University of Hawai‘i System
STEM Pre-Academy End of Year Report 2024-2025

Hawai‘i STEM at Hand

UNIVERSITY of HAWAI‘I® SYSTEM

STEM PRE-ACADEMY

STEM Pre-Academy is administered by the Office of the Vice-President for Research and Innovation (OVPRI), UH System. OVPRI oversees and facilitates research activities, supports innovation, and disseminates research results. STEM Pre-Academy supports OVPRI's mission, working across the UH System and serving teachers statewide. Our work with the UH research community includes researchers, instructional faculty, staff, students, administrators, and other employees and partners.

Director's Message

At our STEM Pre-Academy office in Mānoa, we have shelves and bins full of our Lending Library items. As we have spent time over the course of the past school year doing inventory and organizing, there have been moments of chaos, where every flat surface was covered in equipment, tools, sensors, and boxes. Out of that temporary disarray has come a new inventory and ordering system, the retirement of broken and unused items, and the addition of a number of new kits and products to our website.

In some ways, that process is representative of this year overall. STEM Pre-Academy has worked together to look at what we do and how we do it, and to figure out a new path forward. We still have work to do, but I think we are on a great trajectory moving into the next school year! Mahalo to our STEM Pre-Academy team members Steven Brown, Edwin Colón, and Nicole Saito for their role in the accomplishments outlined in this report and the behind-the-scenes work that makes it all possible.

Our small but mighty STEM Pre-Academy team is fortunate to be backed by the University of Hawai'i Office of the Vice President for Research and Innovation. Both Interim Vice President Chad Walton and University of Hawai'i at Mānoa Interim Provost Vassilis Syrmos have supported our work and encouraged us to strengthen our connections to research and innovation throughout UH's ten-campus system.

I deeply appreciate the patience and dedication of our STEM Pre-Academy community of teachers and collaborators as we try new things! If it's been a while since you checked in with us, I encourage you to take a look at our updated Toolkit for Teachers Lending Library and sign up for our mailing list. We have more in the works and we hope you'll join us!

Me ka ha'aha'a,

Lauren Kaupp, MS, EdD

Director, STEM Pre-Academy

Our Vision

Hawai'i's community of K–12 students and teachers are inspired by the science, technology, engineering, and mathematics (STEM) research and innovation of the University of Hawai'i System (UH System), igniting their STEM passions, growing their expertise, and envisioning their own futures in our islands.

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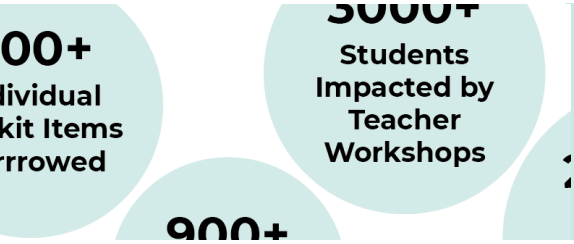


Year at a Glance

In the 2024-2025 school year, STEM Pre-Academy made strides to continue our work of empowering teachers and students throughout the state of Hawai‘i, while also sharpening our vision and mission to grow our program into the future by developing and publishing a new Strategic Plan.

In the past year, we leaned into our mission by:

- Engaging educators directly through in-person workshops
- Offering our free Toolkit For Teachers Lending Library
- Hosting a statewide network of hubs for Center for Microbial Oceanography Research and Education (C-MORE) toolkits
- Distributing digital resources and outreach

This allowed us to assist educators in providing engaging, high-quality STEM learning experiences for thousands of students statewide. Partnerships with UH faculty and staff allowed us to highlight UH research and innovation to inspire the next generation of scientists, engineers, and problem solvers.

Our Mission

STEM Pre-Academy fosters student interest, engagement, and learning in STEM by connecting University of Hawai‘i (UH) research and innovation with K–12 classrooms.

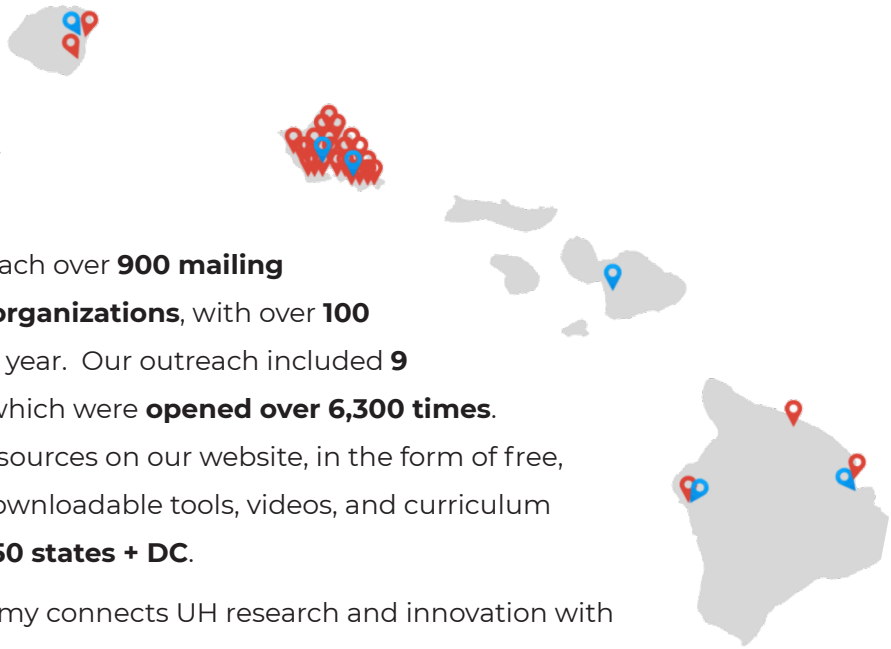
We offer tools and resources, access to expertise, and learning opportunities for teachers, specifically focusing on Hawai‘i public schools for grades 3–8.

Our Reach

STEM Pre-Academy is based in Mānoa in Honolulu. We have C-MORE hubs on Kauaʻi, Oʻahu, Maui, and Hawaiʻi Island.

This year, we actively worked with **44 schools** on Oʻahu, Hawaiʻi Island, and Kauaʻi. As part of our goal to expand our reach and impact across the state, we reached out to increase the number of elementary schools participating with us. Through our initiatives, we seek to make steps toward a more equitable and innovative STEM education community statewide.

In the map on the right, red pins are our active schools and blue pins are our C-MORE hubs.



We expanded our online presence to reach over **900 mailing list subscribers** from **177 schools and organizations**, with over **100 new subscribers** over the course of the year. Our outreach included **9 newsletters and 11 workshop emails**, which were **opened over 6,300 times**. The STEM Pre-Academy hosts digital resources on our website, in the form of free, high-quality resources, in the form of downloadable tools, videos, and curriculum guides, which were **accessed from all 50 states + DC**.

As part of our mission, STEM Pre-Academy connects UH research and innovation with K–16 educators. In the 2024–2025 school year, we worked with faculty and staff from across the UH System to plan, create, and facilitate STEM outreach resources and opportunities. Our collaborations reached **two community colleges, the University of Hawaiʻi at Hilo (UH Hilo), and more than 10 departments and units at the University of Hawaiʻi at Mānoa (UH Mānoa)**.

By the Numbers - This Year

44
Active Schools

200+
Teacher Interactions

800+
Individual Toolkit Items Borrrowed

900+
Newsletter Subscribers

3000+
Students Impacted by Teacher Workshops

20,000+
Student Interactions with Lending Library Items

Learning Opportunities for Teachers

STEM Pre-Academy believes that learning opportunities for teachers can build their pedagogical, technological, and content knowledge, while also inspiring and energizing them. We play a variety of roles in offering teacher workshops, from developing and delivering new offerings to promoting UH broader impact and outreach efforts.

This year, STEM Pre-Academy hosted or assisted with workshops for teachers with topics including solar design, biomimicry and 3D printing, deep-sea ecology, artificial intelligence (AI), Newton's Laws, and waves, reefs, and coastal resilience. Through these workshops, we reached **100 teachers and over 3000* students**.

This year marked a shift in how we systematically collect workshop feedback. Our preliminary findings indicate that participants overwhelmingly find our opportunities interesting, useful, and relevant to their work. Moving into the next year, we will continue to collect and use feedback data to guide our work.

Learning how to use Tinkercad and work with 3D printing was incredible. The fishhook activity connected culture and STEM in a creative way.

I also liked how we were introduced to new resources that we can directly use in our classroom -- very practical. Particularly, we were introduced to a technological resource that incorporates design, modeling, simulation, and AI -- it's very cutting edge and helps keep us up to date with the constant technological advances that are happening.

UH Highlight

STEM Pre-Academy worked with our UH colleagues in a number of ways including designing workshop sessions, recruiting teachers, hosting workshops in our space, and serving as co-presenters. Over the course of the spring semester, we worked with researchers, graduate, and undergraduate students to design a one-day workshop, "Waves, Reefs, and Resilience" for middle school teachers, which took place in April. As a collaborative team, we worked together to create the workshop and design activities that took teachers through a sequence of basic wave concepts, ocean wave generation and propagation, wave energy, and the role of healthy reefs in protecting the coastline. Ning Li and Lucia Hosekova received a CASA grant for the development and implementation of the workshop, which allowed us to provide teachers with take home supplies and add wave demonstration items to our STEM Pre-Academy Lending Library.

**Student impact is estimated on teacher-reported class sizes.*

Tools and Resources

Our tools and resources are provided free of charge to teachers in order to give students opportunities to use scientific and technological tools and help teachers in fostering those experiences.

Our Toolkit for Teacher Lending Library contains over **160 types of technology and hands-on resources** ranging from individual PASCO sensors, to deep-sea ecology and other thematic toolkits, to MakerBot Sketch 3D Printers. This year, **105 unique item types** were borrowed, with a total of **129 borrows** of nearly **900 individual items** by **60 teachers**. Based on teacher reporting, this represents over **20,500 student interactions** with Lending Library items.

In addition to the physical items in our Lending Library, our digital resources were **accessed over 29,000 times** this year.

Over the next year, we are prioritizing ensuring that our resources are accessible and useful to educators.

> *Thank you for your flexibility in providing an opportunity to borrow these tools—it really enhanced our lab activities.*

> *These resources were SO SO HELPFUL! The students were so engaged, and it made our project work much easier.*

UH Highlight

While our lending library resources are primarily borrowed by K–12 classroom teachers, they are also available to faculty for classroom teaching and outreach. Our tools were used this year by faculty and staff at UH Mānoa in the College of Engineering, School of Ocean and Earth Science and Technology, and the Department of Information and Computer Science, as well as from the UH Hilo Kahuawaiola Hawaiian and Indigenous Teacher Education Program. Events included Discover Mānoa, Onizuka Day, the Bishop Museum Science and Sustainability Festival, Girl Scouts, and classroom teaching.

This year we worked with UH researchers to develop new resources to add to our lending library. This year, we added or refined a number of UH-related resources, including:

- Wave Energy Buoys in collaboration with Dr. Troy Heitmann
- Coral Reef Wave Energy Kit in collaboration with Dr. Lucia Hosekova
- Solar Trackers in alignment with solar design with Dr. Aaron Hanai
- Demo Weather Station in collaboration with Dr. Alison Nugent
- Deep Sea Ecology Kit in collaboration with Dr. Jeff Drazen
- Wave Demo Kit in collaboration with Dr. Ning Li

Community Building

We believe that building and sustaining a network of educators, along with a culture of sharing and learning together, amplifies the impact and effectiveness of our work. This drives us to provide relevant and responsive communication through our website, newsletters, outreach events, and direct communication with multiple collaborators and to facilitate opportunities to bring together the UH research community and K–12 teachers and students.

We strive to both intentionally and naturally build relationships within our community of teachers. Our workshops provide teachers with the opportunity to learn from each other in addition to workshop facilitators. Feedback consistently shows that teachers value this approach:

Hands-on learning and meeting other educators really made this workshop impactful.

The discussion between different teachers was so valuable—hearing how others apply STEM concepts inspired me.

I liked the massive collaboration between departments, researchers, and teachers.

In addition to workshops for teachers, we made a concerted effort this year to reach teachers where they are. We met nearly 100 teachers at local conferences and school information sessions. Our staff provided direct assistance to approximately 30 teachers through site visits to provide technical support and follow-up.

UH Highlight

Our work sustains a network of K–16 educators, researchers, and community members. We have leveraged this network to recruit teachers and students for a variety of UH-sponsored workshops, events, and research opportunities.

STEM Pre-Academy has helped connect faculty and graduate students to share their expertise with teachers and students in their schools. Our staff have provided professional service to UH by sitting on committees, conducting grant reviews, giving input and feedback to grant proposals, and providing letters of collaboration.

Together with Anthony Ching, director of Federal Relations for the UH System, STEM Pre-Academy convened a group of K–12 STEM outreach providers to meet with U.S. Senator Mazie Hirono. The group shared with Senator Hirono some of the many ways in which UH provides STEM education and outreach to K–12 students and teachers. This meeting was the first opportunity for some of the departments to learn about others' outreach initiatives and served as a springboard for a future convening of a UH System STEM School Engagement Network.

An important part of our STEM Pre-Academy community is our student interns. This group of undergraduate student employees works with us to develop tools and resources for teachers and provide K–12 STEM outreach. In the 2024-2025 school year we had seven interns.

- Erik Bendickson, Electrical Engineering (2026), Kapiʻolani Community College/UH Mānoa
- Rona Lei Duldulao, Mechanical Engineering (2026), UH Mānoa
- Chris Kaneshiro, Earth Sciences and Planetary (2026), UH Mānoa
- Skyler Padamada, Mechanical Engineering (2025), UH Mānoa
- Walker Sun, Mechanical Engineering (2027), UH Mānoa
- Corey Taoka, Mechanical Engineering (2024), UH Mānoa
- Kailah Reign Vergara, Civil Engineering (2025), UH Mānoa

Skyler, Corey, and Kailah Reign graduated this year from the UH Mānoa College of Engineering! Congrats to them!

Chris, Rona, and Erik took part in exciting research and internship programs outside of STEM Pre-Academy. Rona and Erik were part of the award winning University of Hawaiʻi Team ʻĀINA Farm Robotics Group. Over the summer, Chris completed an internship with the University of Hawaiʻi & University of Washington Materials Research and Education Consortium (MRE-C) in Washington state. Rona went to Laramie, Wyoming for the University of Wyoming Undergraduate Summer Research on Controlled Environment Agriculture (CEA). Erik completed the Hawaiʻi P3I 2025 Summer Intern Program with the Naval Information Warfare Center Pacific (NWIC-PAC).

As we move into the next school year, our goal is to facilitate more connection and interaction within our network.

Join Us!

Stay Informed

- Keep up with all of our newsletters, upcoming events, and news stories on our website
- Join our mailing list to be the first to know about opportunities
- Check out our teacher resources

Reach Out

Have questions, suggestions, or want to collaborate? Contact us any time at stempre@hawaii.edu!

Support Our Work

Help support STEM Pre-Academy strategic initiatives and activities which advance STEM outreach in Hawai'i, with an emphasis on providing access to innovative programs, initiatives, and resources for K-16 teachers and students. Approaches will include teacher and student engagement with UH undergraduate students, graduate students, and faculty, as well as research and entrepreneurial-inspired industry and community partnership.

Give through UH Foundation - https://go.hawaii.edu/zoD

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