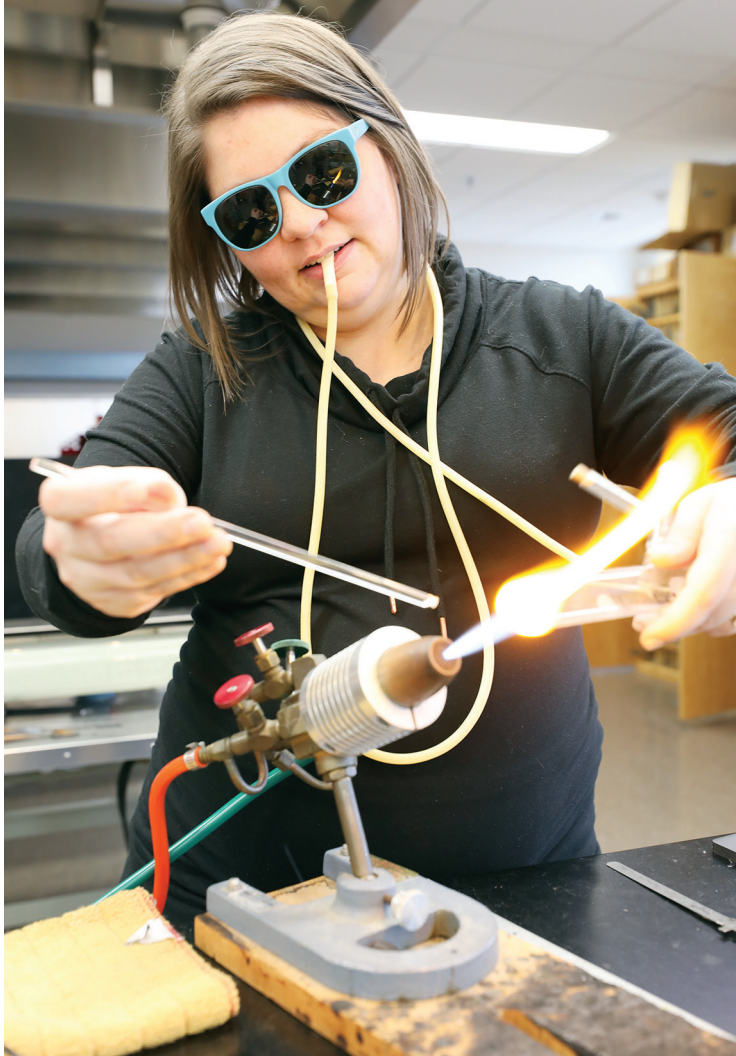
That human being at OU would be Erin A. Mayberry, scientific glassblower, laboratory manager and adjunct instructor in the Department of Chemistry and Biochemistry since 2017. Her work could involve custom fabrication of a state-of-the-art research apparatus or simple repairs to glass instruments.

Mayberry hails from Shelby Township, Mich., about 30 miles north of Detroit. Because old, industrial buildings convert easily into art studios, the Detroit area has drawn many artists in recent years, including a large glass community. Mayberry started as an artistic glassblower, but one day she noticed a membership certificate from the American Scientific Glassblowers Society hanging over a friend's bench.

Interest in this non-artistic field led Mayberry to Salem Community College in New Jersey, where she earned a degree in scientific glass technology in 2015. Many schools offer degrees in artistic glassblowing, but Salem has the country's only scientific glassblowing program.

"I consider myself to be a craftsperson with a skilled trade, while artistic glassblowing is done by artists," Mayberry says.

ABOVE - Erin Mayberry's work makes her one of few scientific glassblowers at an American university and saves OU thousands of dollars each year.



Passing the Torch

The ancient art of glassblowing is alive and well at OU and researchers across campus are glad it is.

BY LARRY LANEER PHOTOS BY LYNETTE LOBBAN

“With scientific glassblowing, the piece has to have excellent structural integrity. If you put a scientific piece with a thin spot under vacuum, the results would be disastrous.”

A regional officer in the American Scientific Glassblowers Society, Mayberry says only a few American universities have scientific glassblowers on staff. In addition to OU, she has worked for Oklahoma State University, Texas A&M and other clients. Her handiwork saves both time and money. Some vessels used in scientific research cannot be purchased off the shelf at any price, so scientists need a skilled crafts-person who can create to unique specifications. Mayberry can repair a \$2,000 glass instrument for as little as \$20. Jobs can range from fire-polishing a chipped test tube to entirely rebuilding a condenser, a tubular apparatus used to cool vapor into liquid.

Mayberry has clients campus-wide. She has repaired quartz reactors for manufacturing carbon nanotubes and fabricated drying tubes for the Sam Noble Oklahoma Museum of Natural History. Museum staff use the tubes to apply a fine-grained compound to invertebrate fossil specimens to highlight areas of topographic relief for photographing.

Mayberry says scientific and artistic glassblowing have different objectives, but use some of the same techniques. The scientific side follows strict tolerances and blueprints. The glass must be functional, as well as aesthetically pleasing. Artistic glassblowers rely on inspiration and storytelling and use a much larger color palette than the clear glass preferred by scientists.

“Depending on what type of artistic glassblowing is being done, basically all the tools are interchangeable between artistic framework and scientific,” Mayberry says. “If anything, artists usually have more tools, like molds and tools for creating textures and shapes. With scientific glassblowing, the piece has to have excellent structural integrity. If you put a scientific piece with a thin spot under vacuum, the results would be disastrous.”

Covering more than 1,700 square feet, including an office area, the OU lab is one of few designed by a glassblower, Jim Cornell, who held the OU job for nearly 18 years. It features a 6-foot long stainless-steel sink, ample storage — glass not stored in drawers becomes dust covered — and gas lines running through walls and columns instead of across the floor where they may be tripped over or punctured. Machinery includes two sizes of lathes, two kilns for the slow cooling method known as “annealing,” and a teaching area for 12 students, each with an individual gas manifold for fuel.

Various materials require different fuels, explains Mayberry. Borosilicate glass (known by its trademark name, Pyrex) takes a combination of methane or propane and oxygen and has a softening point of 1,510 Fahrenheit and an annealing point of 1,050 F. Quartz requires a hydrogen and oxygen mix to soften at 3,061 Fahrenheit and has an annealing point of 2,219



TOP - An accomplished glass artist, Grant Mayberry teaches OU students the finer aspects of glassblowing for the School of Visual Arts. ABOVE - A crystal-clear Great Dane figurine Grant Mayberry custom designed is no bigger than a credit card. Grant’s artistic work uses many of the same talents applied to scientific equipment by his wife, Erin. OPPOSITE - OU students wear didymium lenses and cotton clothing while taking classes in the Scientific Glassblowing Laboratory, which is one of few of its kind in the nation.

Fahrenheit. With such high temperatures at arm's length, Mayberry says her greatest fear as a neophyte glassblower was "a hand in the torch."

Scientific glassblowers use a technique called "flameworking," torchworking or even lampworking — a nod to the time when glassblowers used oil lamps for fuel. With this technique, a glassblower uses a "torch," or open flame, to heat the glass into a molten state while blowing through a hose until a glass "bubble" is formed at one end. Constant rotation and shaping tools produce the desired result in a matter of minutes.

Artistic glassblowers also do flameworking, as well as another technique called "offhand glassblowing," in which molten glass in a large vat is gathered on a blowpipe and shaped using rotation, gravity and hand tools.

Safety comes first in the lab, says Mayberry. Glassblowers wear cotton clothes, as nylon or polyester would melt under the flame or an errant piece of hot glass. Hair and loose-fitting clothes must be tied back, and anything that could melt has

no place on the bench. For eye protection, workers and observers wear glasses with didymium lenses. Oxygen and gas tanks must be at least 10 feet from fire sources. Careful attention went into ventilation, and the hydrogen tank occupies a steel, continuously ventilated box in case of leakage. The lab is stocked not only with eyewash solutions, but also fire blankets.

In rare instances, glassblowing can lead to love. Mayberry met her husband, Grant, an artistic glassblower, at a glassblowing charity event in Michigan. At OU, Grant teaches a class on glassblowing for the School of Visual Arts, while Erin teaches laboratory glassblowing for the chemistry and engineering physics departments.

"The craft is at a turning point, as many experienced glassblowers reach retirement age and close their glass shops," Mayberry notes, to the detriment of research programs.

Fortunately, the ancient craft has a clear future at OU. 

Larry Laneer writes about the arts from Norman.

