Projects

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

Sept 2023 (ongoing) | Rat Milker

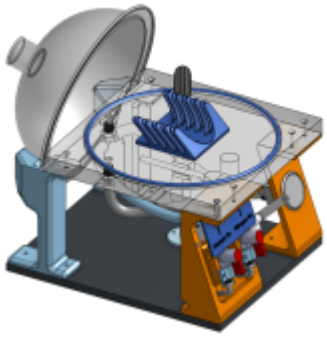
Because rats develop type 2 diabetes in a similar way to humans, their developmental stages are being researched to see how this can be prevented in human babies. Research has found that the breastfeeding phase is the best time to introduce nutrients that will prevent diabetes.

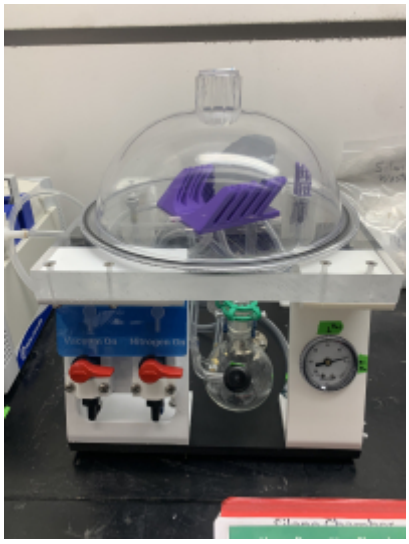
In order to make the milk-extraction portion easier, we are developing a rat milker that will be more comfortable for the rats while allowing easy sample collection for the researchers.

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.

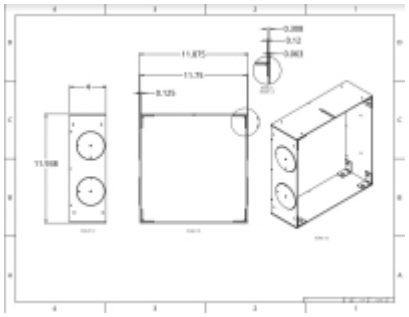
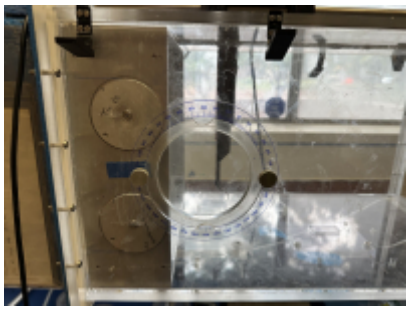
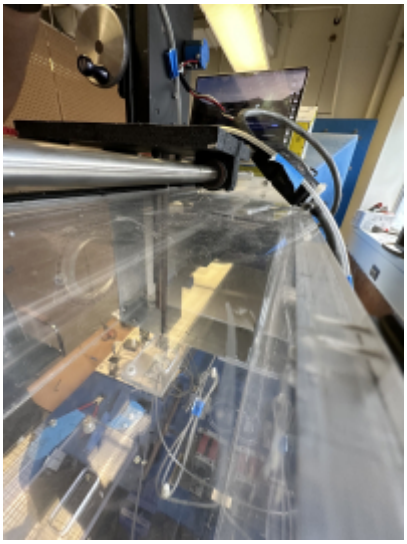
This silane chamber was improved from the old one to have a clearer view of how much silane is left and to have clearer instructions.





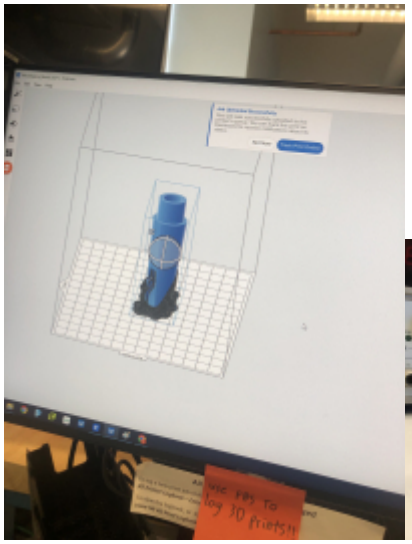
Jul 2023 | Wind Tunnel Frame

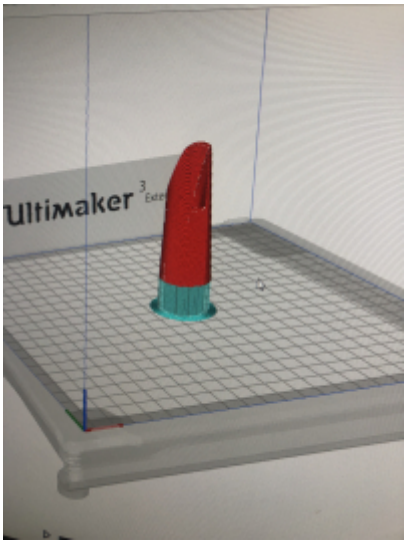
In order to hold a thin disk in place in a wind tunnel while maintaining both adjustability and secureness, we designed a frame.


Jul 2023 | 3D Printed Mouthpieces

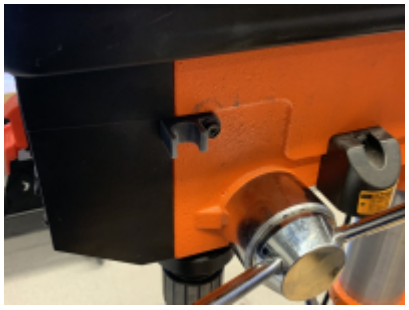
The music department at UCSB and SBCC reached out to create different instrument mouthpieces through 3D printing. We started off with 3D printing some clarinet mouthpieces with resin and ABS filament at 40% and 100% infill. We found that printing with filament created pieces with poor tolerances and 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



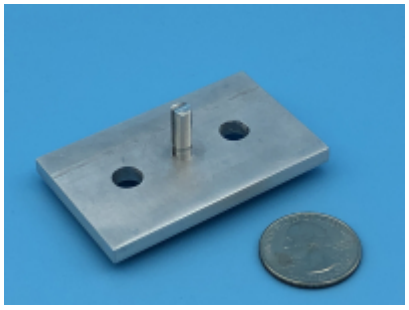
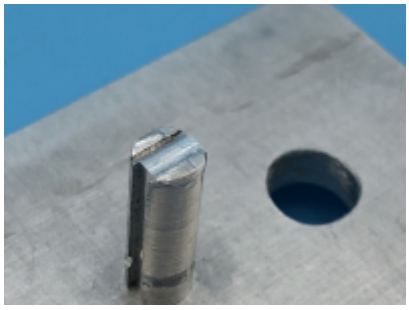
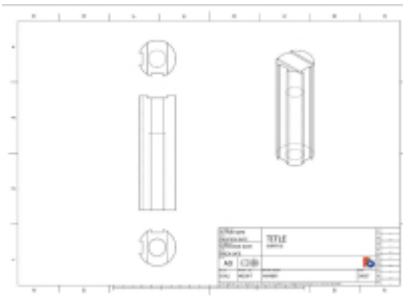
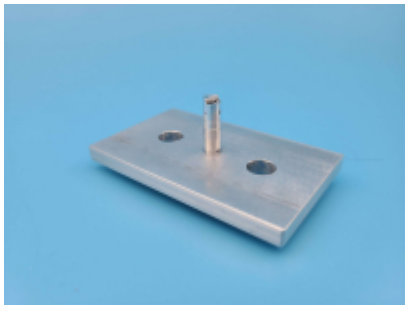
Printed replacement cabinet door latch

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

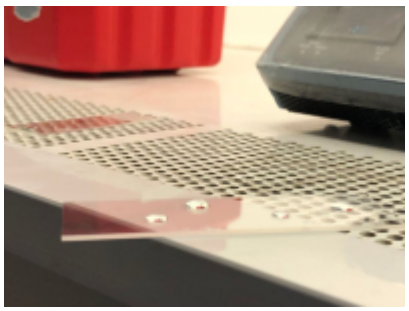
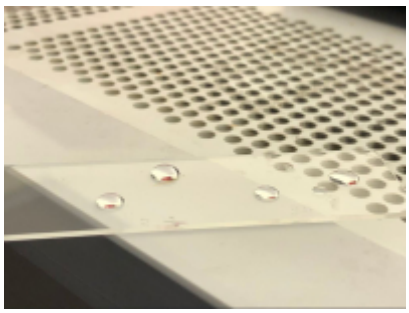

Oct 2022 | BNL Sonicator Lid

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

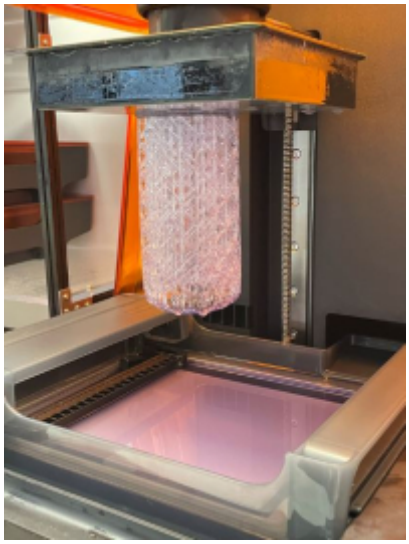
One lab user wanted to make small PDMS domes on glass to serve as “grippers” for 2D materials like graphene. We tried etching patters into glass slides, but they lost transparency and the PDMS wets glass too well to make a standing drop. Instead, we ended up mixing PDMS and dispensing drops directly 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 the Innovation Workshop and the Microfluidics Lab. These include the Ultimaker and Stratasys F270 FDM printers, Form 3 SLA printers, and an Objet 30 Polyjet printer. Here are example projects: