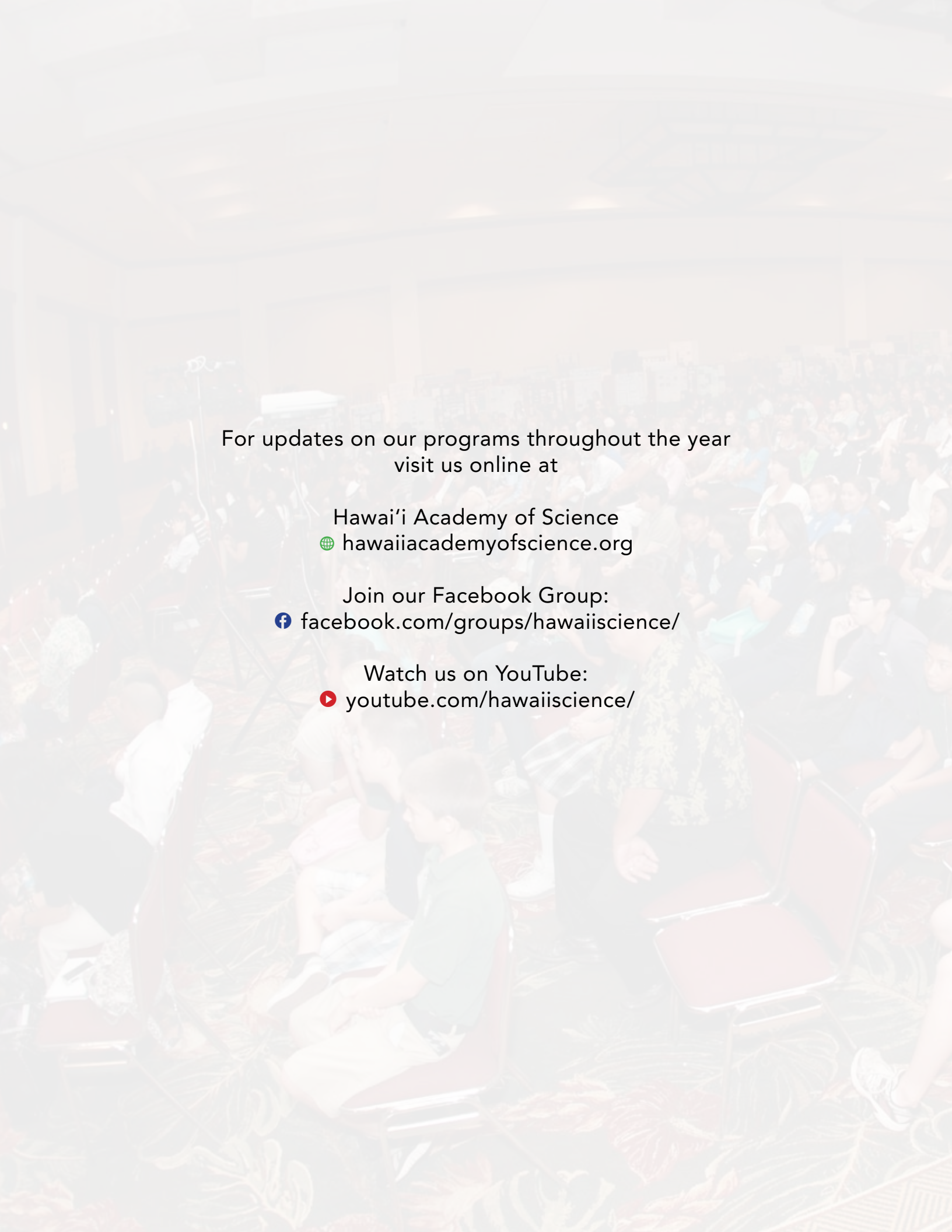


Promoting Science Education and Research in Hawai'i and the Pacific Rim

HAWAI'I ACADEMY OF SCIENCE



Annual Report 2012



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A Message From Our Board Chairman

In today's global economy, the vital importance of science education for our youth has become increasingly more evident. The people of Hawai'i understood this even back in 1925 when the Hawai'i Academy of Science made it its mission to promote science education in Hawai'i and the Pacific. For eighty-seven years, the Academy has sponsored educational programs for professional scientists and students alike, and today it continues to support STEM education in Hawai'i with the Pacific Symposium for Science and Sustainability, Science Café, STEM Week, and our flagship program, the Hawai'i State Science and Engineering Fair.

These science education programs are tremendously popular. Each year 7000 Hawai'i public and private school students participate in the science fair at the district level, with approximately 500 progressing to the state level. The Pacific Symposium for Science and Sustainability attracts the brightest students from across the Pacific Basin. Science Café provides a stimulating public forum for scientific discourse. Our newest endeavor, STEM Week, recognizes excellence in our students, schools, and businesses in the areas of science, technology, engineering, and mathematics.

But despite the success of these programs, budget cuts from the economic downturn resulted in the complete loss of our state funding three years ago. For the first time we would need to find our own funding for our educational programs, mainly from local businesses and supportive individuals from the community. As a private non-profit organization with no government support, it is a miracle we have survived these past few years. We have significantly scaled back our budget, but without new sources of financial support we will not be able to continue to support our programs in the future.

As hard as it is to imagine, in two years we may no longer have a state science fair. For many students, working on a science fair project can become a turning point in their lives. It personalizes science, transforming it from something "other people" do, to something in which they themselves actively participate. It ignites the spark that turns an undirected student into one who has found a passion for learning. Without a science fair, there may be lost opportunities we will never know about. Now more than ever we need each of our students to fulfill his or her potential, especially in the sciences.

If you share our belief that the science fair is worth saving, please help. Contact your local and state representatives. Spread the word that we are in desperate need of support. I am hopeful that with increased awareness we will be able to raise enough funds to run our state science fair and other STEM activities in Hawai'i for many years in the future.

I would like to express my deepest appreciation to the thousands of dedicated individuals who support the state science fair and other STEM activities in Hawai'i: the parents, teachers, judges, business leaders, and countless other members of our community. I would also like to express my thanks to the Staff and Board of Directors of the Hawai'i Academy of Science for their tireless efforts to advance STEM education in Hawai'i.

Mahalo nui loa,
Neal H. Atebara, M.D.
Chair, Board of Directors
Hawai'i Academy of Science



Neal Atebara
Chair, HAS Board of Directors



HAWAI'I ACADEMY OF SCIENCE

Our Mission

Hawai'i Academy of Science (HAS) is a private, non-profit organization founded in 1925. The mission of HAS is to promote education and scientific research in Hawai'i and the Pacific Region. The Academy is particularly interested in linking organizations with research, educational, and business interests related to science and technology.

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HAS Project Reports

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Hawai'i State Science & Engineering Fair (HSSEF 2012)

On the surface, the 55th Hawai'i State Science and Engineering Fair (HSSEF) may appear similar to the previous two years. On April 2–4, 2012 at the Hawai'i Convention Center, approximately 600 students representing 87 schools competed for approximately 450 awards spanning over the seventeen categories of science and engineering. Twenty-four of these students went on to attend the International Science and Engineering Fair (ISEF) and proved themselves as capable competitors on the global science arena (see report on page 10).

Yet, despite the statistical similarities to past years, each science fair is very different. As every teacher knows, though the number of students in their classes may be consistent each year, “group personalities” are unique. HSSEF is comprised of hundreds of students, teachers, volunteers and supporters that come and go over the years. Every year is a very different experience for all of us who work together on this premier event.

The science fair cannot continue without the foundation of the Hawai'i Academy of Science and the year-long program it supports. The HAS Board of Directors and the three-person operations staff facilitate and guide the science fair program—raising funds, assisting districts, presenting teacher workshops, recruiting mentors, judges and other volunteers—putting into place the framework that is essential to the Academy's educational commitment.

Also critical to the success of the HSSEF are the dedicated and generous efforts of the volunteers, ranging from students to educators, engineers and scientists, who donate their time and expertise to staff the many positions required for the fair. Without their assistance it would be impossible to execute the myriad duties judging, supervising, setting up and evaluating projects for the duration of the 3-day event. We deeply appreciate their support and willingness to work long and tirelessly for the keiki.

Funding for the state science fair has always been a challenge, and our responsibility is to provide excellent educational programs as well as expanding our reach throughout the state. As the Hawai'i Academy of Science continues to seek new sources of funding, partnerships and volunteers, and we request the help of the community in these efforts. We welcome your input and assistance, and appreciate your partnership in our commitment towards strengthening science and engineering education for Hawai'i's youth.

Carolyn Kaichi
HSSEF Director



Above: First Place Chevron Poster & Cover Contest winning entry from Von Dickens Ulsa of Farrington High School. His design will decorate the cover of the 2013 HSSEF Program. The theme for this past year's contest was Energy & Transportation.

Middle: Emcee Justin Cruz (KHON2) had fun "photobombing" during a break in the awards ceremony.

Right: The 55th Hawai'i State Science & Engineering Fair logo featured on pins and t-shirts given to participating students.



Top: At the Opening Ceremony students were shown interviews with past HSSEF winners as they talked about their experiences as participants.

Above: The Junior Display and Junior Research divisions, which include grades 6–8, are where the majority of first time entrants get their earliest science fair experience.

Left: Emcees Justin Cruz (KHON2) and Hi'ilani Shibata entertained the audience of parents and students at the HSSEF Awards Ceremony held on April 4, 2012.



International Science & Engineering Fair (ISEF 2012)

The Intel International Science and Engineering Fair (Intel ISEF), the world's largest international pre-college science competition, provides an annual forum for more than 1,500 high school students from about 70 countries, regions, and territories to showcase their independent research as they compete for over \$3 million annually. The Intel ISEF is the premier global science competition for students in grades 9–12.

Society for Science & the Public is honored by Intel's commitment to the Intel ISEF through 2019.



ISEF 2012, held in Pittsburgh, PA from May 13–18, brought together a delegation of twenty-four students and twelve teacher-chaperones from all over Hawai'i. The Hawai'i contingent traveled as a group led by the Hawai'i Academy of Science (HAS) to this year's beautiful and historic host city. The competition was held at the David L. Lawrence Convention Center in downtown Pittsburgh, and featured many activities, highlighted by social events at locations such as the Carnegie Science Center and Heinz Field. These diverse activities gave the students a wonderful opportunity to participate in ISEF 2012 as a multifaceted experience.

It is almost impossible to describe the ISEF experience and the impact on those who attend. The eight days of travel and experiences are long and intense, but everyone takes away unique, positive and life-influencing perspectives. Students as well as teachers form lasting friendships with

each other and maintain those bonds through college and beyond. Teacher and student alumni who have attended ISEF share their insight on the following pages. Most are in college today, were attendees at multiple ISEFs, and are pursuing academic science and engineering degrees.

One student, Viola Mocz, is a junior at Millilani High School this year. What distinguishes her at her younger age is the fact that she is the third child in her family to attend and win at ISEF. Both her siblings are past winners at HSSEF and ISEF, and are now students at Harvard studying in the sciences. It appears Viola is on a similar path, as she took First Place in this past HSSEF and also won awards at ISEF. Their Mocz's high school teacher, Dr. Namthip Sitachitta, is also highlighted as the HAS Teacher of the Year (page 21). We hope you will find theirs and all the following narratives interesting and inspiring.

The 2012 Hawai'i ISEF Delegation & Award Winners

Hawai'i State Science & Engineering Fair:

| | |
|------------------|----------------------|
| Danten Inouye | Waipahu High School |
| Travis Le | Punahou School |
| Alec Matsumoto | Kamehameha Schools |
| April-Joy McCann | Mililani High School |
| Kyle Yoshida | Kamehameha Schools |

Central Oahu:

| | |
|-----------------------------------|----------------------|
| Abraham Kwan | Moanalua High School |
| Viola Mocz | Mililani High School |
| Marc Siler & Danielle Terukina | Mililani High School |

Hawai'i County:

| | |
|---------------------|------------------|
| Shalila de Bourmont | Hilo High School |
|---------------------|------------------|

Kauai County:

| | |
|----------------|--------------------|
| Savanah Frisk | Kapaa High School |
| Kayla Ishida | Waimea High School |
| Noelani Murray | Kauai High School |

Leeward Oahu:

| | |
|---------------|-----------------------|
| Erik Wessel | Hale Kula Home School |
| Jennifer Wong | Kapolei High School |

Maui County:

| | |
|--|---------------------|
| Moriah Jenkins | Molokai High School |
| Sage Trudeau, Travis Taylor & Dominic Mills | Seabury Hall |

Windward Oahu:

| | |
|----------------|--------------------|
| Rebecca Weible | Castle High School |
|----------------|--------------------|

Hawai'i Association of Independent Schools:

| | |
|---|--------------------|
| Logan Davis, Kyle Flores & Erin Main | Iolani School |
| Danielle Keahi | Kamehameha Schools |

Additional Delegation (not shown)

Teachers, Fair Directors and Coaches:

| | |
|----------------------|----------------------------|
| Carolyn Kaichi | Hawai'i Academy of Science |
| Jon Asato | Hawai'i Academy of Science |
| Gareth Wynn-Williams | Hawai'i Academy of Science |
| Mark Adato | Campbell High School |
| James Cox | Kapaa High School |
| Robert Hutchison | Kamehameha Schools |
| Gail Ishimoto | Kamehameha Schools |
| Heidi Jenkins | Maui District |
| Scott Parker | Jefferson Elementary |
| Namthip Sitachitta | Mililani High School |
| Aaron Tsuha | Castle High School |
| Nel Venzon | Mililani High School |

ISEF Grand Award Winners

2nd Place - Life Sciences (\$1500)

Danielle Lyn Keahi, 18

Kamehameha Schools, Kapalama

"Characterization of Cerebellar Phenotype in Mice with Mutated *Rreb 1*"

4th Place - Life Sciences (\$500)

Alec Kaipo Takeshi Matsumoto, 17

Kamehameha Schools, Kapalama

"The Regulation of Length-Dependent Myosin Light Chain Phosphorylation in Bladder Smooth Muscle"

4th Place - Life Sciences (\$500)

Shalila Shek de Bourmont, 17

Hilo High School

"Medicinal Profiling of *Colletotrichum boninense*, a Fungal Endophyte Derived from *Clermontia parviflora*, an Endemic Hawaiian Plant"

ISEF Agency Special Award Winners

First Award of \$1,000 (Plus \$500 School Award & \$250 Mentor Award) from the Acoustical Society of America

Savanah Quinn Frisk, 16

Kapa'a High School

"Who Do You Listen To? An Exploration on the Effects of Age and Gender on Listening Comprehension"

Second Award of \$2,000 from NASA

Second Award of \$1,500 from Air Force Research Laboratory

Erik Keoni Wessel, 18

Hale Kula Home School

"Simulating Orbital Dynamics & Planetary Collisions in a Video Game"

Second Award of \$2,000 from the Consortium for Ocean Leadership

Erin Lynn Main, 17, 'Iolani School

Logan Keahi Davis, 17, 'Iolani School

Kyle Randolph Miki Flores, 17, 'Iolani School

"The DOCTORS: A Fusion of Engineering and Biological Analysis"

All-Expense Paid Trip to Tour CERN from the European Organization for Nuclear Research-CERN

Certificate of Honorable Mention, American Association of Physics Teachers and the American Physical Society

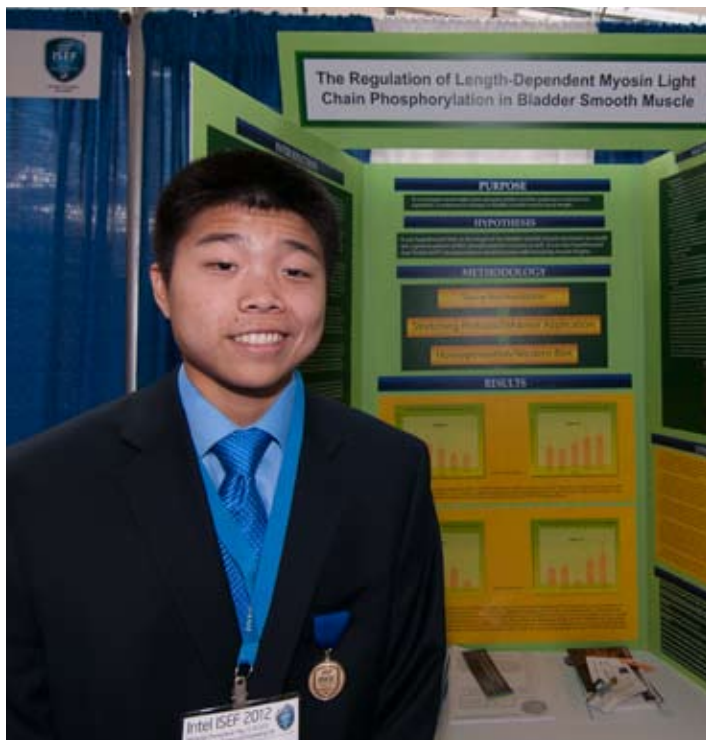
Viola Mocz, 16

Mililani High School

"New Ideas in Physics: The Mass Ratio of Elementary Particles from Torus Geometry"

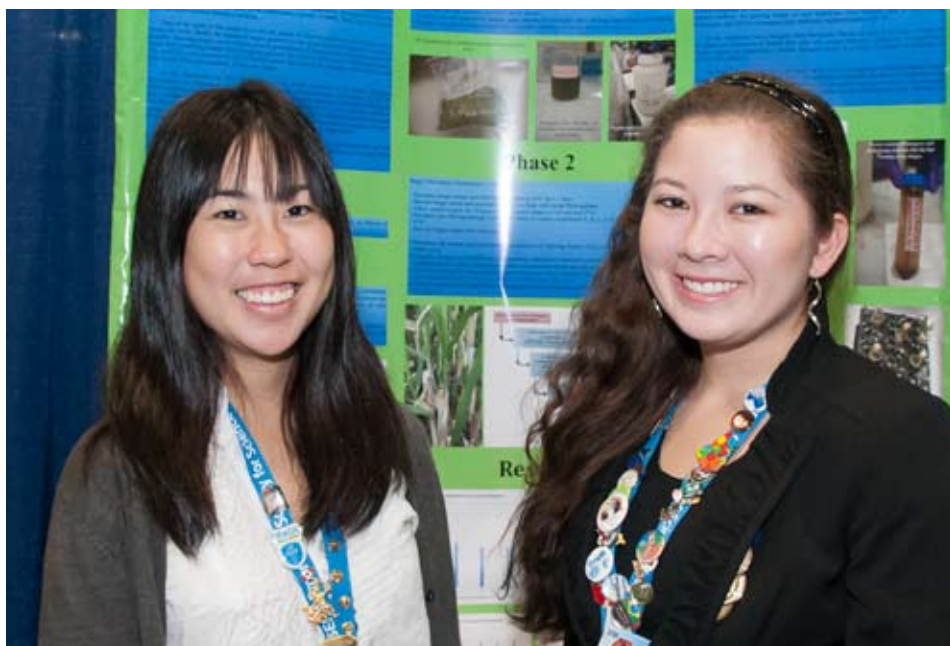
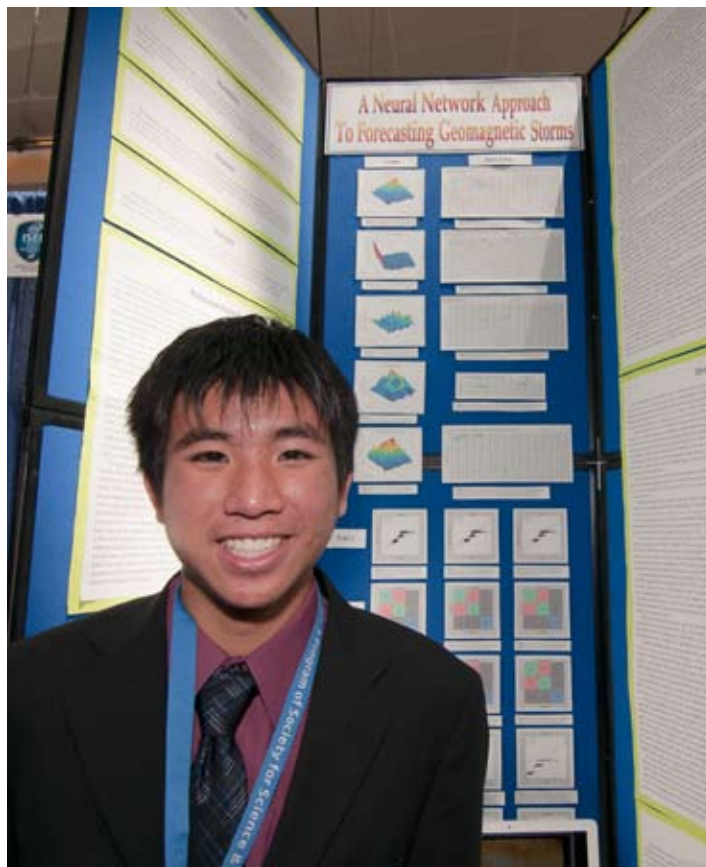
Student Experiences – Life Memories

Abraham Kwan is currently a senior at Moanalua High School with college right around the corner. He plans to major in biomedical engineering while completing required pre-med courses. His plans include medical school with hopes of becoming a cardiologist. He says that he started doing science fair back in 7th grade and did another project in 8th grade. He skipped the 9th grade but entered a project in 10th grade under the guidance of his middle school science teacher. Abraham remarks, “The entire process of getting to discover something and doing things that other scientist are doing is wonderful. I am glad I made the choice to go back to doing science fair.”



Kaipo T. Matsumoto, a senior on the Kamehameha Kapalama campus, says he measures life in terms of experiences and strives to add more life to his time and less time focusing on adding time to his life. “ISEF surely added more life to my time; it (ISEF) will change one’s life and show one the world through a completely different scientific perspective. My attitude changed from not even expecting to win anything to realizing that I really can compete with other students from around the world, and it all started with being given the opportunity to do so. Science is a place of equal opportunity. The search for higher knowledge is not dependent on your socio-economic level, the language you speak, or anything of that nature. The ideology behind all science comes from being a human and having a raw form of inquisition.” Kaipo has deep gratitude for the Hawai’i Academy of Science; the staff’s help and support, the opportunity to attend ISEF and the role it played in awakening his interest in science.

Travis Le always reached for the stars. As a young child he was fascinated by the planetarium and with his father's help he took off from there. "From that moment," says Travis, "my dad helped me pursue my passion by taking me to the public libraries to borrow books and to star parties to expand my knowledge of the night sky. Without his help, I wouldn't have had such a strong interest in science as I do today." Excelling in school was not enough for this budding astronomer. Pursuing summer workshops and mentoring other students, Travis learned many skills "essential to completing a successful science fair project". Travis is also meticulous and persistent, valuable traits for his career goal to become a professional astronomer. Although Travis' school does not participate in science fairs, Travis was determined to enter HSSEF and compete. His persistence has paid off, as Travis has won state and international awards since 2009. He is currently attending his first year at Stanford University and starting off on his new phase of life, but has profound memories of his science fair experiences: "Some of my fondest memories are the bonding opportunities that ISEF presented us with... I can remember only laughing and having a great time with some pretty awesome friends."



Sarah Tamashiro (left) will be a Sophomore at Occidental College this fall and she reflects back and states that relationships at the fairs (HSSEF and ISEF) were extremely important. "How cool is it to say that the people presenting projects next to you will become the movers and shakers of science in the next twenty years or less, and will also become your close friends? Although I've decided to hang up my lab coat for art history, the tools I learned from science fair like problems solving and public speaking are still applicable to me as I attend college and work at internships in museums and art galleries."

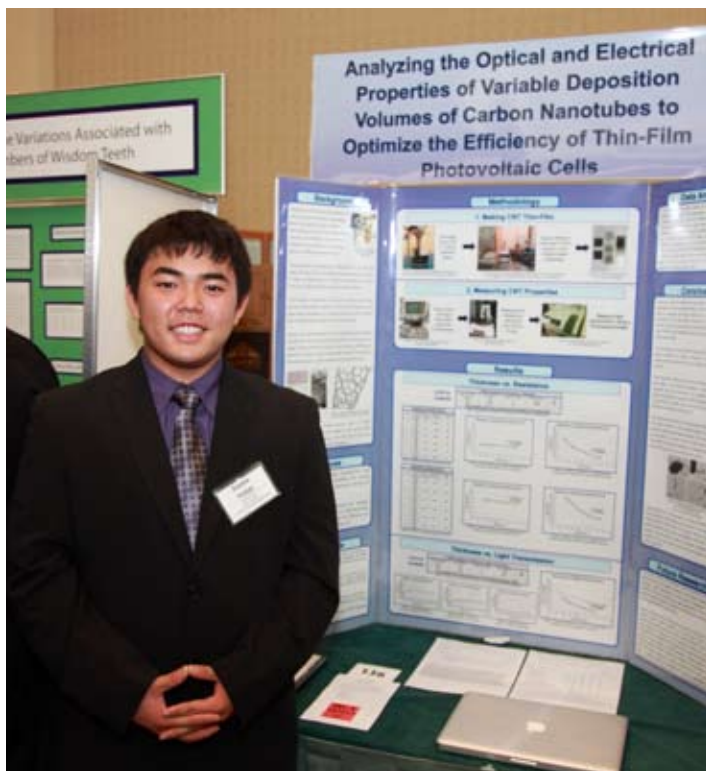


Shalila de Bourmont is currently attending Yale University exploring molecular, cellular and development biology with an emphasis on global health. Shalila loves science but makes time to get involved in sports like running and ultimate frisbee. She looks back at her science fair participation and has difficulty narrowing her experiences down to just one lasting impression. “Every fair was amazing in its own way. If anything sticks out in my memory it would be during my first ISEF fair - as we were about to enter the floor for our first day of judging, I remember the amazed looks that everyone gave us as we blew the conch and did our chant. Then the overwhelming sensation I got as I entered the floor and saw the hundreds of projects and students just swarming. What a rush!”

Moriah Jenkin's science fair project, "Save the Three Legged Dogs, Myoelectric Prosthetics for Dogs" is a project that she has developed since 2009. Her research and presentation won her the 2012 Senior Division Award for Maui County. She first competed in science fair as a freshman, but winning the Senior Division Project Award this year realized her goal of attending ISEF. Moriah states that her favorite memory at HSSEF was when she was visited by judges and award judges who remember her project from the previous year, they were fascinated to learn and hear about the modifications and adjustments she had made to the project. Going to ISEF was a highlight for Moriah, "It was amazing to see all the countries represented and to interact with participants who share their love of science."



Presenting at the Pacific Symposium (see page 23) was one of the moments when **Danielle Keahi** realized that she truly loves science. Dani states, "From this point on, science fair talks became conversations instead of make-it-or-break-it presentations. The confidence that science competitions helped me gain is one of the most valuable things I have learned over the course of high school. I actually look forward to having the opportunity to discuss my research with scientists and to share my enthusiasm for my topic of study." Her participation in the Pacific Symposium, the Hawaii Independent Schools District Science Fair, the Hawai'i State Science & Engineering Fair and the International Science & Engineering Fair allowed her to achieve goals she never thought possible. Dani heads to Harvard College this fall and feels extremely fortunate to have had the chance to share her passion for science with others in Hawai'i and internationally through the competitions that the Hawai'i Academy of Science has coordinated.

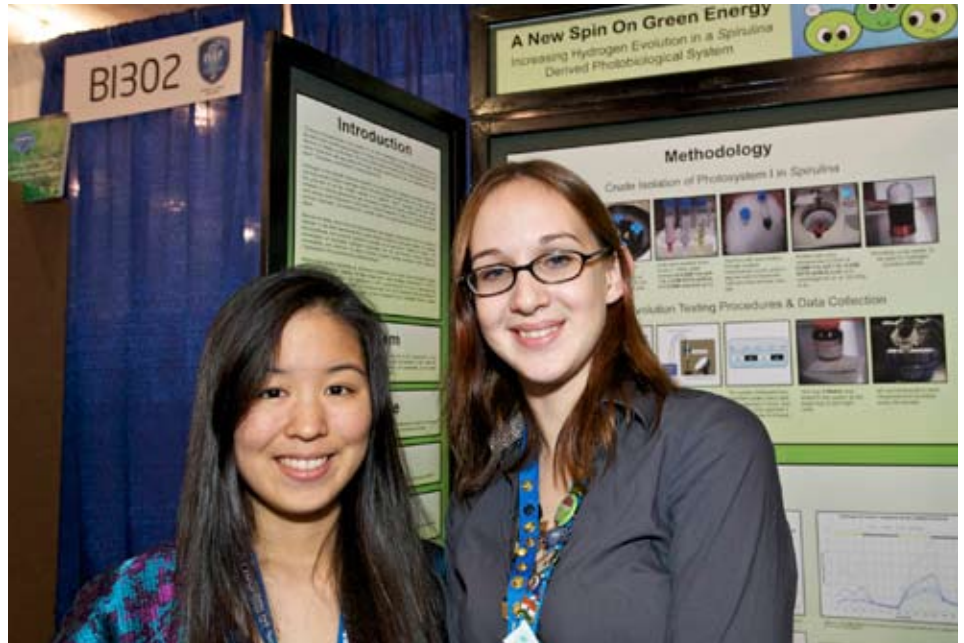


Research in the area of physics or applied physics is **Danten Inouye's** (left) focus as he begins his college studies at Occidental College. Danten took AP Physics as a senior at Waipahu High School this past year, "I was fascinated about how much more I knew when I knew physics. I could look around and explain how and why things happen." Danten was able to be part of ISEF for two years and looked at the event as large-scale competitions bringing together people from around the world sharing a wide variety of complex projects. "It provided a sense of accomplishment to compete in ISEF. HSSEF/ISEF felt like the perfect place for someone who is passionate about science."



Erik K. Wessel (right), a 2012 home school graduate entering UH-Manoa as a freshman, recognizes the valuable opportunities he had this past year. His project "Simulating Orbital Dynamics & Planetary Collisions in a Video Game" was a big hit with gamers but both HSSEF and ISEF allowed him to connect with like-minded students and scientists something he would not have been able to do easily as a home schooler. He looks to the future and states, "I hope to help out one day so that other students might have such an inspiring experience that truly motivates them to continue investigating science."

Megan Kurohara (left in photo), a 2010 Hilo High School graduate is presently a rising sophomore at Stanford. Megan is undecided on her major, and she presently says that it may or may not end up in a science field. Megan reflects back to her science fair experience and said, “Science Fair has taught me to take mental risks and to believe in my ability to execute things at a level of excellence. It has also taught me the value of clear communication and clean but engaging presentation. I believe these skills are useful in any field of study and, in general, life.” Megan sums it up with, “My experiences through HAS have opened up so many doors of opportunity.”



Sara Middendorf (left in photo), currently a sophomore at the University of Notre Dame, is majoring in both Sociology and Anthropology. She is a dedicated member of the Notre Dame Hawai'i Club and the GlobeMed Chapter of Notre Dame. Sara hopes to join the Peace Corps after getting a master's degree in Public Health. She looks back at her participation in science fairs and says, “Going to ISEF was an amazing experience, both academically and socially. I met a lot of people from different countries, and saw projects at such a high level of intellect. It was also an amazing experience to win an award at ISEF. My partner and I completely did not expect to win anything there – we were just so happy to make it to ISEF. We were completely shocked when we heard our name called at the Awards Ceremony. I cherish my science fair experiences and memories.”

Philip, Lucia and Viola Mocz are all veterans of the science fair. The three young scientists come from parents who are scientists by profession, and each young Mocz has established their own distinct paths in different disciplines. All three attended Mililani High School (Viola is still attending as a junior this year) and were students of our 2012 Teacher of the Year recipient Dr. Namthip Sitachitta (see profile in this publication). Although this year we are highlighting mostly HSSEF alumni, Viola Mocz is a member of this exceptional family and so we include her in this section.



Photo: David Ding, Harvard HCMR

The eldest of the Mocz clan, and the only son, **Philip Mocz** set a sterling example for his two younger sisters by starting his research career in middle school and winning 1st place in the Junior Category at HSSEF. From there he continued to participate and win at both the state and international fairs, culminating in a \$20,000 scholarship from Intel in 2008. Philip is now in graduate study at Harvard and aims to become a professor in Astrophysics.

He attributes part of his incentive in pursuing science as a career to the science fair program, explaining, "I really liked getting to know the other students who were excited about science like me. When I attended HSSEF for the first time as an 8th grader I also remember being really inspired by the creativity, seriousness, and impact of some of the senior division projects in artificial intelligence and cancer research. This inspiration drove me to continue doing science fair projects as a high school student."

Lucia Mocz is the second of the three siblings. Raised by scientist-parents who passed down their proclivity to their offspring, being a "middle child" in this family could be interpreted as being a difficult position. But like her siblings, she has a long history of competing, and winning, at both state and international fairs. Lucia's project, "Complex Evaluation of Danger and Tranquility in Urban Settings: An Immunocomputing Intelligence Approach", won her first place at HSSEF as well as two awards at ISEF in 2009. She is now a senior at Harvard and will graduate with both bachelor and master degrees in mathematics.

"With both of my parents being scientists, it felt the natural course of action that I pursue a career in the sciences as well," writes Lucia. "However, my interests were far-reaching, and it was only in college that I confirmed that I would like to be a mathematician, and more specifically a number theorist. ISEF nevertheless served as a cornerstone to coming to this realization. While most of my work was in developing computer simulations, it was the mathematics I applied in creative ways to tackle real-world problems which intrigued me the most."

Last is certainly not "least" in this family of scientists. Currently a junior at Mililani High School, **Viola Mocz** takes mathematics classes at Leeward Community College and will enter college in 2014. Although following in the footsteps of both her parents as well as her older siblings, Viola is well on her way to collecting her own impressive set of achievements. Her project on nuclear physics won her first place at HSSEF and recognition at ISEF, including a trip to Europe.

Viola spoke to us about her experiences, saying, "My most positive memories are meeting other like-minded students who are passionate about science, discussing my project with experts in my field of interest, and having the opportunity to visit the European Organization for Nuclear Research (CERN) in Switzerland as an ISEF award. Many of the students share similar interests but come from diverse backgrounds so the science fair is a great way to learn more about the world and form lifelong friendships."

CHEVRON TEACHER OF THE YEAR – NAMTHIP SITACHITTA

The students at Mililani High School know her as “Ms. S”, as her full name **Namthip Sitachitta** can be a tongue twister for those not familiar with her cultural background. But “Ms. S” brings more to Hawaii’s education community than a catchy name. She has earned a master’s in Chemistry and PhD in marine pharmacognosy (study of drugs from natural origin) and her passion and dedication to teaching has helped put Mililani’s science department in the spotlight for many years.

Dr. Sitachitta also has the distinction of being the science teacher to the Mocz siblings; all three (Philip, Lucia and Viola) were multiple winners at the state and international fairs. Viola, the youngest, is a junior at Mililani High while her older brother and sister have graduated and attend Harvard. “Ms. S is a wonderful chemistry teacher. She patiently guides students through the processes all scientists need to learn.” explains Viola. (All three Mocz are highlighted in this annual report.)

Dr. Sitachitta’s efforts and successes as a science teacher and mentor were rewarded this year by Chevron, winning her the title of Teacher of the Year at the Hawai’i Science and Engineering Fair. This cash award allowed her to accompany the Hawai’i delegation of twenty-four students and twelve teacher-chaperones to the International Science and Engineering Fair in Pittsburgh.

The intent of this award is to give the recipient the opportunity to experience the “Superbowl of science competitions”, to expand on that teacher’s perspectives and to even inspire a greater sense of purpose for teaching. Dr. Sitachitta

is soft-spoken and reserved, but the positive impact of her experiences are evident in her interview below.

How did it make you feel to receive the award?

I am honored to be the recipient of the teacher award.



What impressed you the most about ISEF?

The trip to ISEF definitely was an eye-opener for me. I was able to see the bigger picture of the science fair, and how important it is to students’ learning. I was very impressed with the caliber of the projects, and how scientifically inspired the finalists were.

How will you take what you learned back to the classroom?

The ISEF experience definitely motivates me to encourage all my students to conduct independent scientific investigation.

The school system is very fortunate to have a highly educated scientist in the high school classroom—how did you find yourself in teaching profession?

I always enjoy teaching. I discovered my passion when I was a teaching assistant at UH Manoa (the chemistry department requires all grad students to serve as teaching assistants). I started my teaching career as a teaching assistant at the Department of Chemistry for three years.

After I had earned my Ph.D., I was employed as a faculty at Chulalongkorn University (Thailand). I taught medicinal chemistry at Chulalongkorn University for two and a half years. After my daughter was born, my priority changed. I wanted to have an occupation that has the same schedule as my daughter’s. In addition, because my parents live in Thailand, long summer breaks allow me to spend time with them.

My latest teaching experience (the best one) is at a high school level (six years at Mililani and currently at McKinley).

You were raised in Thailand?

I was born and raised in Thailand but I spent three years in Hawaii while I was 8–11 years old. I went to Mililani Waena School.

How do you see the science fair program helping kids succeed in college and in their careers?

Independent scientific investigation process teaches students to be self-directed learners. In order to have a successful science project, a student must also have a certain level of self-discipline. In addition, students with science fair experiences are likely to have clearer professional career goals. The combination of these traits will contribute to students’ success in college.

Teachers impart information to their students, but often there are teachers who play a critical role in making things happen for their students. These individuals share knowledge and experiences, help make connections, support and encourage exploration, and often spend long hours after school and on weekends to mentor students to encourage them to pursue their passion. Four of these teachers were fortunate to be able to journey to the ISEF this past spring.



Mark Adato, Physical Science and Physics teacher at Campbell High School, found the ISEF experience to be stunning and life changing. The well-organized event had great impact on both the participants and their chaperones with Adato feeling that the vast majority of participants and projects were revolutionary. A science fair project has been a required assignment for Adato's classes and the perception set was that this assignment was a long, drawn-out burden that entailed a lot of time and work. Adato has changed his introduction to this assignment to include exciting photos from ISEF and the statement that a science project can become an amazing opportunity to achieve great things.



Aaron Tsuha, AP Biology, Medical Biotechnology and Health Services Core teacher from Castle High School, felt that ISEF was an amazing production. Intel ensures the integrity and prestige of ISEF while making the fair a fun and memorable experience for all. Tsuha, a first time ISEF attendee, remarks "I got to see bright and talented students become 'rock stars' through their passion and love for science. The participants – especially the Hawai'i group – really got to reflect on how much they have accomplished as well as how much more they can achieve. I truly feel that ISEF opens up many opportunities and possibilities for our students and they will take full advantage of this."



Jim Cox, Honors Physics, Physics, Marine & Environmental Science, and Physical Science teacher from Kapa'a High School on Kauai has traveled with the Hawai'i ISEF delegation a few times over the past years. When asked about the benefits of science fair for students Cox says, "In education we speak of rigor, relevance and relationship. Science Fair builds all three. The level of rigor at both the district and state level fairs continues to improve. Participants work with concepts and concerns that are near and dear to them and they learn to make connections with their findings and their world. Students are getting the message that developing inquiry skills has value. Science Fair is one way of inspiring the next generation from all over the world to celebrate what they can accomplish together."



STEM Week: Recognizing Hawai'i School Excellence

Running concurrently with this past season's Hawai'i State Science & Engineering Fair (HSSEF), STEM Week showcased Hawai'i-based companies, their technologies and career opportunities and culminated in a banquet to recognize schools across the state for their efforts in providing various STEM education programs for their students. The inaugural STEM Week Awards Banquet was attended by technology companies, organizers of various STEM education programs and school representatives was hosted by Hawai'i Academy of Science (HAS).

The keynote speaker at this first annual event was Senator Daniel K. Inouye a committed advocate for STEM education. Sen. Inouye said in a statement: "I arrived home to Hawai'i last night and was pleased that my first event was to participate in the STEM Week Awards Lunch. It warmed my heart to see bright young students and their committed teachers and principals. Hawai'i has much to be proud of and to be hopeful about. We should not sell ourselves short. Our future is in good hands."

The following schools were recognized for their commitment to STEM education:

High School State Champions

- | | |
|-----------|------------------------------------|
| 1st Place | Mililani High School (Photo above) |
| 2nd Place | 'Iolani School |
| 3rd Place | Waipahu High School |

Middle School State Champions

- | | |
|-----------|-------------------------------|
| 1st Place | Highlands Intermediate School |
| 2nd Place | 'Iolani School |
| 3rd Place | Punahou School |

HIGH SCHOOL DISTRICT AWARDS:

- Oahu Island - Moanalua High School
- Big Island - Waiakea High School
- Kauai Island - Waimea High School
- Maui County - Baldwin High School
- Independent School - Punahou School

MIDDLE SCHOOL DISTRICT AWARDS:

- Oahu Island - Waipahu Intermediate School
- Big Island - Waiakea Intermediate School
- Kauai Island - Waimea Canyon Middle School
- Maui County - Maui Waena Intermediate School
- Independent School - St. Andrew's Priory School

The first STEM Week Awards also featured the first Daniel K. Inouye Award for Commitment to STEM Education, which went to Hawaiian Electric Company. The award is given to an individual or organization that demonstrated leadership in Hawaii's STEM educational initiatives by ensuring continued access to STEM programs statewide.



Pacific Symposium for Science and Sustainability

The Pacific Symposium for Science and Sustainability (PS3) is one of forty-nine regional Junior Science and Humanities Symposia (JSHS) funded by the Research Offices of the US Army, Navy, and Air Force. The program is administered by the Academy of Applied Science located in Concord, New Hampshire in cooperation with nationwide colleges and universities and other STEM education societies.

The JSHS program encourages high school students to challenge themselves through experimental research, and aims to prepare and support students to contribute to society as future scientists and engineers. At the regional and national symposia students learn from each other and from distinguished scientists, engineers, and educators. At the 2011-2012 Pacific Symposium for Science and Sustainability held at the University of Hawai'i Manoa campus in Honolulu, library research papers were accepted in addition to experimental research papers. However, only students conducting experimental research were eligible to be finalists representing Hawai'i at the National JSHS.

High school students from Oahu, Maui, Hawai'i Island, American Samoa and Micronesia entered the regional competition coordinated by the Academy. Students submitted papers summarizing scientific research they had performed

during the year. HAS judges selected the top students who were invited to participate in the weekend symposium.

Each student gave a 10-minute oral presentation in sessions throughout the day to a panel of scientists from various fields of study. This year five PS3 students from Hawai'i and American Samoa represented the Pacific region in the 50th National Junior Science & Humanities Symposium (JSHS) held in Washington, D.C.

The following are the top five winners and their awards:

1st Place (gold medal):
Danielle Keahi - Kamehameha School
 "Characterization of Cerebellar Phenotype in Mice with Mutated *Rreb1*"
 \$2000 scholarship to the college of choice

2nd Place (silver medal):
Iris Kuo - Iolani School
 "Culturable Microbes Associated with Fresh and with Decaying Hawaiian *Wikstroemia oahuensis*"
 \$1500 scholarship to the college of choice

3rd place (silver medal):
Allison Fitisone, Tafuna High School
 "*Culex quinquefasciatus* oviposition response to organic infusions from common flora of American Samoa"
 \$1000 scholarship to the college of choice

4th place (silver medal):
Steven Okada, Maui High School
 "Phytolith Sequestration in *Saccharum officinarum* (Sugarcane) and *Pennisetum purpureum* (Napier grass)"

5th place (silver medal):
Viola Mocz, Mililani High School
 "Evolutionary Graph Theory Applied to Computational Artificial Vision for Supporting Bionic Eye Devices"

Alternate (bronze medal):
Travis Le, Punahou School
 "Determining 'Hot Spots' Through Correlations of CMEs and Solar Flares"

The first and second place winners, Danielle Keahi and Iris Kuo, presented at the National JSHS Symposium in May. Winners from that competition go on to the London International Youth Science Forum in the Fall of 2012. The other students participated at the JSHS for other awards but were not eligible for the international competition. All of the HAS nominated students did a fantastic job of representing the state of Hawai'i. Their science projects were on a par with or better than those of many of the top high school science students in the nation.

Bernard J. Kilonsky
 Director
 Pacific Symposium for Science and Sustainability



Science Café

Science Café has settled into a comfortable monthly affair, embodying the atmosphere that is the objective for this casual “science dining” program. Guests begin arriving at Happy Hour, and stay through the featured science presentation. Questions, comments and opinions from all participants are welcomed and encouraged.

One of the highlights of this season’s Café was an added ceremony in July. Science Café co-partner Sigma Xi held their annual member meeting at the event, honoring their student and teacher awardees from the 2012 Hawai‘i State Science and Engineering Fair. Several of the students mesmerized the audience with presentations on their winning projects, and a short awards ceremony followed.

For more information, visit our website: hawaiiacademyofscience.org or you may request to be added to the mailing list by contacting the Hawai‘i Academy of Science at info@hawaiiacademyofscience.org.



2012 HIGHLIGHTS:

January - **Nader Haghhighipour**, Institute for Astronomy: The Search for Earth-like Planets Outside our Solar System

March - **Doug Carlson**, Honolulu Rail: Sustainable Transportation for This and Future Generations; Why Elevated Mass Transit Will Meet Oahu’s Needs

April - **Heather Spalding**, UH-Manoa Botany: Discovering New Coral Reef Ecosystems in Hawai‘i

May - **Bruce Howe**, UH-Manoa, Ocean and Resources Engineering: New Tools for Observing the Ocean from the Surface to the Abyss

July - **Dr. Ginnie Watson**, Science, Technology and Security in the Asia-Pacific Region

2011 HIGHLIGHTS:

January - **Dr. Bruce Anderson**, Hawai‘i Pacific University: Dengue Fever

February - **Dr. Peter Mouginis-Mark**, Hawai‘i Institute of Geophysics: Progressing Towards Hawaii’s Own Space Program

March - **Dr. Peter Gorham**, UH High Energy Physics Group: Searching for Neutrinos in Antarctica: Astrophysics at the Ends of the Earth

April - **Tim Wong**, Sopogy MicroCSP: Micro-scale Concentrated Solar Power (MicroCSP)

May - **Dr. Michael DeWeert**, BAE Systems: The Thorium Energy Amplifier and a Sustainable Energy Future

June–August *SUMMER BREAK*

2011–2012 State Science Fair Sponsors & Awarding Agencies and 2012 STEM Week Sponsors & Exhibitors

Associate Sponsors (Sponsorship/Partnership)

University of Hawai'i at Manoa, College of Education
State of Hawai'i, Department of Education
NOAA's Pacific Region & The National Marine Sanctuary Foundation

Platinum Sponsors (\$25,000+)

NOAA Fisheries Service - Pacific Islands Regional Office

Gold Sponsors (\$24,999–\$10,000)

Bank of Hawaii
Chevron USA
Hawai'i Community Foundation
Hawaiian Electric Company, Inc.
Verizon Foundation

Silver Sponsors (\$9,999–\$5,000)

Armed Forces Communication & Electronics Assoc. of Hawaii
Jerris Hedges
Island Insurance Foundation
Flora Ling & Paul Sturm
The Queen's Medical Center
Syngenta Crop Protection, Inc.

Bronze Sponsors (\$4,999–\$1,000)

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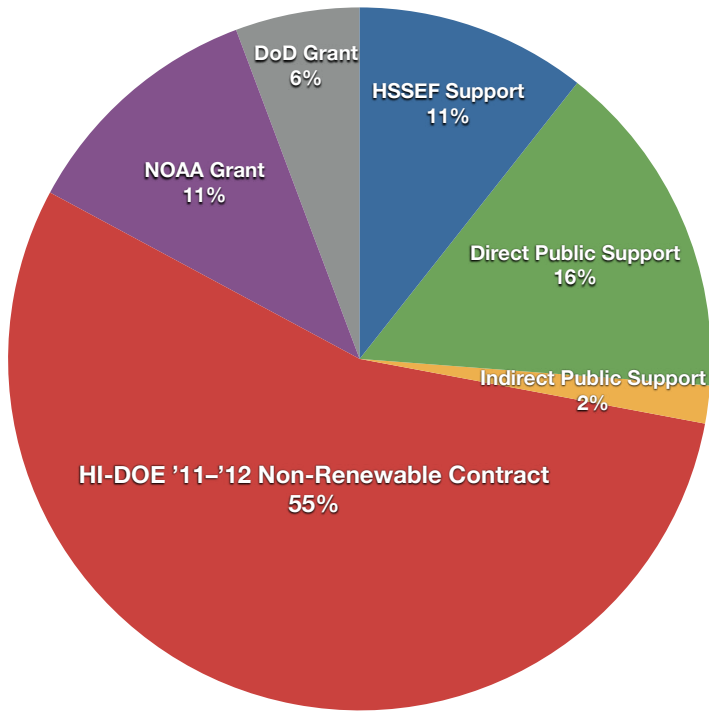
Archionetics
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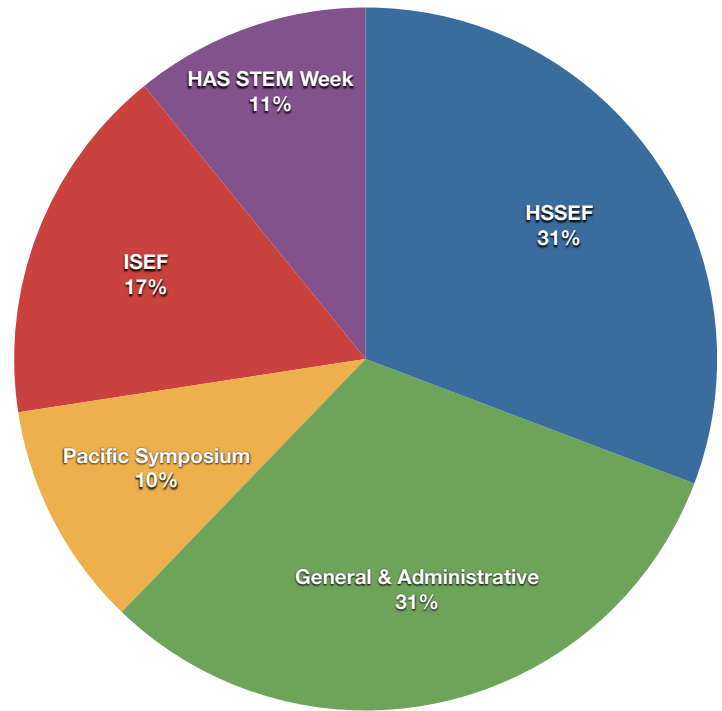
AFT
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Iolani School
Karl & Mae Kawahara
Michelle Medeiros
Pukoa
Terasys

Income & Expenses for the Fiscal Year Ending June 30, 2012 (Unaudited)

Income



Expenses



Income & Expenses Summary

INCOME

Grants

| | |
|--|----------|
| US Dept. of Defense Grant (AAS-JSHS, Symposium) | \$25,000 |
| NOAA Grant | \$50,000 |

| | |
|--|-----------|
| HI-DOE 2011–2012 Non-Renewable Contract | \$240,060 |
|--|-----------|

| | |
|-------------------------|----------|
| HSSEF Support | \$46,478 |
| Direct Public Support | \$68,114 |
| Indirect Public Support | \$7,618 |

Total Income \$437,270

EXPENSES

| | |
|--------------------------|-----------|
| HSSEF | \$125,820 |
| ISEF | \$67,815 |
| HAS STEM Week | \$44,343 |
| Pacific Symposium | \$42,405 |
| General & Administrative | \$128,582 |

Total Expenses \$408,965

Major Awards Presented at the State Science Fair

ISEF Trip Award Sponsors:

Chevron

Hawai'i Academy of Science & Hawai'i State Department of Education

Hawaiian Electric Company

Best in Division:

Hawai'i Academy of Science Grand Awards

The best projects in the Senior Research and Junior Research are awarded plaques and ribbons by the Hawai'i Academy of Science. The best individual projects in categories 1–17 of the Senior and Junior Research Divisions are awarded cash prizes by the Hawai'i Academy of Science. The Junior Display Division are given their awards at the District Fairs.

Best in Category: Hawai'i Academy of Science

The best project in each category will be awarded a ribbon by the Hawai'i Academy of Science. The Academy reserves the right to not award ribbons in categories where there are no worthy projects.

The Queen's Medical Center

Twelve (12) \$500 Awards for JR/SR Students & Teachers in the categories of Biochemistry, Medicine & Health, and Microbiology.

Armed Forces Communications/Electronics Association

Thirteen (13) Cash Awards totalling \$2,500.

School of Ocean and Earth Science and Technology

Five (5) Awards totalling \$1,000.

Department of Information and Computer Sciences,

University of Hawai'i, Manoa

Seven (7) \$200 Awards for JR/Students in the category of Computer Science.

College of Engineering, University of Hawai'i, Manoa

Eight (8) \$100 Awards.

College Scholarships

The following institutions and organizations award scholarships:

- Hawai'i Pacific University
- University of Hawai'i Foundation

Best Public School Junior Research Project:

Hawai'i State Dept. of Education

The Chamberlin Perpetual Trophy is awarded by the Hawai'i State Department of Education to the best Junior Division research project by a public school student.

Best Public School Senior Research Project:

The best Senior Division research project by a public school student is awarded the Honolulu Star-Bulletin perpetual school trophy.

Institute for Astronomy - University of Hawai'i Awards

The student with the best astronomy project in the Senior Research division will win a trip to Mauna Kea and an evening at a telescope. Prizes will be awarded to the best astronomy projects in the Junior Division.

Agency Presenters at the State Science Fair

American Cancer Society
American Chemical Society, Hawaii Section
American Industrial Hygiene Association, Hawaii Section
American Meteorological Society
American Meteorological Society, Aloha Chapter
American Psychological Association
American Public Works Association
American Society for Clinical Laboratory Science, Hawaii
American Society of Civil Engineers, Hawaii Section
American Society of Heating Refrigerating & AC Engineers
American Society of Safety Engineers, Hawaii Chapter
American Statistical Association, Hawaii Chapter
Apollo Society
Armed Forces Communications/Electronics Assoc.
ASM International Foundation
Associated Chinese University Women's Inc.
Association for Women Geoscientists
BAE Systems Employees
Broadcom MASTERS
Center for Asian Pacific Exchange
Chaminade University of Honolulu
Chevron
Clinical Laboratory Management Association
College of Engineering, University of Hawaii at Manoa
College of Trop Agriculture & Human Resources Alumni Assn
College of Tropical Agriculture and Human Resources
Conservation Council for Hawaii
Department of Information and Computer Sciences UHM
Dept. of Environmental Services
Engineers & Architects of Hawaii
Environ Control, Inc.
Friends of Hanauma Bay
Gamma Sigma Delta, The Honor Society of Agriculture
Global Environment & Energy in the 21st Century
Hawai'i Academy of Science
Hawaii Agriculture Research Center
Hawaii Association of Environmental Professionals
Hawaii Audubon Society
Hawaii Botanical Society/Winona Char Award
Hawaii Chemical & Scientific, A Div of Hawaii Chemical Co
Hawaii Conservation Alliance
Hawaii Optometric Association
Hawaii Pacific University Scholarship Awards
Hawaii Pacific University Senior Scholarship Award
Hawaii Science Teachers Assn.
Hawaii State Dept of Education
Hawaii State Dept. of Business, Economic Dev. & Tourism
Hawaii Veterinary Medical Association
Hawaiian Astronomical Society
Hawaiian Dredging & Construction Company
Hawaiian Electric Co.
Hawaiian Entomological Society
Hawaiian Eye Foundation
Hawaiian Humane Society
Hawaiian Malacological Society
Hawaiian Sun Products
Honolulu Board of Water Supply
Honolulu REACT
Honolulu Star-Advertiser
Honolulu Veterinary Society
Honolulu Zoological Society
Imi Hale
Institute for Astronomy - UH Manoa
Institute of Electrical & Electronics Engineers - Hawaii Sec
Intel Computer Science Award
Iris Shinseki's Aiea High Junior Researchers
J W Morrow Environmental Management Consultant
Makai Ocean Engineering
Miles Muraoka Education Award
Mu Alpha Theta
NASA Pacific Regional Planetary Data Center
National Society of Professional Engineers
Nature Conservancy of Hawaii
Navy League of the US, Honolulu Council
NOAA Award - Discover Your World
NOAA's Office of Education and Sustainable Development
Pioneer Hi-Bred International, Inc
Ricoh Corporation
Saul Price/Aina Haina Community Association
Sigma Xi, The Scientific Research Society
Society for In Vitro Biology
Society of American Military Engineers, Honolulu Post
Society of Fire Protection Engineers, Hawaii Chapter
SOEST, University of Hawaii
The Queens Medical Center
U.S. Army, Tripler Army Medical Center
U.S. Metric Association
U.S. Navy/Marines
UHM School of Medicine
University of Hawaii Cancer Center
University of Hawaii Foundation
Verizon
Water Environmental Federation SJWP
Yale Science & Engineering Association



HAWAI‘I ACADEMY OF SCIENCE

ANNUAL REPORT 2012

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