HPA
Hawai'i Preparatory Academy

THE MICHAEL AND JEANNETTE SAALFELD

ENERGY LAB

THINK. MAKE. DO.

ENERGY LAB

A Living Laboratory at HPA

Opened in 2010 and guided by a donor family's vision to create a place where students develop solutions to the environmental challenges their generation will inherit, the Energy Lab is a fully integrated research and learning hub unlike any traditional classroom.

Located on HPA's Upper Campus in Waimea, the Energy Lab is a zero net-energy, fully sustainable facility where students learn about alternative energy systems through direct, hands-on experience. Purposefully designed to support project-based learning, the Lab offers flexible spaces for collaboration, research, prototyping, and experimentation — both indoors and out.

A MODEL OF SUSTAINABLE DESIGN

- **Net-zero energy:** The Energy Lab produces as much energy as it consumes annually through on-site photovoltaic systems and other renewable sources.

- **LEED Platinum & Living Building Challenge certified:** Among the most rigorous sustainability standards in the world, reflecting HPA's deep commitment to environmental responsibility and educational excellence.

- **Integrated environmental systems:** Students actively engage with real-time systems for solar energy, natural ventilation, water management, and energy monitoring, turning the building itself into a living classroom.

RESEARCH & ACADEMIC PATHWAYS

The Energy Lab supports students across disciplines, skill levels, and interests.

Courses & Programs in the E-Lab Include:

- Independent Science Research (ISR)
- Capstone Projects
- Island Science (geology, astronomy, oceanography, navigation, and more)
- AP Environmental Science
- Computer Engineering
- Cybersecurity
- Animation, digital modeling, and fabrication

ISR is the most flexible pathway, allowing students to design original projects while accessing advanced tools, faculty mentorship, and external research partners.

Coming Soon:

- AP Cybersecurity
- AP Computer Networking (College Board pilot courses)

LEARNING THROUGH REAL PROJECTS

Students in the Energy Lab work on projects that matter — many with direct impact on Hawai'i Island and beyond.

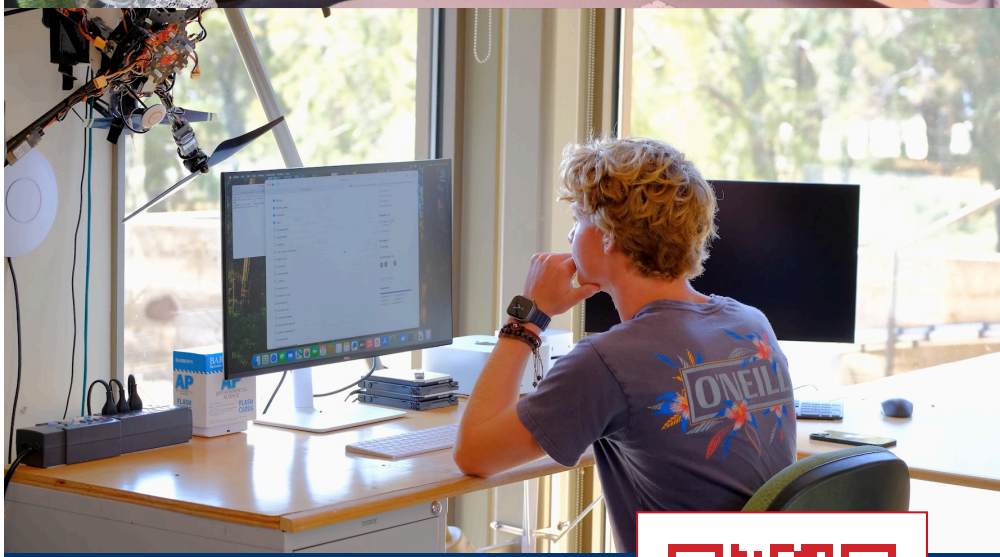
Current and Ongoing Projects Include:

- Solar-powered internal AI server (Project Tailwind)
- Tsunami research partnership with the Pacific Tsunami Warning Center
- Local earthquake monitoring as part of the Raspberry Shake Network
- Volcanic air quality monitoring in partnership with PurpleAir
- Emergency-resilient solar text network using Meshtastic
- Community emergency communications via inter-island radio networks
- Campus and community weather station network (Windy & Tempest)
- Drone deployment of remote fire sensors to monitor wildfire escape routes
- Space weather tracking as part of satellite research projects
- Hydroponics research to reduce rat lungworm propagation
- Recycling plastics into filament for 3D printers
- Virtual reality environments connected to live data systems
- 3D modeling, animation, and digital fabrication using printers and laser cutters
- Drone research evaluating solar panel performance for homeowners

COLLABORATIONS THAT EXPAND LEARNING

The Energy Lab hosts collaborative projects with leading research institutions — always with one requirement: students must have access to the data and the researchers.

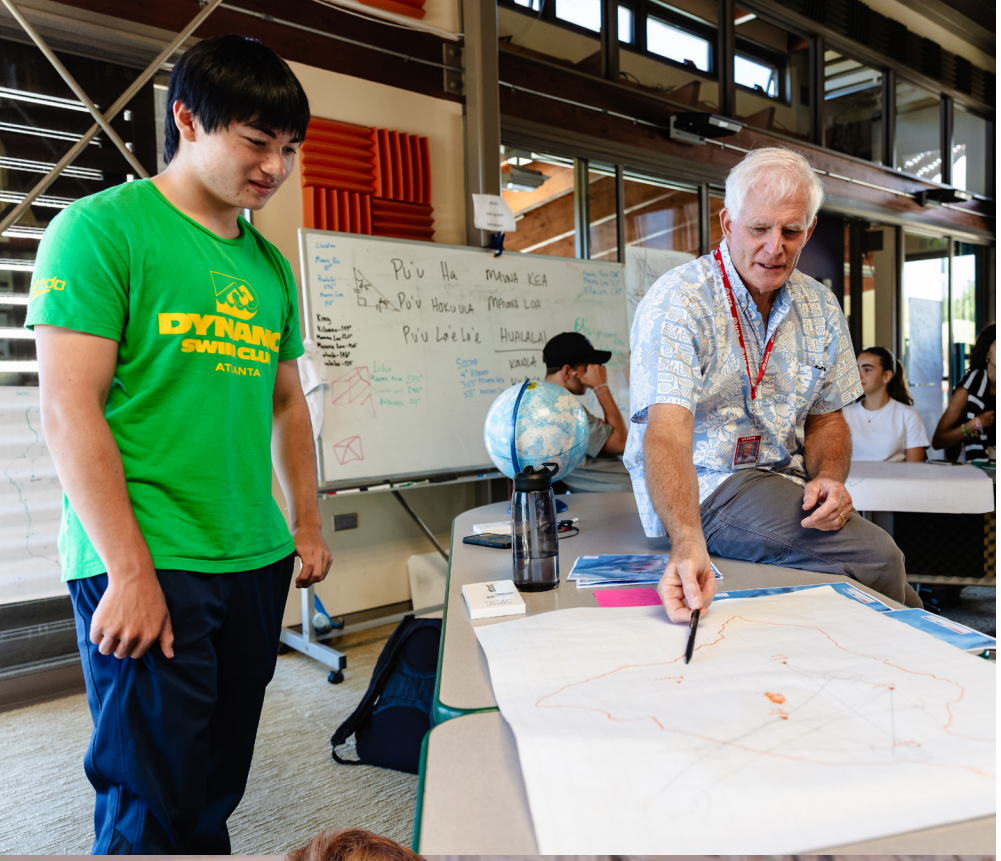
Partners include:
NASA, Cornell, MIT, Caltech, UC Berkeley, Cal Poly, and more.



"This space gave me the freedom to explore ideas that don't fit into a traditional curriculum."

Kelan K. '26

SEE HOW CURIOSITY BECOMES DISCOVERY



"The Energy Lab empowers students to explore what's possible—and then build it."

Philipp G. '27

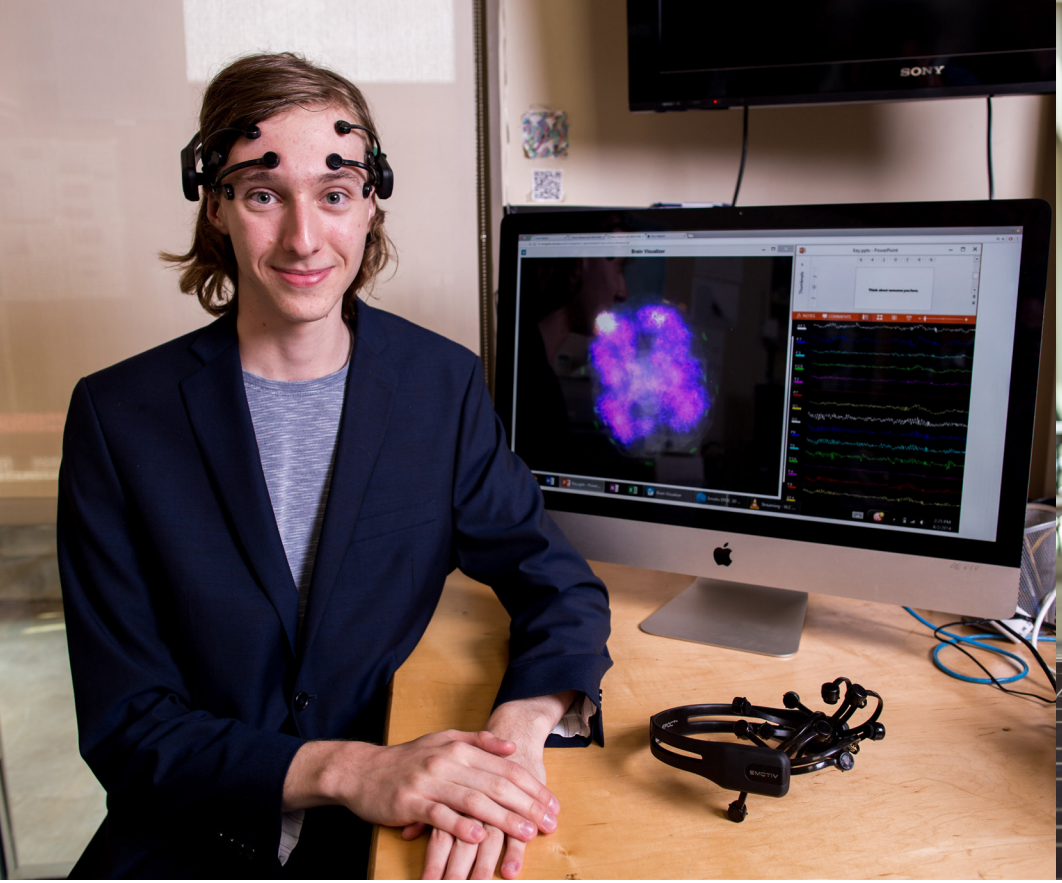
SEE HOW STUDENTS TURN IDEAS INTO ACTION

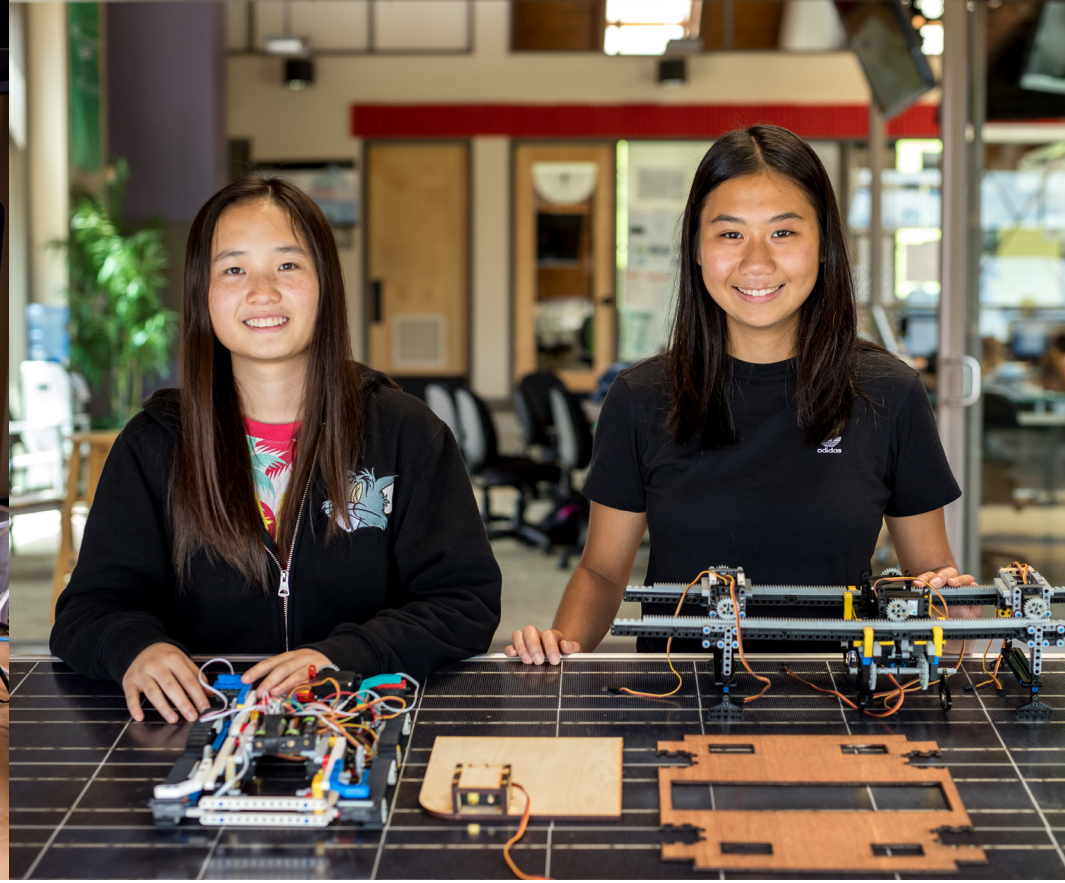
DESIGNED FOR HOW STUDENTS LEARN BEST

The Energy Lab was intentionally designed to move beyond traditional classroom norms. With no "front" of the room, learning happens in the round around a triangular table layout inspired by early humans gathering around a fire, with shared screens at the center to promote collaboration. Natural light fills the space, double-glazed glass walls provide sound control without isolation, and a curved, Polynesian-inspired roof supports natural ventilation. Smart building systems monitor CO_2 levels to enhance focus and learning, while workshop tables made from reclaimed roof beams reflect the Lab's commitment to sustainability and thoughtful design.

PURPOSEFULLY SET APART

Energy Lab's location is part of the learning. Just a short walk from the heart of campus, the eLab feels intentionally removed from the everyday flow of school life, creating space to think differently. With direct access to wind and solar energy, wide-open areas for field research, and opportunities for outdoor experimentation, it's a place built for testing ideas in real-world conditions. This separation isn't about distance, but perspective — inviting students to step beyond traditional classroom boundaries and into a learning environment that encourages exploration, creativity, and reimagining what education can be.





FREQUENTLY ASKED QUESTIONS

How can my child access these projects?
Students engage with the Energy Lab through Independent Science Research (ISR), Capstone projects, and courses such as Island Science, Computer Engineering, Cybersecurity, and AP Environmental Science. ISR is the most flexible pathway, allowing students to design a project around their own interests while receiving mentorship and access to the Lab's tools and resources.

What computer science options are available?
In addition to ISR and Computer Engineering, HPA offers Cybersecurity and is piloting two future College Board courses: AP Cybersecurity and AP Computer Networking. Students interested in independent or advanced computer science projects often find ISR to be the best entry point.

Can families or alumni visit the Energy Lab?
Yes! Tours are welcome when they do not interfere with classes. We enjoy sharing how the Energy Lab supports hands-on learning and continues to evolve as part of HPA's commitment to innovation and sustainability.

How does the Energy Lab connect to HPA's broader mission?
The Energy Lab reflects HPA's belief in experiential learning, environmental stewardship, and preparing students to think critically about the world they will inherit. It is a living example of the school's commitment to learning that is rigorous, relevant, and deeply connected to place.

HPA

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