

# BACK TO RESEARCH

## FALL 2020 VINSE NEWSLETTER

The past six months have presented many new challenges, and changes have been necessary in our daily routines. However, as we know, with new challenges come new opportunities. Here I highlight many of the opportunities that VINSE has embraced during this time to enhance the impact of our institute.

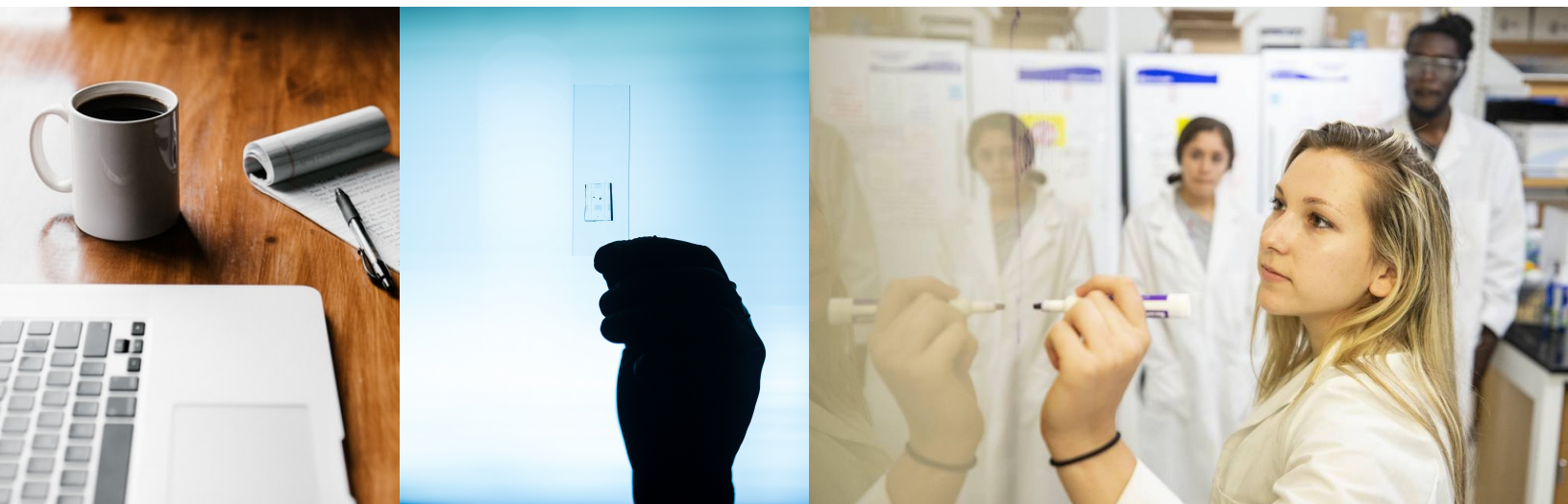
- Made **two large donations** of PPE to VUMC for use by those on the front lines of the pandemic
- Performed **much needed maintenance**: pumps and chillers were rebuilt, and the tool chilled water system was cleaned out
- Rolled out **new tool capabilities** that will enable live imaging of biological species in the AFM, automated TEM sample preparation, and the imaging of liquid-solid interfaces and cryo-milling of biological specimens in the Helios FIB/SEM (page 2)
- Launched a new **Spotlight Podcast** series to highlight recent work published by VINSE researchers (page 3)
- Developing extensive **video content** that will be used for virtual tours, tool highlights, recruiting, coursework, and outreach (page 3)
- Adding a new initiative, **faculty speed talks**, to allow everyone to get a quick overview of the latest exciting research VINSE faculty are doing, a Zoom link will be provided (page 3)
- Planning a highly interactive **virtual poster session** with prizes for both active participants and poster presenters – stay tuned for more details (page 4)
- Launching new monthly **social media competitions** (page 4)

As you can see, we have many exciting initiatives happening in the VINSE community. I hope everyone has a great semester. Stay safe.

Sharon Weiss  
Director, VINSE

## VINSE Fall Events

- August 31**– Annual VINSE Image Competition opens (Deadline of October 16)
- September** – Monthly Social Media Competition: hashtag sharing
- September 16, 4pm** – Faculty Speed Talks: Nano Electronics & Nano Bio
- September 23, 4pm** – VINSE Colloquium - Paul Westerhoff
- October 2, 10am** – Virtual Coffee Hour with the Director
- October** – Monthly Social Media Competition: like and comment
- October 7, 4pm** – Faculty Speed Talks: Nano Energy & Nano Materials
- October 23, 3-5pm** – NanoDay! Poster Session
- October 28, 4pm** – VINSE Colloquium - Joshua Robinson
- November** – Monthly Social Media Competition: share photos
- November 4, 4pm** – Faculty Speed Talks: Nano Optics & Nano Computation
- December** – Monthly Social Media Competition: best caption



## User Training Available

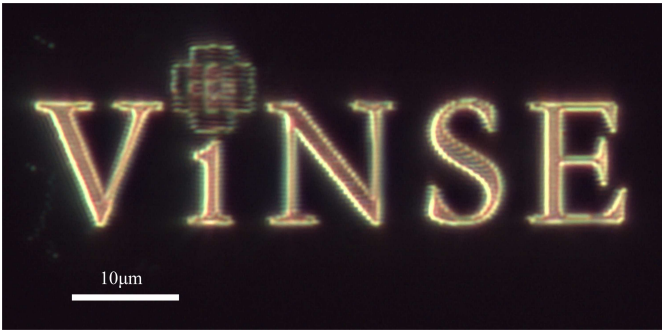
New user training is available under Phase 2+. Please contact [vinse@vanderbilt.edu](mailto:vinse@vanderbilt.edu) to learn about the new policies that are now in place and to schedule your training.

## New Capabilities

VINSE announces the availability of the following new capabilities:

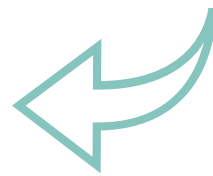
### Fluid & Gas Flow Cell with Temperature Control for Atomic Force Microscope (AFM)

VINSE has now expanded the capabilities of our Bruker Dimension Icon AFM by adding a heating controller in conjunction with a fluid & gas flow cell kit. The new accessories allow real-time observations of biological samples under native conditions. The temperature can be controlled between room temperature and 60 °C, and it is possible to direct fluid flow and gas perfusion over the sample. A microthermocouple with digital readout enables real-time monitoring of the fluid and sample temperature.



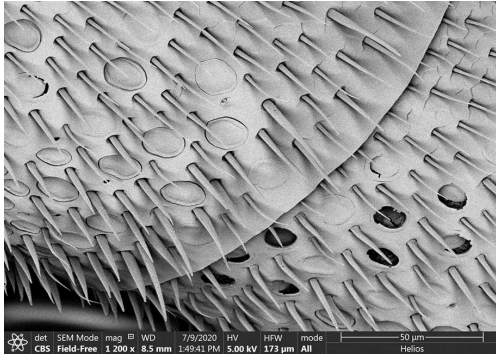
Check out what our VINSE users can do with the Helios Dual Beam FIB/SEM!

Image credit: Tom Folland

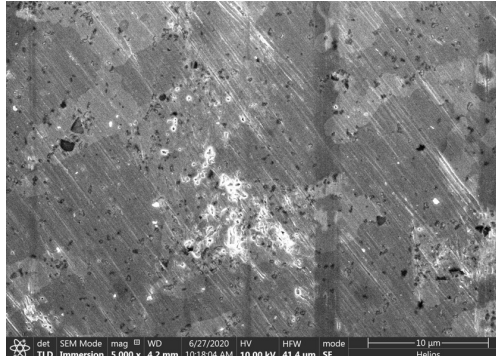


### Backscattered Electron Detector, In-Chamber Sample Navigation Camera, Automated TEM Sample Preparation, and Cryo-Preparation System for Helios Dual Beam Focused Ion Beam – Scanning Electron Microscope (FIB/SEM)

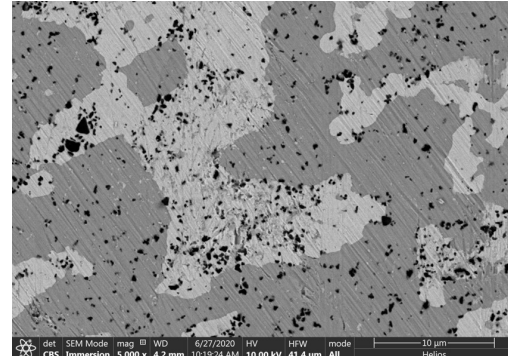
The first upgrade is the addition of a circular backscattered electron detector, which can acquire images revealing both chemical and topological contrast simultaneously (see example images below). The nature of the signal generated also greatly suppresses imaging artifacts that result from charging. The second physical upgrade is the NavCam+, which acquires a high-resolution optical image of the sample stage that is linked to the stage position. This feature greatly accelerates the process of locating a specific location on a sample to be imaged. Additionally, the AutoTEM4 software package has been installed which enables automated TEM lamella preparation and advanced scripting that brings Python-based control and automation to the Helios. Lastly, a Quorum Cryo-preparation system is installed, which allows for all the current FIB/SEM functionality at low temperatures. This system greatly expands the types of samples that are now suitable for FIB/SEM, including beam-sensitive materials, liquid-solid interfaces, and biological systems.



Who knew what a bee antenna looked like up close? This is an image taken with the new Helios CBS detector.



In-Lens SE without CBS detector.



BSE – all angles with CBS detector.



Check out how well the new Helios CBS detector reveals the material and topographic contrast of the Pb-Sn eutectic sample compared to the old in-lens secondary electron (SE) detector!

Image credit: James McBride

## Specimen Prep

Recently VINSE has reinvested in the Specimen Preparation Lab in ESB 020. Originally intended as space to prepare electron microscopy samples, it now includes fabrication and optical imaging abilities. The space houses two optical microscopes, three 3D printers, an electrochemical etch set-up, a grinding and polishing station as well as a gold sputter coater and plasma cleaner. The space will continue to grow to meet our users specimen prep needs. Reach out to [vinse@vanderbilt.edu](mailto:vinse@vanderbilt.edu) for more information.



## Pilot Funding

We want to remind our community that the VINSE pilot funding initiative will continue in FY21. We particularly encourage new submissions that include usage of the new VINSE capabilities. Please contact our technical staff to discuss project ideas. Since the September 2019 launch of pilot funding, VINSE has awarded over \$18,000 to thirteen research groups spanning a wide range of research in the School of Engineering, College of Arts and Science, School of Medicine, and VUMC. Visit the VINSE website for more details and to apply for this funding.



Click [here](#) to learn more and apply

## Spotlight Podcast

VINSE users belong to more than twenty different departments and are pursuing research across a diverse range of subject areas. Keeping up with the latest research in nano bio, computation, energy, electronics, optics and electronics can be a daunting task, but can present exciting opportunities for collaboration. To help the VINSE community keep up to date, VINSE highlights the work of one VINSE member per week in the VINSE Spotlight publication. Now VINSE has added the Spotlight podcast, in which Alice Leach talks to the first author of the Spotlight publication and learns more about the cutting-edge research that happens at Vanderbilt every day. This is a great way to stay up to date on what's happening at VINSE, hear more about a project straight from the source, and interact with publications on the go!



Click [here](#) to give the spotlight podcast a listen!

## Video Content Coming Soon

VINSE is creating video content this fall for virtual tours and tool highlights, in addition to video content tailored for use in classes and outreach. Tour videos will be available for use in graduate recruiting and are expected to be posted in the Facilities pull-down menu on the VINSE website at the beginning of October. Tool highlight videos that describe both basic and advanced tool operations will also be posted in the Facilities section of the VINSE website as they are completed throughout the fall semester. Please let us know if you are creating outreach videos in your lab so that we can link them to the VINSE outreach video content that we are building for our K-12 school partners.

## Speed Talks

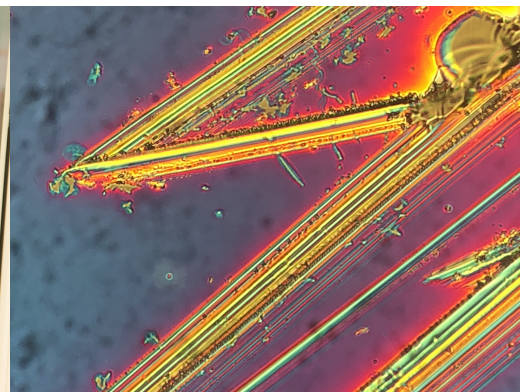
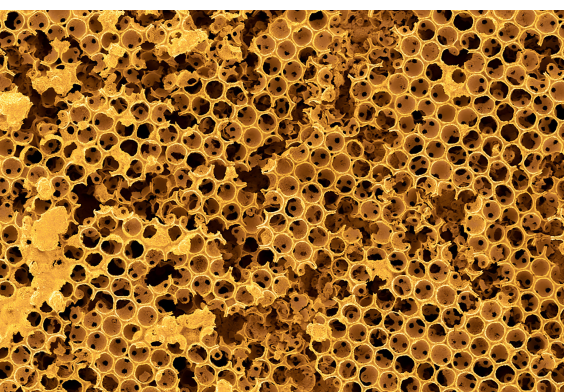
For the fall semester VINSE is introducing a new faculty speed talks initiative. Join in on these Zoom webinars to hear about current nano research and collaborations, all concentrated into 5-minute presentations.

- Wednesday, September 16 Nano Electronics & Nano Bio
- Wednesday, October 7 Nano Energy & Nano Materials
- Wednesday, November 4 Nano Optics & Nano Computation

These sessions will be held at 4pm CST, pre-registration is required.



Click [here](#) for the full schedule of speakers & register



## NanoDay! Poster Session

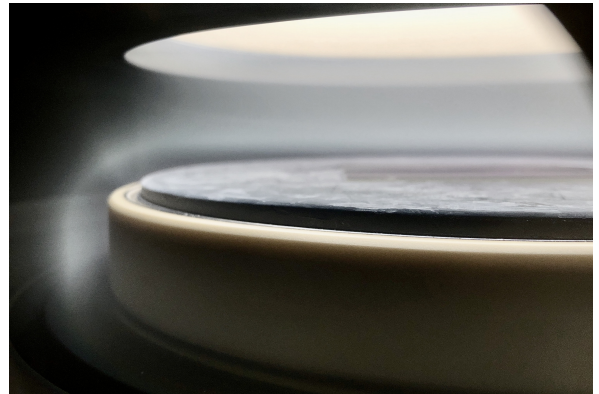
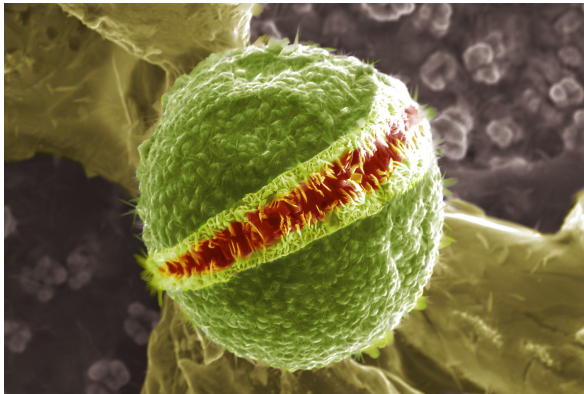
VINSE will host our annual fall poster session as a highly interactive virtual event on Friday, October 23rd. Posters will be evaluated by both a panel of judges and virtual poster session attendees for an opportunity to win up to \$500. All actively participating poster session presenters and attendees are eligible to receive a VINSE t-shirt. Registration deadline is Friday, September 30th.



Click [here](#) for details and to register

## VINSE Image Competition

If you have visually attractive images of materials or devices that have been fabricated, characterized, or imaged using VINSE equipment please submit them for a chance to win a \$50 prize! Photos of tools and facilities are also eligible. All winning images will be displayed proudly in the VINSE facilities. Deadline for submissions is October 16th.



Click [here](#) for competition guidelines

## Virtual Coffee Hour

On Friday, October 2nd, VINSE will have a virtual coffee hour with the Director. Grab your favorite beverage and join Director Sharon Weiss to discuss strategic opportunities for VINSE, pilot funding, Tech Crew, new policies and initiatives implemented during the phased research ramp-up, video content currently being developed, and any other VINSE topics on your mind.



Click [here](#) to register

## Keeping it Social

Do you follow VINSE on Social Media? If you're not already, you definitely should. Throughout the fall semester we will host a monthly social media competition. What's in it for you? First off, it's FUN! Who doesn't like fun? It's also a good way to give your mind a break if you are in the middle of a stressful day. Oh, and did we mention you could be the one of the first around town sporting a VINSE t-shirt?! That's right! At the end of each month participants will be entered into a drawing to win their very own, hot off the presses, VINSE t-shirt.



Click [here](#) to see the list of competition topics

