

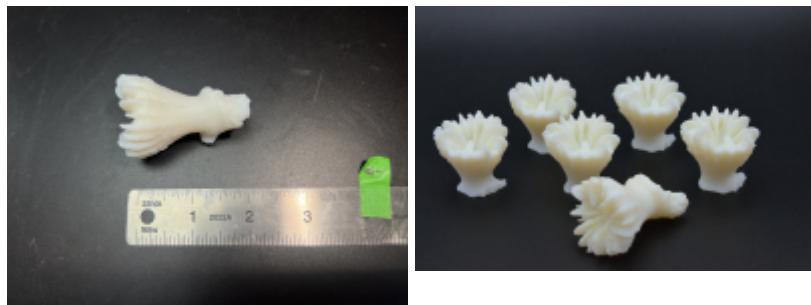
Projects

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

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.

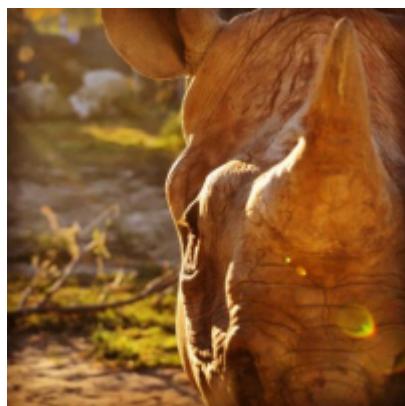
corals_gulf.pdf



3D Printing Rhinoceros Stent for the Brookfield Zoo

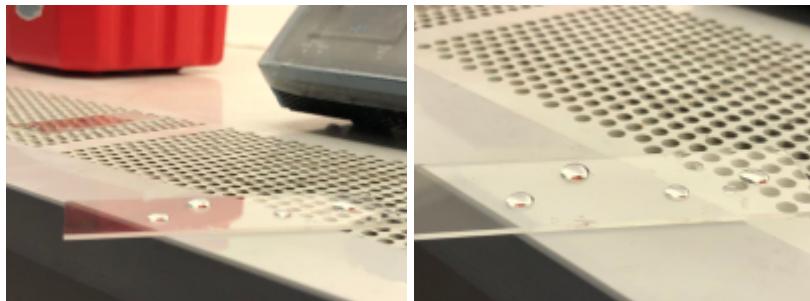
The Brookfield Zoo promotes conservation by introducing people to wildlife. One of the zoo's residents is Layla, a black rhinoceros. Infected sinal tissue made it hard for Layla to breathe. We partnered with Brookfield Zoo and other universities to design and manufacture a surgical stent. Surgeons were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

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



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 patterns 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.

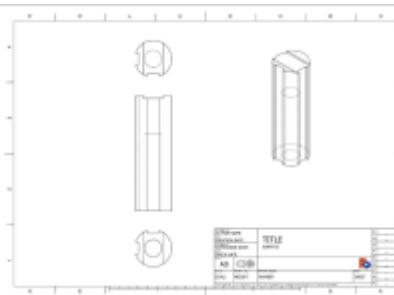


Diamond Holder

The Quantum Foundry within CNSI is working on making next-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.



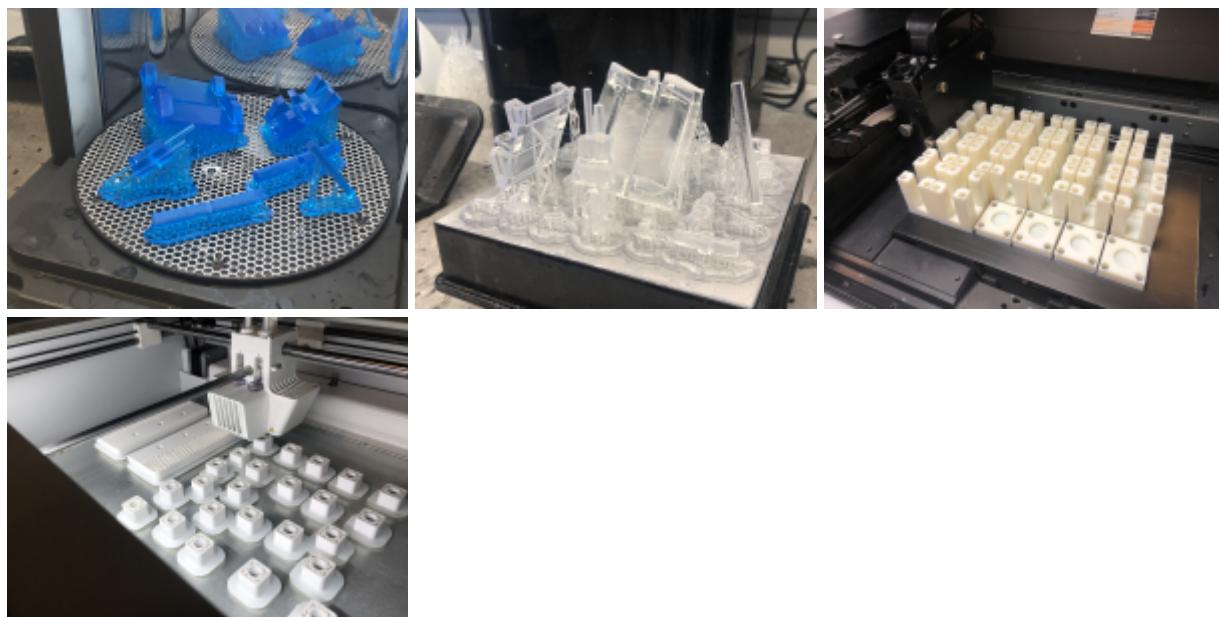
Jen Sonicator

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.

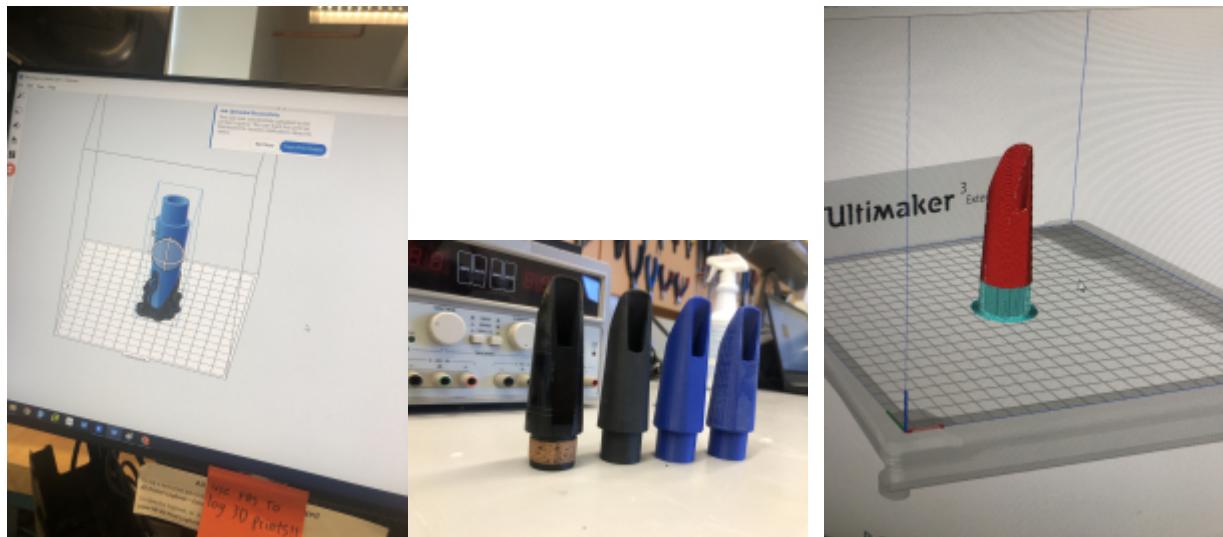
Cool 3D Prints

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:



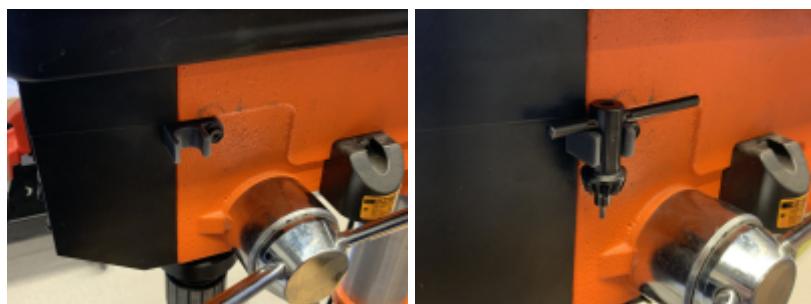
3D Printed Mouthpieces

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.



Lab Fixes/Improvements

Printed replacement drill press chuck key holder



Printed replacement cabinet door latch



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