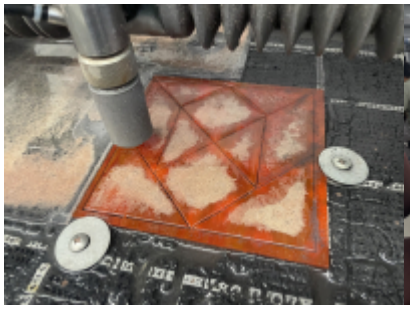
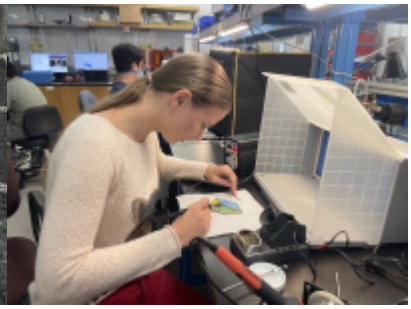
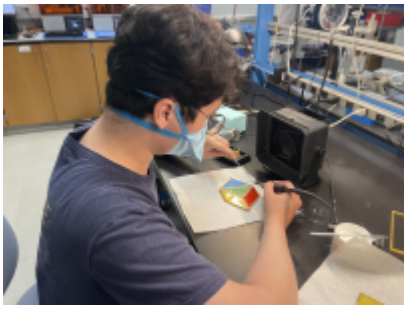
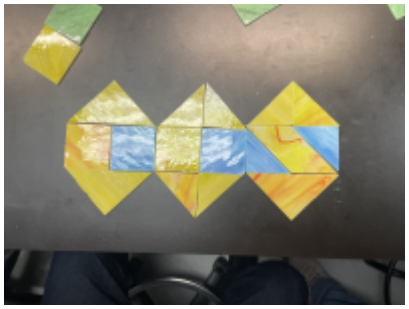
Projects

This page is a continual work in progress – a place for us to document our past and ongoing projects.

Spring 2026 - CCS Introduction to Making Class

In Spring Quarter of 2026, we helped lead 2 classes for an experimental seminar in the College of Creative Studies, led by Tim Sherwood (CCS dean). In the first class, the students learned how to use the water jet and also got familiarized with the lab through a new user orientation in preparation for a stained glass workshop, which was led a couple of weeks later. The stained glass workshop (taught by Elaina Pace) allowed students to see cutting on the water jet and then choose from pre-cut pieces to make a design. They then practiced taping their designs (with copper tape) and soldering the pieces together!

Summer 2025 - Current | Future Makers Workshop

Innovation Workshop and Los Ingenieros are partnering to host a hands-on program for local elementary and middle school students from underrepresented communities in science and technology. Participants will design their own custom trading card while learning to use tools such as the laser cutter, 3D printer, and CNC paper cutter.

Update: We successfully hosted field trips for about 300 future-makers this school year!

https://dailynexus.com/2025-10-09/campus-organization-set-to-host-future-makers-workshops-for-local-students/




Spring 2025 | UV-Blocking Incubator Shroud

This project involved designing and fabricating a custom UV-blocking shroud for a moving sample incubator used at the NSF ExFAB Biofoundry at UCSB. The project was intended to reduce UV exposure to light-sensitive samples while maintaining accessibility and compatibility with the different sample rack systems.The shroud was designed in CAD and manufactured using ASA through 3D printing to provide durability and resistance to the incubator environment and UV light.



Fall 2024 - Current | Collaboration with UCSB's Art, Design, & Architecture Museum

The ADA Museum at UCSB has acquired two models created by architect Kendrick Kellogg. We are collaborating with them to create 3D printed copies of the models.

The two models we are helping with are of the Hoshino Wedding Chapel in Japan (pictured on the left) and the Doolittle House in Joshua Tree, California (pictured on the right).




Doolittle House

Due to the size, we sliced it into 22 pieces. Altogether, this Doolittle model used more than 6 kg of filament and took over 350 hours to print. That's more than 15 days!

Fall 2024 - Current | Flute Project for Pedro Eustache

Pedro Eustache is an innovative studio flautist. We are collaborating with him to help bring his idea to life!

July 2024 | UCSB Summer Research Academy - Bionic Creatures

The UCSB Summer Research Academy is dynamic summer experience that engages qualified high school students in project-based, directed research in STEM, Humanities, and Social Sciences fields.

This summer, Ph.D. student Anna Alvarez in Mechanical Engineering leads a course called Bionic Creatures, where students form hypotheses about the evolutionary adaptations of organisms and build experiments to test those hypotheses.

The Innovation Workshop and its staff have helped facilitate this course by providing extensive tools, training, and supervision for these students to safely build and conduct their experiments.

Winter-Spring 2024 | Crystalmark + Sherline = Custom CNC Airjet Cutter

In the Summer of 2022, the Innovation Workshop acquired a CrystalMark abrasion etcher secondhand from a dentist downtown. Over the next 1.5 year, the Workshop Wizards have made iterative modifications and additions to the tool. These include mounting the handheld tool to a Sherline CNC Z-Axis, creating a vacuum stage to hold wafers and glass slides, replacing the manual food pedal with relay controlled by g-code, and extensive feed and cut rate testing.

This is a truly one-of-a-kind tool capable of cutting arbitrary contours in brittle substrates such as silicon and glass much faster than traditional cleanroom techniques.

cutting_video.mp4

November 2023 | Deep Sea Release Prototyping

We were commissioned by Talia Evans, a postdoc in Professor Moran Raven's Lab, to help design an affordable and reliable release mechanism for deep-sea experiments. The prototype was made primarily from aluminum and acrylic, with a long-term goal of manufacturing all components in 316L Stainless Steel using the waterjet cutter.

kraken_release.mp4

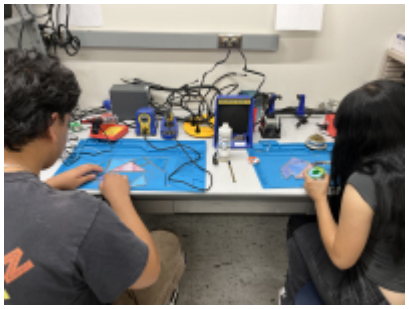
Oct 2023 | Stained Glass Workshop

This project was completed in collaboration with CSEP in order to provide education on STEM to high school students. The pieces for the stained glass were cut on the Wazer Waterjet. Below is an excerpt from their website.

What does an experimental physicist actually do? Sure, sometimes we stand and do problems on the chalkboard, but so much of experimental physics research is driven by creative thinking, problem solving, and making things with our hands. In this course we'll explore some of the most common fundamental physics research tools like lasers, magnets, detectors, and how these technologies are harnessed in building things to answer deep questions about the universe. We'll get a taste of how physics experimentalists tackle physics problems, and discover how exercising our creative skills helps us do interesting science. This course will be about physics, but it will also be about art, creative expression, and expanding our physics explorations beyond just calculations and math. We'll spend half of each day learning about modern and relevant topics in experimental quantum and particle physics, and the other half learning how to solder by making our own stained glass art pieces.

Supported by: NSF Quantum Foundry through Q-AMASE-i program # DMR-1906325

Taught by: Madeleine Bow Jun Leibovitch, Ph.D. student in Physics





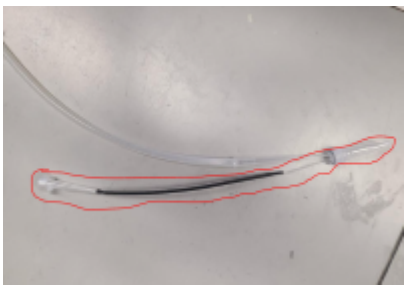
Sept 2023 | Rat Milker

Because rats develop type 2 diabetes in a similar way to humans, their developmental stages are

being researched to see how this can be prevented in human babies. Research has found that the breastfeeding phase is the best time to introduce nutrients that will prevent diabetes.

In order to make the milk-extraction portion easier, we developed a rat milker that will be more comfortable for the rats.

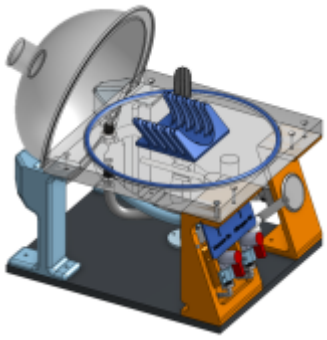
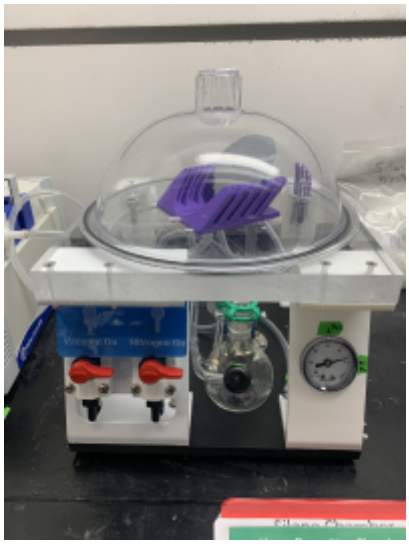




Sept 2023 | Silane Chamber

Silane chambers are used to deposit a thin layer of gas-phase silane to serve as a counter adhesion agent for glass or silicone substrates.

This silane chamber was improved from the old one to have a clearer view of how much silane is left and to have clearer instructions.

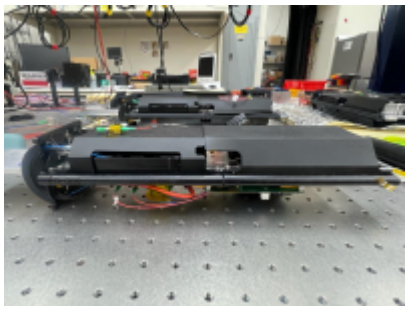
Aug 2023 | Halbach Ring

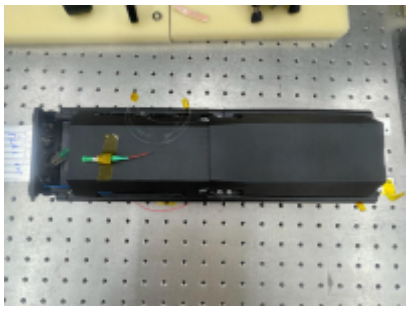
This Halbach Ring was created for the Physics Department. Halbach rings fixture magnets to create a magnetic field in one direction. It was made by CNC and waterjet cutting aluminum into rings, inserting permanent magnets, and then bolting the rings together.



Aug 2023 | Laser Array Dust Covers

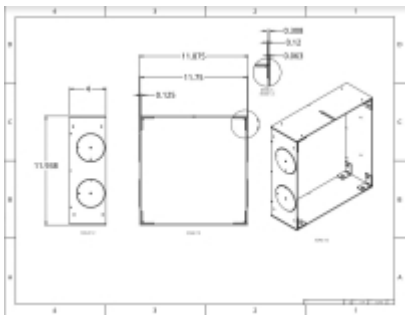
These prints from the F270 are prototypes of dust covers for a space laser array. These are currently being assembled in preparation for space readiness testing at NASA.

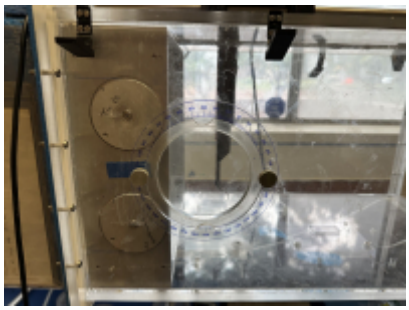


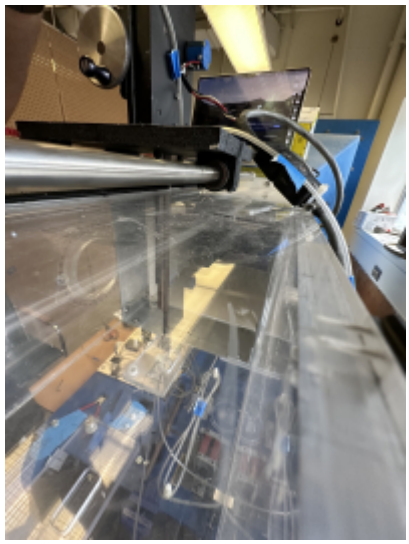


Jul 2023 | Wind Tunnel Frame

In order to hold a thin disk in place in a wind tunnel while maintaining both adjustability and secureness, we designed a frame.



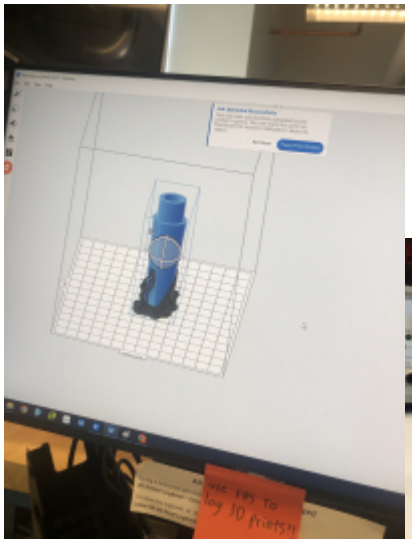




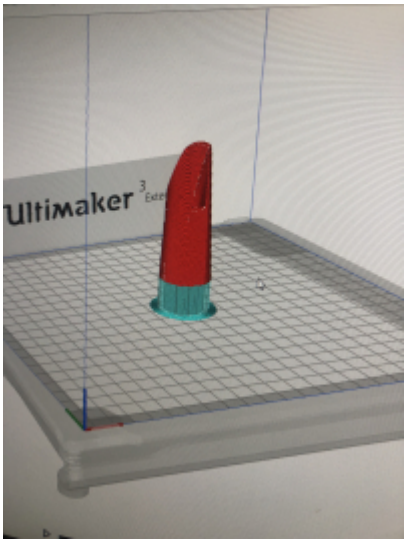


Jul 2023 | 3D Printed Mouthpieces

The music department at UCSB and SBCC reached out to create different instrument mouthpieces through 3D printing. We started off with 3D printing some clarinet mouthpieces with resin and ABS filament at 40% and 100% infill. We found that printing with filament created pieces with poor tolerances and were unable to produce sound, while the resin mouthpiece was usable. For our next steps, we will continue this process with mouthpieces for different instruments and add food-safe epoxy to maximize safety.

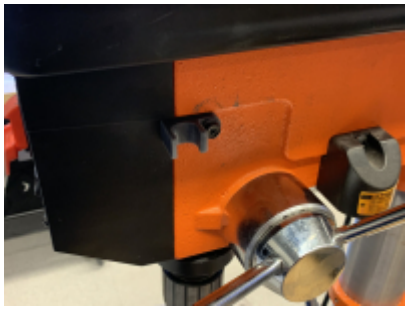
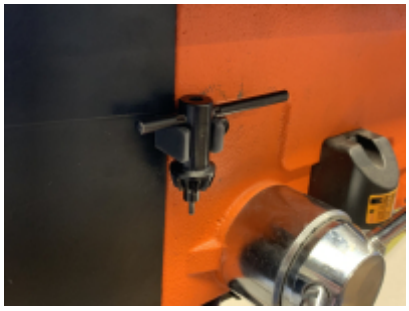






Jul 2023 Lab Fixes/Improvements

Printed replacement drill press chuck key holder

Printed replacement cabinet door latch

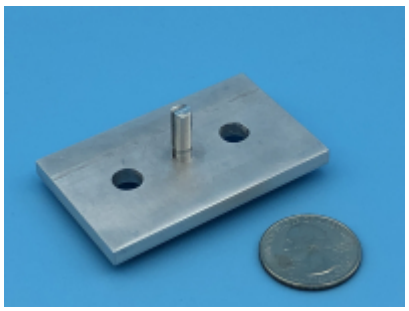
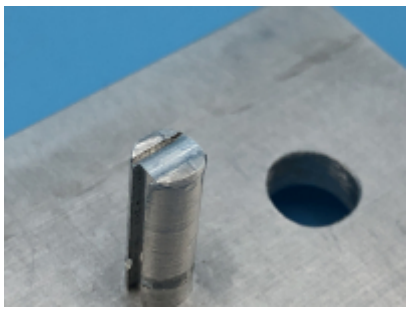
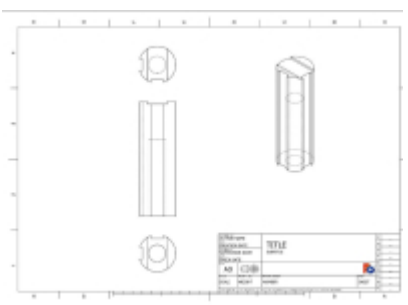


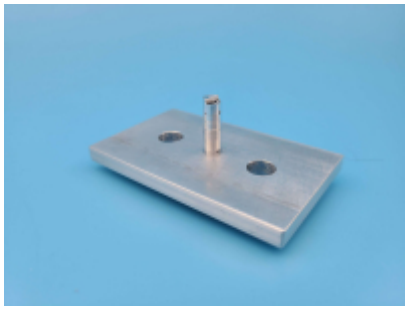

Mar 2023 (ongoing) | Diamond Holder

The Quantum Foundry within CNSI is working on making nex-gen quantum materials from synthetic diamonds. They do this by blasting the diamonds with electrons.

However, they needed a way to hold their tiny diamond samples at a specific height. So we were tasked with designing and machining a fixture for mounting their samples and positioning them under the electron beam.

While their previous method took several days to fully dose a sample, early testing revealed that this holder allows them to dose their diamonds in a matter of hours.



Jan - Mar 2023 | 3D Printing Rare Corals for the Channel Island Marine Sanctuary

The Channel Island Marine Sanctuary works to understand and educate the public about our marine ecosystems. One of their groups is on a mission to educate the public about corals and coral reefs. They wanted this curriculum to be tactile and interactive, however coral skeletons are rare and fragile. To overcome this limitation, we partnered with NOAA to 3D print their coral specimens.

corals_gulf.pdf





Oct 2022 | BNL Sonicator Lid

The ultrasonic bath located in the Bio Nanostructures Lab (BNL) here at CNSI uses a special top-mounting sample holder. This holder ensures that samples are held where ultrasonic intensity is maximized. The original holder was also very fragile. After breaking a 2nd time, we were asked to make a better one.

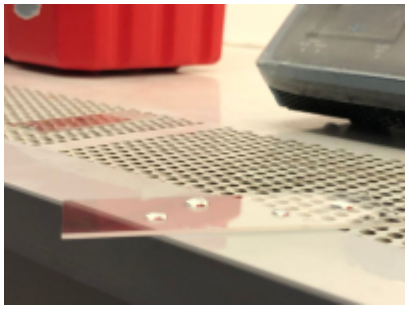
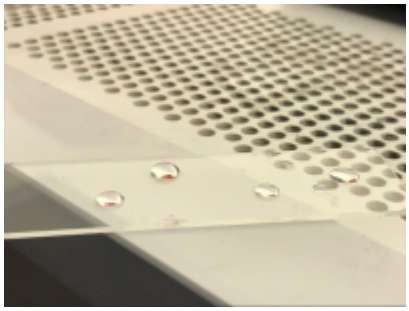
We measured the important dimensions for the existing holder, then re-designed it to be much stronger and cheaper than the original.





Jul 2022 | PDMS Dome Grippers

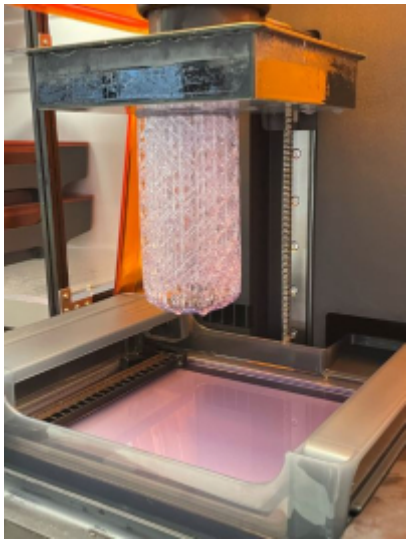
One lab user wanted to make small PDMS domes on glass to serve as “grippers” for 2D materials like graphene. We tried etching patters into glass slides, but they lost transparency and the PDMS wets glass too well to make a standing drop. Instead, we ended up mixing PDMS and dispensing drops directly onto a 180C slide. The cured in a couple minutes into perfect PDMS domes.

Dec 2020 - Jan 2023 | 3D Printing Rhinoceros Stent for the Brookfield Zoo

The Brookfield Zoo promotes conservation by introducing people to wildlife. One of the zoo’s residents is Layla, a black rhinoceros. Infected sinal tissue made it hard for Layla to breathe. We partnered with Brookfield Zoo and other universities to design and manufacture a surgical stent. Surgeons were able implant the stent and remove infected tissue.

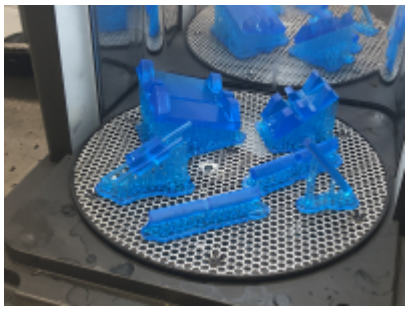
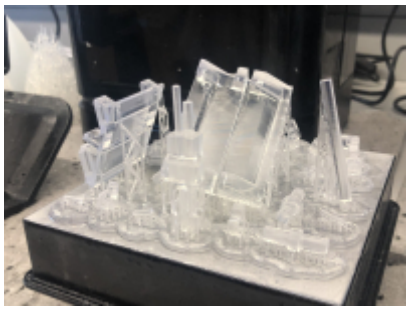
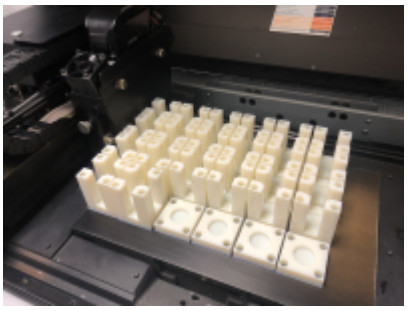
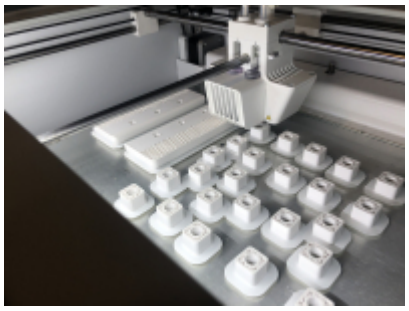
https://www.youtube.com/watch?v=KDv_NTDPRQw


Cool 3D Prints

We use a variety of 3D printers in our Elings 3430 lab. These include the Ultimaker and Stratasys

F270 FDM printers, Form 3 & Form 4 SLA printers, and an Objet 30 Polyjet printer. Here are example projects:

From:
https://microfluidics.cnsi.ucsb.edu/wiki/ - **Innovation Workshop Wiki**

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