

INSPIRE STEM PROGRAM

POWERED BY HITACHI HIGH-TECH AMERICA

FY2024 - QUARTER 1

ISSUE 3



To ensure the success of new semiconductor manufacturing projects, we need to expand high-quality workforce training programs. To capitalize on the opportunities of the CHIPS Act, we must ensure that the skills developed through workforce programs align with industry's needs. Hitachi Inspire STEM Education Outreach Program seeks to collaborate with other STEM programs, corporate leaders, and university partners to reach as many students as possible.

As leaders in the semiconductor industry and STEM education outreach area, Hitachi Inspire STEM Education Outreach Program has been taking their best practices and knowledge out to the semiconductor education community by participating in workforce development programs to help strengthen the semiconductor community. The Hitachi Inspire STEM program has connected with corporations such as **ExxonMobil**, industry communities such as **Texoma Semiconductor Hub**, and universities such as **University of Texas Dallas** and **Stanford** to engage and expand the program.

Our **SCOPE** of work

Highlighting our
Regional
Collaborations

ExxonMobil



Lee Kong Chian
Natural History Museum



NORTH TEXAS SEMICONDUCTOR INSTITUTE

Read on to learn more
about these exciting
collaborations!

HELPING TO CLOSE THE GAP

During the summer months, teachers have been participating in ongoing education workshops such as the NanoSIMST program at Stanford University - which offers middle school teachers an opportunity to delve into the nanoworld as a learner and discover resources about high demand STEM careers for students. University of Texas Dallas offers high school teachers and opportunity to learn more about the semiconductor industry in an effort to better define and understand the needs of each of the communities from a technical and workforce development standpoint.



Hitachi Inspire STEM EOP offered to conduct sessions for each of these summer programs. For the University of Texas Dallas workshop, Hitachi Inspire STEM staff hosted fifteen local teachers, along with University of Texas Dallas staff, for a half day session including Hitachi Inspire STEM program and SEM demonstration, onsite SEM demonstrations in the HTA Dallas office Semiconductor QA lab, and tour of our Semiconductor Training facility. Teachers participated in hands-on sessions creating SEM samples and SEM imaging.

EXXONMOBIL BIODIVERSITY MICROWORLDS PROGRAM 2.0 PARTNER

The ExxonMobil Biodiversity Microworlds Program (BMP) 2.0 is a partnership between ExxonMobil and the Lee Kong Chian Natural History Museum (LKCNCNHM), National University of Singapore. The workshop aims to create awareness about the more visually obscure biodiversity that are small in size and the ones even smaller in size, while learning more about the tools and techniques that can be used to study them. Following the successful run of the ExxonMobil Biodiversity Microworlds Program completed in early 2024, this second run of the program will incorporate the use of the TM4000Plus II Tabletop Scanning Electron Microscope which is on loan from Hitachi High-Tech America as part of Hitachi High-Tech America's Inspire STEM Education Outreach Program.

Lee Kong Chian Natural History Museum will be offering fourteen fully sponsored workshops for schools. Workshops will run from August to November 2024 during the week - Tuesdays to Fridays and will hold a maximum of twenty students and 1 teacher for each workshop. The workshop is available for secondary and tertiary level students

There are a variety of workshop activities including LKCNCNHM Biodiversity Gallery Tour, Station Activities (including learning about the scanning electron microscope), and Classroom Activity (including hands on use of the scanning electron microscope).



EXXONMOBIL BIODIVERSITY MICROWORLDS PROGRAMME (BMP) 2.0

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WORKSHOP ACTIVITIES

LKCNCNHM Biodiversity Gallery Tour
Guides will focus on the importance of smaller sized biodiversity and the ones even smaller, like microorganisms.

Station Activities
Students will have the chance to handle Museum specimens up close, learn various microscopy techniques, and gain insights into the use of stereomicroscopes, and compound microscopes.

Classroom Activity
Students will examine how various animal outer coverings look under a scanning electron microscope.

BOOKING DETAILS

We will be offering **14 fully sponsored workshops** for school booking. Sign-ups are on a first-come-first-served basis.

For booking enquiries, please email nhmlearning@nus.edu.sg.

Booking Period:
AUGUST TO NOVEMBER 2024
Tuesdays to Fridays,
2:30pm to 5pm (2.5 hr)

Capacity:
20 students + 1 teacher
Priority given to schools who take up maximum capacity

Suitable For:
Secondary and Tertiary level students

LKCNCNHM has previously been partnered with ExxonMobil in their highly successful, fully sold out Biodiversity Conservation and Explorers Program. During the program, the students were tasked with a 'Conservation Challenge Assignment' that required them to develop a plan to convince stakeholders to conserve a chosen habitat in a hypothetical nature area. Their plans were presented via ArcGIS StoryMaps, which is a digital storytelling tool.

At a recent introduction event for the TM4000Plus II and the Hitachi Inspire STEM Program partnership, LKCNCNHM staff introduced the ExxonMobil Biodiversity Microworlds 2.0 Program to the audience and 2 of the fourteen workshops were immediately claimed by Crescent Girls' School. This excitement about the program and the inclusion of the Hitachi Inspire STEM Program guarantees success for all involved.



Lee Kong Chian
Natural History Museum

inspire | STEM
EDUCATION
Powered by Hitachi High-Tech America

Hitachi Program News



Natural History Museum Singapore Debuts Collaboration with Hitachi Inspire STEM Program

On May 20, 2024, an exclusive showcase titled 'Nature Remixed' was held at National University of Singapore, the Lee Kong Chian Natural History Museum (LKCNHM) in Singapore, in collaboration with Hitachi High-Tech Singapore, Hitachi High-Tech America and Hitachi Asia. This exhibition is part of a 1 collaboration between Hitachi and the LKCNHM.

Media and other VIP were introduced to the TM4000Plus II tabletop scanning electron microscope and its many strengths for STEM education. Mr. Hidehiro Yamada, Managing Director of Hitachi High-Tech Malaysia addressed the attendees about the Hitachi Inspire STEM Program and the One Hitachi connection in regards to this collaboration.

This one year pilot collaboration program aims to provide training and biodiversity workshops for not just educators and students in Singapore, but also around the ASEAN region via remote access.



Hitachi Inspire STEM EOP Introduces STEM Workforce Development Opportunities to Texoma Semiconductor Hub

The Hitachi Inspire STEM program is continually looking for new ways to engage in semiconductor workforce development. Recently, Hitachi Inspire STEM EOP staff was introduced to leaders with the Texoma Semiconductor Tech Hub. The Texoma Semiconductor Tech Hub, led by Southern Methodist University (SMU), seeks to unify existing and planned semiconductor supply chain infrastructure by enhancing regional collaboration and uplifting underserved communities through workforce expansion. It is one of 31 federally funded Tech Hubs designed to develop and grow innovative industries in regions across the U.S.

Texoma Tech Hub has connections with University of Texas Dallas - the university that Hitachi Inspire STEM is currently engaged with for the Capstone projects. SMU has a similar capstone program that the Hitachi Inspire STEM program is learning more about.



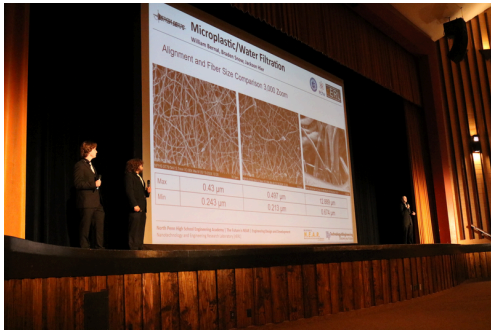
Hitachi Inspire STEM EOP Presents at NanoSIMST In-Person and Virtual Workshops for Teachers

On two separate occasions, Hitachi EOP staff conducted program and SEM demonstrations for middle school teachers participating in nanoscience summer workshops at Stanford University in California. One workshop was solely virtual, while the other workshop was in-person on the Stanford campus. Both presentations by Hitachi Inspire EOP staff were held virtually.

The Nano-SIMST program believes that middle school is the key for engagement in STEM education. Middle school teachers are introduced to nanoscience and taught ways to engage students in this area.

Hitachi Inspire STEM program's Remote Access technology makes this program ideal for teachers to utilize program tools and resources in their classrooms. The excitement among the teachers has been so great, that Hitachi Inspire EOP staff is creating additional sessions to accommodate teachers' requests.

Hitachi Region Highlights



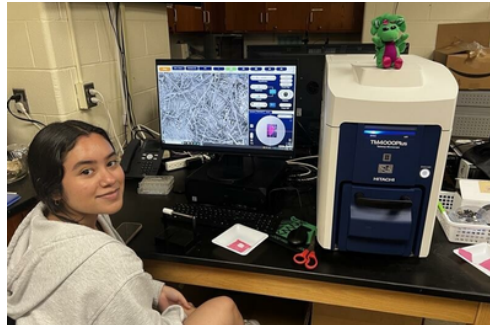
North Penn High School

Lansdale, PA

The cornerstone of the Nanotechnology Education and Research program at North Penn High School is the Nanotechnology and Engineering Symposium held each May. This symposium is the culmination and presentation of a school-year-long research and project development of 30 students in 11 separate research teams. The event took place on May 30, 2024.

Research topics such as Bioplastics R&D, Microplastic Pollution, and CO₂ Capture and Reduction. The TM4000Plus tabletop scanning electron microscope was fundamental in the research for the students' research for the entire school year.

In addition to the school year wrap-up, North Penn HS teacher Mike Boyer is looking into new ways to engage the SEM in outreach opportunities in the Pennsylvania area and beyond. Mike met with Dr. Zachary Gray from Penn State to learn about the PA Semiconductor Manufacturing Consortium. Hopefully more to come on this opportunity.



Brentwood High School

Brentwood, NY

Brentwood High School junior, Elizabeth, has begun a new experiment to continue her research on textile pollution on Long Island's water systems. Elizabeth's research delves into a crucial yet often overlooked aspect of daily life: how laundry practices contribute to environmental pollution, particularly through lint that enters water systems. What sets her study apart is the method she employed to mimic drying: using 400-grit sandpaper to replicate the abrasive conditions fabrics endure during tumble drying. The SEM analysis allowed Elizabeth to observe and document the structural differences and similarities between lint particles from polyester and cotton fabrics post-drying. This microscopic approach provides valuable insights into how different types of fabric shed lint, which can eventually find its way into local water bodies. The implications of Elizabeth's research extend beyond theoretical knowledge. Her findings could potentially influence consumer habits, fabric manufacturing processes, and environmental policies aimed at reducing microplastic pollution.



Metro Early College High School

Columbus, OH

While many teachers and students are on summer break, Dr. Erik Rothacker and associates from Ohio State University have been engaging the tabletop scanning electron microscope with education outreach in the Columbus, Ohio area.

Onsite demonstrations and activities include participating in the Platform Participants program at COSI (Center of Science and Industry). Designed for youth in grades 9-12, The Platform immerses students in a one-of-a-kind STEM experience. Participants will attend a demonstration of the SEM and participate in hands-on activities.

The SEM was also used for an interactive demonstration for summer campers with the Dublin Community Rec Center at Camp Kaltenbach. Later this summer, MECHS and OSU volunteers will take the SEM to Camp Ken-Jockety to introduce Girl Scouts to the fascinating nano world.

Hitachi Region Highlights



JSNN

Joint School of Nanoscience and
Nanoengineering Greensboro, NC

JSNN focused extensively on community outreach and educational initiatives in the first quarter, leveraging the portable Hitachi SEM to inspire and educate students across different age groups.

One of the outreach events of particular interest was the weekly National Organization for the Advancement of Black Chemists and Chemical Engineers (NOBCCChE) outreach for Frazier Elementary School. Every Friday, JSNN graduate students led interactive sessions with the students. Activities included: Scientific Demonstrations, Mentorship, Understanding the SEM and How it is Used, and Interactive Learning where students rotated through different stations focused on scientific discovery.

JSNN also hosted a variety of Summer Camps such as INRELPs and STEM GEMS (teaching scientific discovery to refugee girls), and Explorers (examining agricultural samples from farms to provide support and feedback).



Out of Door Academy

Sarasota, FL

The Scanning Electron Microscope spent the month of May at Lakewood Ranch High School and was shared between the chemistry, physics, biology, and environmental sciences classes. The integration of the Scanning Electron Microscope (SEM) has significantly enriched the educational experience across multiple disciplines.

In biology classes, students utilized the SEM to study the intricate details of various biological materials. In chemistry classes, the SEM was pivotal in material studies. Students examined the microstructure of different compounds and materials, analyzing their composition and properties. Physics students benefited from the SEM through exploration of material properties and surface physics, investigating how materials structures influence physical properties such as conductivity, magnetism, and elasticity. Environmental science classes leveraged the SEM to evaluate the composition of various soil samples.



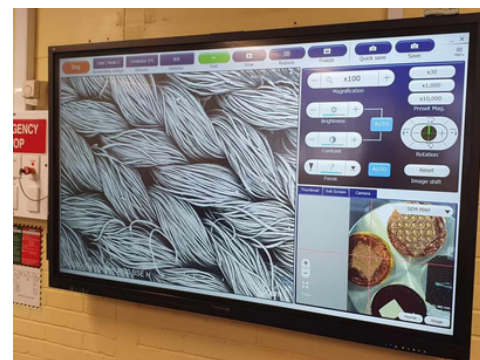
Newspec

Australia

The Australia region did much outreach during the first quarter. At Trinity College, 8th - 12th grade students learned how to prepare samples and operate the microscope. The students used Adobe Photoshop software to create artwork with the images they took using the TM4000 Plus.

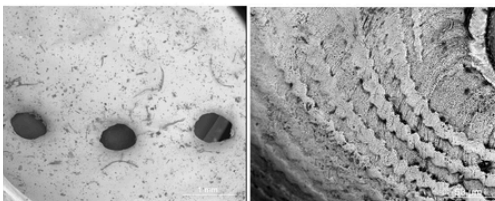
Students at Balaklava High School were encouraged to collect and bring their own samples to class creating much excitement among the students. Students quizzed each other to guess what the imaged item was.

Students at St Josephs School took a personal approach for the samples they provided - bringing samples of wool from their own sheep flocks to view in the SEM.



Hitachi Region Highlights

NxNW Up Close PUZZLE 82



The inside is very smooth. A little dusty but smooth. The outside is much more interesting in a SEM.
The Clues
1. It's marine and some are considered a delicacy.
2. While the inside is a little boring in a scanning electron microscope, it is full of reflected colour in the light. The outside is a little boring in the light but much more interesting in a SEM.
3. A unipod class of squidgy, often slimy, creatures with the decency to grow a coveted covering.

University of Victoria British Columbia, Canada

Dr. Elaine Humphrey always comes up with creative ways to engage students with the tabletop scanning electron microscope. In May, third grade students embarked on a remote “Whodunit” mystery adventure to figure out which suspect committed the crime using what specimen. Students were given clues tied to suspects and directed to study different specimens such as tea, pollen, sand, and hair linked to each of the suspects. Students connected with Dr. Humphrey virtually and were directed to draw the specimens they saw in the SEM. Armed with all of the clues and specimen images, students then worked to solve the crime. The activity was so popular, Dr. Humphrey decided to extend the activity to her weekly CBC radio program, NxNW Up Close.

In addition to the weekly radio spot and mystery activity, University of Victoria has kept the microscope busy with continued virtual labs for Arizona State University, a virtual art session and outreach with local schools.



Natural History Museum UK London

The tabletop scanning electron microscope at the Natural History Museum in London - affectionately named Mulder (from the popular television show “The X-Files”) always stays busy - mostly on loan to local schools for education outreach.

This quarter among other visits, the SEM visited Dover Grammar School for Girls. Dover school trained student ambassadors - the students who will be responsible for running the projects and showing the technology to the visiting primary schools. They have their own projects including one looking at chalk from different beaches around Kent.

While the SEM was on loan to Liverpool Life Sciences, the local teacher requested help with a diatom project. As those in the Hitachi Inspire STEM community know, Dr. Humphrey from University of Victoria is an expert in this area. In a true example of STEM communities, Dr. Ball connected the local teacher with Dr. Humphrey to help.



Natural History Museum Singapore

In addition to upcoming fall programming in collaboration with ExxonMobil (highlighted in this newsletter on page 2), the SEM at Hitachi Inspire STEM's newest region was featured in the museum's “Secrets of Extraordinary Microworlds” program. This program saw 100 participants in total, ranging in age from 7 years old to 50 years old, learning and engaging in lively discussions about how scientists classify biodiversity and discovering features of biodiversity that can only be seen clearly with high-powered microscopes like the TM4000Plus II.

In June, the museum hosted over forty staff members from Hitachi Asia and Hitachi High-Tech Singapore for Hitachi Family Day.



Hitachi Inspire STEM is Scheduling Remote Sessions for Fall 2024

The Hitachi Inspire STEM Education and Workforce Development Program is now scheduling Remote Sessions for Fall 2024 (September through December).

Remote Sessions include demonstrations of the TM4000Plus II SEM, workforce development

sessions, and remote access and use of the SEM. Sessions can include samples from our stock sample collection or samples that are collected by the remote organization and sent to HTA Inspire STEM staff. Sessions will utilize TeamViewer applications.



Maximize the learning experience with these instructional materials.

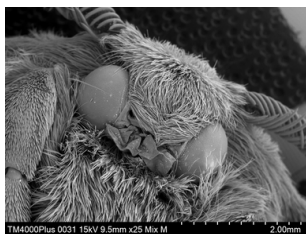
To request a Remote Session, go to www.inspirestem.com and click on “Request Access to Learning Lab” link on the STEM Outreach tab. Hitachi Inspire STEM staff will reach out to you for more details about your request.

[REQUEST ACCESS TO LEARNING LAB](#)



Resource Share

If your region has created unique programs, lesson plans, or teaching tools utilizing the tabletop scanning electron microscope, we would ask that you share them with our extended virtual STEM community of Hitachi Inspire STEM regions. Please share your best practices and teaching resources with Hitachi Inspire STEM staff.



Sample and Image Library

EOP staff are currently creating a sample library and would love your help! If you have samples you would be willing to share, please let us know! Please also be sure to label your images clearly so we can add them to the resource library.

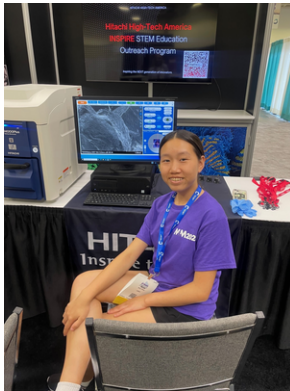


STEM Virtual Roundtable

Join us for our upcoming bi-annual STEM Virtual Roundtable. Hitachi Inspire STEM regions are asked to come together twice a year, to catch up on current projects, meet new regions, and see how we can help each other grow. Here are the details:

- Date: September 19, 2024
- Time: 3pm-4pm
- Teams Virtual Meeting
- All regions - past and present - are invited to attend.
- Let's connect and grow our STEM communities!

Past and present regions are encouraged to attend the Virtual Roundtable. There is always so much information to share. We find that new connections and collaborations are made at each of our roundtables. These roundtables are one of most valued events for resource sharing.



Hitachi Inspire STEM Education Outreach Program heads to the Microscopy & Microanalysis Conference in Cleveland, OH

The Hitachi Inspire STEM EOP team is gearing up for an exciting week at the Microscopy & Microanalysis Conference - July 28th through August 1st in Cleveland, Ohio. Hitachi High-Tech America is sponsoring two TM4000Plus II tabletop scanning electron microscopes at M&M this year - one in the Microscopy Society of America Mega Booth and one in the Oxford Instruments Booth - highlighting an EDX (Energy Dispersive X-ray) on loan to the STEM program from Oxford Instruments.

Hitachi Inspire STEM staff has been meeting with MSA Education Outreach staff as well as professors at Kent State University and Case Western Reserve University to prepare outreach opportunities for high school students attending a summer microscopy program. These students will participate in a remote demonstration of the tabletop SEM followed by an in-person, hands-on activity with the tabletop SEM on the floor of the Microscopy & Microanalysis Conference.

Lori Harvey, Hitachi Inspire STEM Senior Manager will be hosting a STEM Roundtable session entitled "Building Skills for the Future". This session will seek to connect microscopy industry professionals and educators to discuss the importance of STEM education for students and workforce. This conference will be an exciting opportunity to highlight the excellence of the Hitachi Inspire STEM Education program.

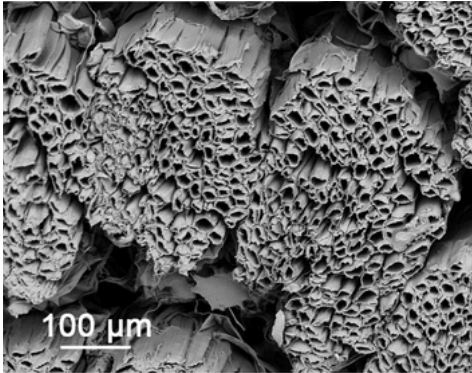
Thank you for reading!

HITACHI INSPIRE STEM PROGRAM

www.inspirestem.com

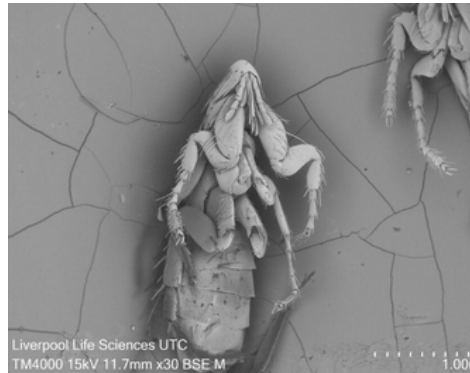
Image Gallery

Images using the TM4000Plus by students in our current STEM regions.



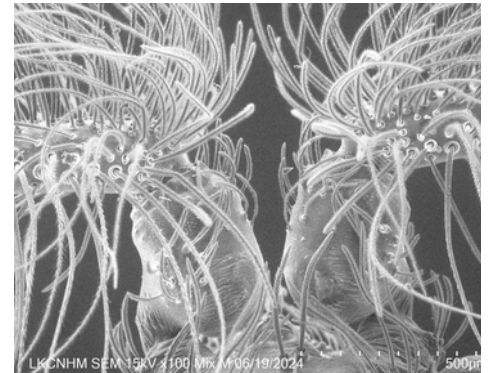
Banana Peel

University of Victoria



Flea

Natural History Museum UK



Hemiptera Antennae

LKC Natural History Museum Singapore



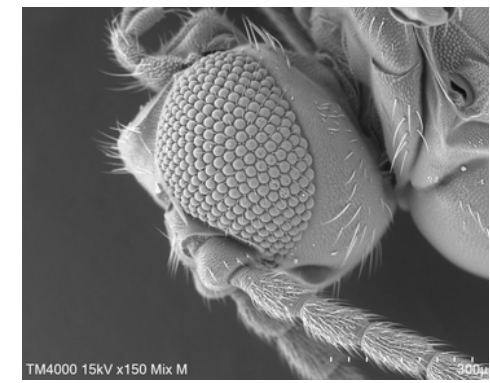
Hard Coral

Out of Door Academy



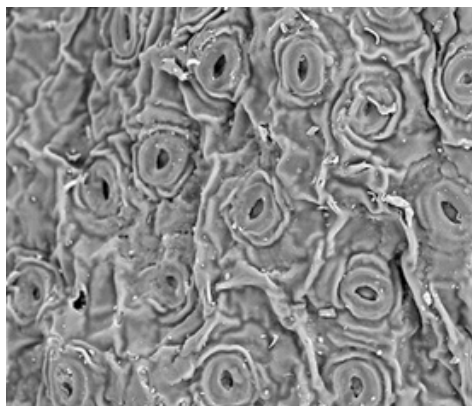
Armored Scale

North Penn High School



Ant Compound Eye

Brentwood High School



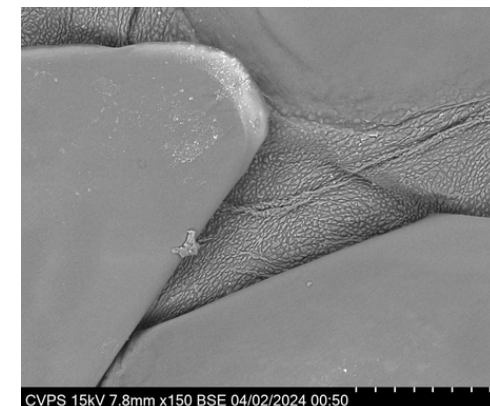
Tea Leaf

University of Victoria



Termite Mandibles

LKC Natural History Museum Singapore



Snake Skin

Newspec Australia
