NJIT Professor Elevates CT Scan Lab Work to Realm of Visual Art

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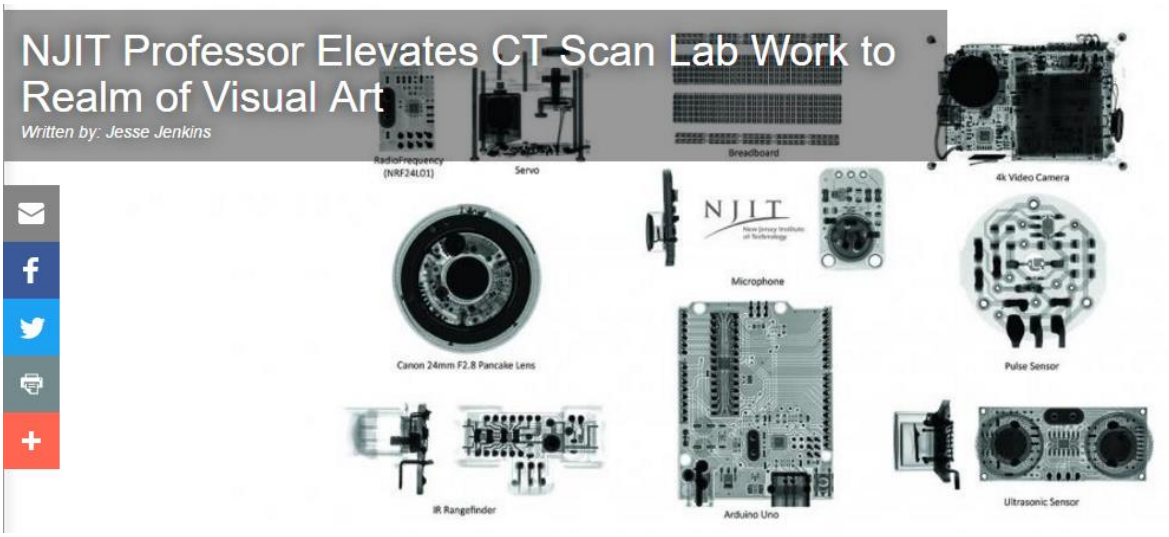


For most, the stark black and white images produced through **computed tomography (CT)** may not ignite much imagination beyond the routine bone scans that we'd see at the radiologist's lab. However, for **NJIT Assistant Professor of Architecture and Design,** , the technology has become the creative medium by which he is building a library of digital art, steeped in the niche field of x-ray photography.

At NJIT's York Center Laboratory, Schwartz's ongoing work is proof that artistic inspiration can strike anytime, anywhere. Using the lab's advanced imaging equipment, Schwartz is expanding a free-to-use online repository of prints in the public domain, featuring 3D X-ray-based compositions of everything from mini orchids to used electronics — all captured in micron-scale detail.

"In our everyday surroundings, we see common objects like orchids or hard drives, but we can get a new perspective of these things when we present them on such a micro level," said Schwartz. "Being from an art and design school, I think it is always interesting when you can use technology to visually explain how things work… the chance to experiment and cross between my research and artistic projects with such expensive imaging equipment like this is a rare opportunity."

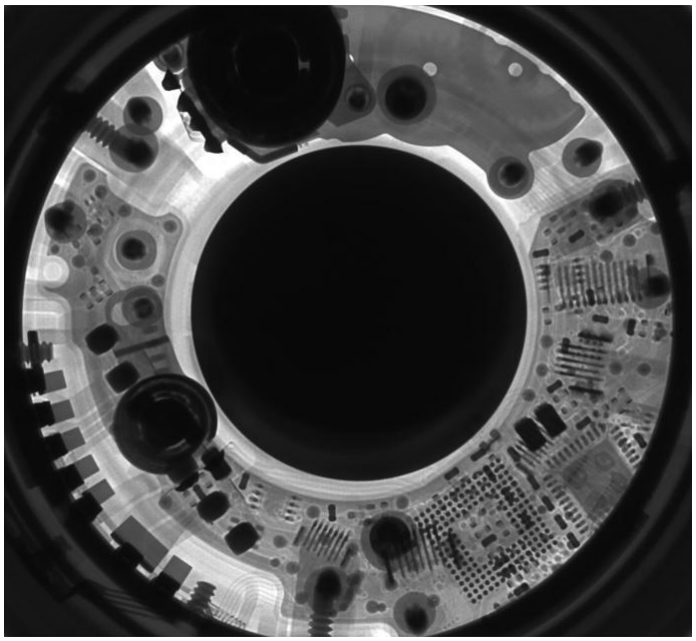


Photo: *A Canon DSLR Lens (24mm f2.8 pancake lens) is imaged at resolution of ~20 micron using a Bruker SkyScan microCT scanner. The camera's outside ring is composed of thin metal, while the darker inner circle of the camera lens is composed of dense glass. Credit — Mathew Schwartz/NJIT*

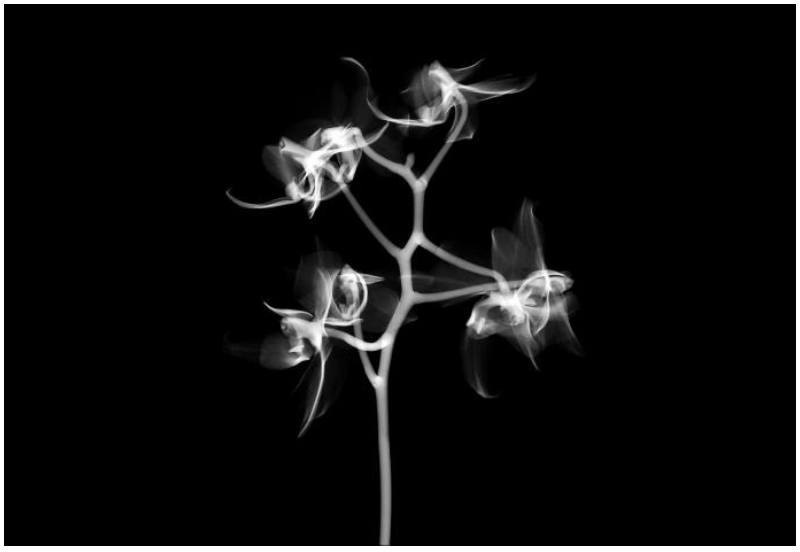


Photo: *Ghost Tree. Miniature orchid with a height under 4'. Credit — Mathew Schwartz/NJIT*

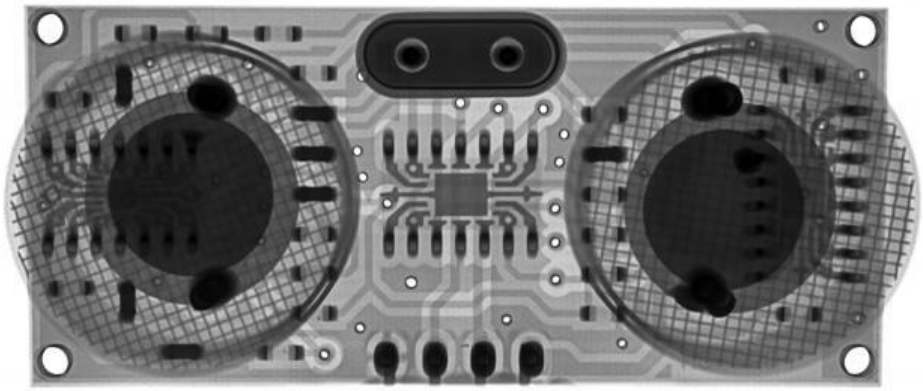


Photo: *A black and white microCT scan image of an ultrasonic sensor at resolution of ~15 micron. Credit — Mathew Schwartz/NJIT*

Schwartz found initial inspiration for his creative endeavor at the start of his current research collaboration with Professor of Chemical Engineering, Sagnik Basuray, to study rock aggregate properties that are beneficial for growing plants. The project has involved imaging the composition of aggregates using micro-CT scanning — a 3D imaging technique utilizing x-rays to visualize the interior of small-scale objects. The scanning machine is capable of rotating small samples so that multiple views can be captured from different angles. Those angles can then be reconstructed to build a high-resolution 3D image of a given structure.

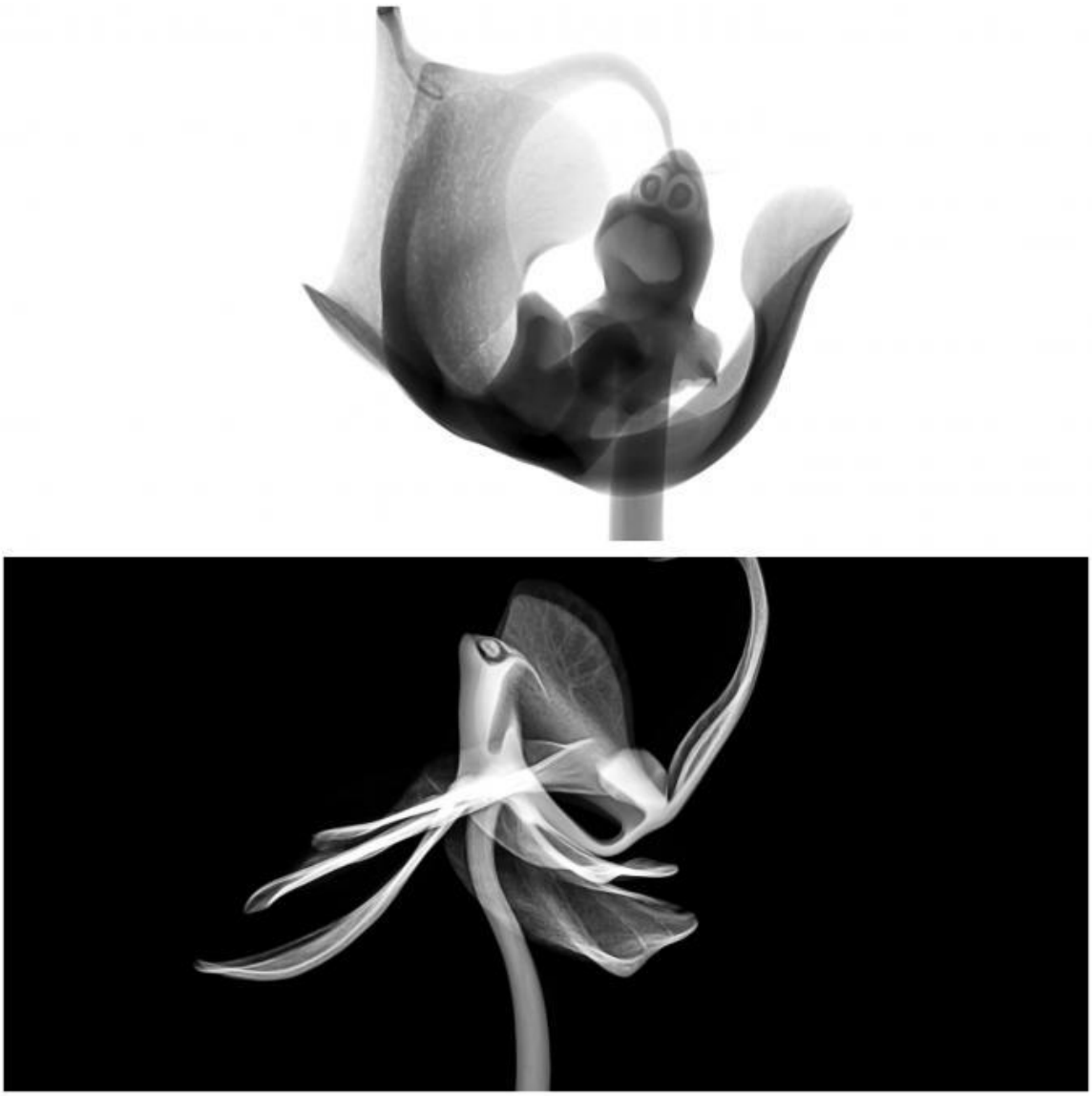
Schwartz has spent his free time in the lab pursuing his photography — which has shifted between capturing the inner workings of sensors, hard drives and other micro electronics, and visualizing the subtle aesthetic differences in the density of flower tissue. He has collaborated with acclaimed macro photographer, Don Komarechka — the results of

which yielded one flower image, amassing more than 9,000 likes on the artist's Facebook page.

"Don is famous for his macro photography, including of snowflakes from his 'Sky Crystals' series, so it was great to collaborate with him and get new ideas from a project like this," said Schwartz. "We were in the lab for a few hours and were able to get that one image, but it took nearly two months of testing and scanning different objects at different settings before he came to make sure we would be able to secure the flowers in the machine in order to cleanly capture objects we wanted to image."

While x-ray prints of flower subjects are nothing new — having roots as far back as 1800's and reaching mainstream notoriety with the artwork of radiologist Dain L. Tasker in the 1930s — Schwartz says his work with micro-CT scanning is enabling him to explore the form in a deeper level of detail. Unlike many x-ray prints one might find while running a basic Google Image search, Schwartz says the process of micro-CT scanning objects enables him to capture much smaller subjects at a resolution of up to 0.01 millimeters.

"In one series of mine, I began closely imaging single mini orchids that are about three centimeters wide, and found that the flower seemed to show anthropomorphic properties, almost like a character," said Schwartz. "The different densities of the orchid here gave the appearance of eyes and a mouth…from a side perspective, the flowers looked like a dramatic opera singer, or a bug up close. There are many orchid x-rays online, but none that I have seen that have this characteristic."



For now, Schwartz plans to keep expanding his digital repository of CT scan photo-art for the general public to use freely, and hopes to be involved in more collaborations with photographers, scientists, and students in the future.

“I want to find new materials to image with interesting densities to them like wood, and I’m hoping to experiment with CT scan slices to get some more unique perspectives,” said Schwartz. “I always like collaborating, so if there are students or artists who are interested by this and have great ideas, I am always up for it.”