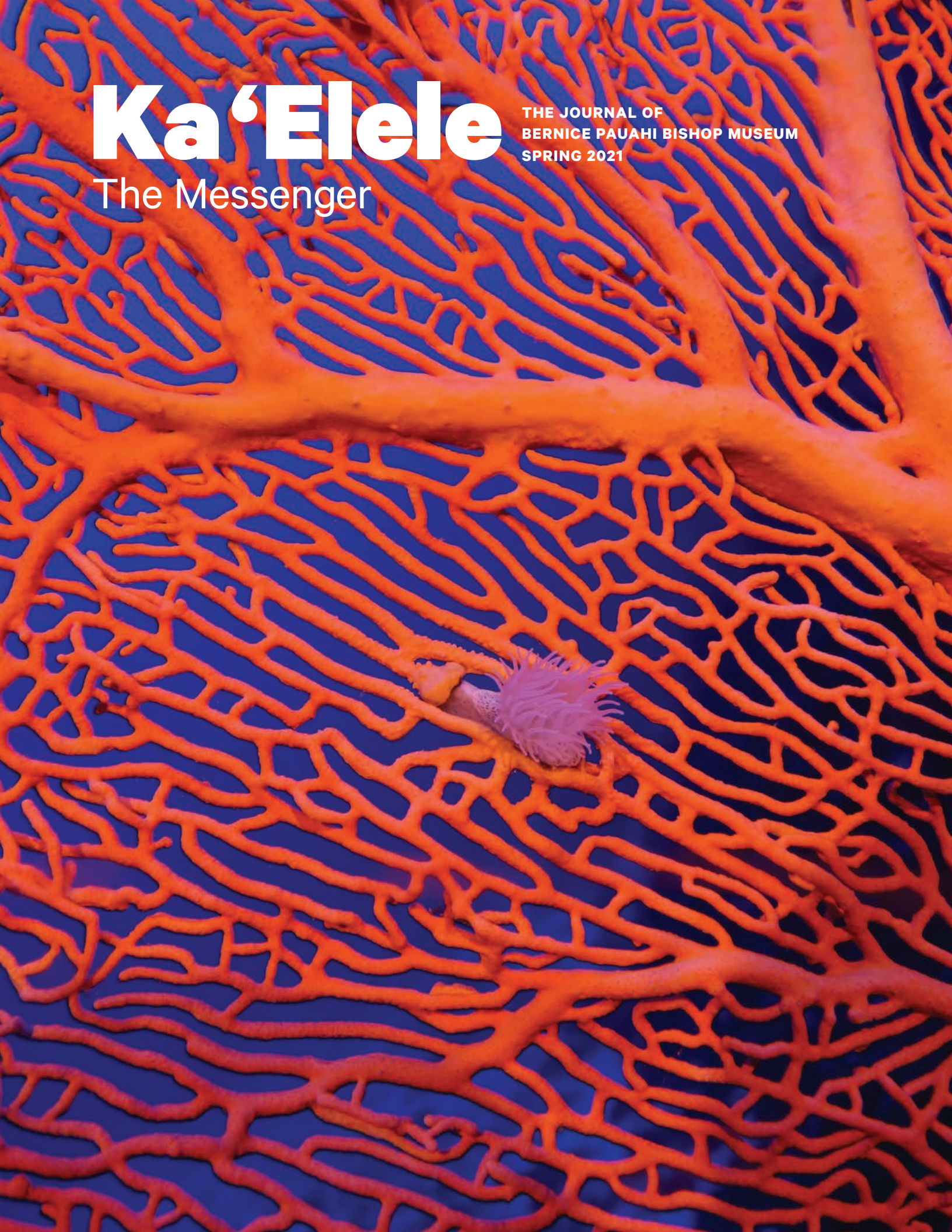


Ka'Elele

The Messenger

THE JOURNAL OF
BERNICE PAUHAH BISHOP MUSEUM
SPRING 2021



Upcoming Events

Current and Upcoming Exhibits

(Re)Generations: Challenging Scientific Racism in Hawai'i

February 20–October 24, 2021

**Parley Ocean School |
Parley AIR Station Hawai'i**
Spring 2021–June 2022

**POW! WOW! The First Decade: From
Hawai'i to the World**

May 15–September 19, 2021

PLEASE NOTE

The health and safety of our visitors and employees continue to be our highest priority. All events and programs are subject to change. Capacity restrictions and access to indoor galleries and exhibits may apply due to COVID-19 safety protocols. Please visit BishopMuseum.org for the most updated schedules.

Visit our website for the latest updates.

Daily Programs:

BishopMuseum.org/dailyprograms

Special Programs and Events:

BishopMuseum.org/events

J. Watumull Planetarium Reopens

Bishop Museum is excited to announce that the J. Watumull Planetarium reopened on Saturday, March 27 to in-person guests. Moving forward, the Planetarium will host two, 30-minute *Wayfinders* shows every Tuesday, Thursday, Saturday, and Sunday at 11:30 a.m. and 2:30 p.m.

Wayfinders is a full-dome program that puts you on the deck of the voyaging canoe *Hōkūle'a* as you explore traditional Polynesian navigation and find your own way to Tahiti from Hawai'i. Produced by Bishop Museum in collaboration with Polynesian Voyaging Society and 1001 Stories.

Planetarium Safety Measures

- As per Bishop Museum safety protocols, all guests over the age of five (5) must wear **face masks that cover both the mouth and nose** while indoors at all times—no exceptions.
- Please note that the following are NOT allowed:
 - ♦ Face shields without accompanying face masks
 - ♦ Gaiters
 - ♦ Face masks with vents of any kind
- Planetarium shows are **limited to 15 guests per show** (25% of theater capacity)
- Groups will be **seated at least six feet (6') apart**

Between shows, our staff will:

- Wipe down all contact surfaces
- Use large fans to increase airflow and overall theater circulation

WEEKLY EDUCATIONAL PROGRAMMING

Daily

The Explosive Truth: A Volcano's Lifecycle

Self-guided Audio Tour (Science Adventure Center)

Learn about the geologic processes of creation and the evolution of the Hawaiian Islands.

Daily

Find Pipipi Scavenger Hunt

Self-guided Activity (Pickup Location: Ho'okipa Desk)

Help us find Pipipi, our marine snail from Hawai'i! He is hiding in different places all around our campus. This activity is perfect for kids of all ages!

Daily

Great Lawn Activities & Games

Check out kits at the Ho'okipa Desk

Enjoy our outdoor spaces by checking out one of our free outdoor activity or game kits, including Hawaiian games, bean bag toss, football, Frisbee, hula hoop, soccer ball, and toss across! All activities are sanitized after each use.

Daily

Nā Ulu Kaiwi'ula

Native Hawaiian Garden Tour

Self-guided Audio Tour (Native Hawaiian Garden)

Learn about plants of Hawai'i, some found nowhere else in the world and others brought for food, medicines, and materials.

Daily

Sustainability Scavenger Hunt

Self-guided Activity (Pickup Location: Ho'okipa Desk)

Explore the Bishop Museum campus and learn about our commitment to demonstrating change by identifying sustainable practices across our campus, inspiring visitors to do the same.

Daily

Walk the Solar System Activity

Self-guided Activity (Great Lawn)

Explore the layout of the solar system and learn about moons, dwarf planets, asteroids, comets and more!

Weekends Only (as of this publication)

E Ulu, E Ola! Botany and Me

Available during Museum hours (Hale Ikehu)

Explore the ways in which our native plants arrived and thrived in Hawai'i through interactive demonstrations led by Education staff around our garden spaces.

Weekends Only (as of this publication)

GO and GROW!

Self-guided Activity (Keiki Corner)

GO and GROW! your own native plant using seeds from our ethnobotanical garden.

This program is sponsored by Alexander & Baldwin, Grace Pacific and Hawaiian Electric.

Weekends Only (as of this publication)

In My Scope Explorations

Available during Museum hours (Keiki Corner)

Discover the natural wonders of Hawai'i through scientific exploration.

Aloha & Mahalo



Aloha Bishop Museum 'Ohana,

Since our last issue of *Ka 'Elele*, our world has experienced convulsions of a size and frequency that most of us have been fortunate to avoid, until now. At just about every level—global, national, local, organizational, familial, and individual—we have had to deal with changes, pressures and concerns having to do with physical, emotional, economic, environmental, and even societal health. Many have days of feeling weary and spent. Too many have fought to recover from illness, or lost loved ones. We need stamina because it's going to take time and energy to either get through this, or learn how to adapt to it.

With this in mind, I want to take a moment to thank our entire staff, Board of Directors, and our community. As a safe space for Hawai'i's most cherished collection and research, we are also grateful for the unified support from our legislative and executive branches. Mahalo to you, Congressman Case, Senator Hirono, and Senator Schatz. Mahalo to you, Senator Kouichi, Senator Dela Cruz, Representative Luke, and Senator English. Mahalo to you, Governor Ige and First Lady Dawn Ige. We all share Hawai'i's legacy and it is comforting to know that in these tumultuous times, we can find respite, guidance, and safety in our State Museum. We have served Hawai'i's community for over 130 years, and today we are humbled by the support and aloha from our leadership in order to serve Hawai'i for another 130 years and beyond.

As you might guess, the past months of closure, reopening, rollbacks to a second closure and another reopening has caused much stress on our Museum. We, like just about every museum in the country and around the world, have lost revenue streams from a variety of sources. But unlike many museums, we've managed to remain stable and are continuing our work. In fact, we are building.

In addition to performing critical research in Hawai'i and around the Pacific, and doing the ongoing work of caring for our many collections, we're developing new programs and experiences for our "Outdoor Museum" and our "Online Museum."

Knowing that it's safer outdoors—we've activated our 15-acre campus with a range of programs including regular practitioner workshops, a new self-guided tour of our Native Garden, a Sustainability Scavenger Hunt, a "GO and GROW!" activity in our Keiki Corner, and Hawaiian games.

Online, we're piloting hula workshops, museum tours for remote school visits, digital curriculum and learning tools, and offering members access to new programs like our biweekly Pau Hana Talk Story Seminar Series. We also held our first-ever online fundraiser, E Ulu A Pa'a, which featured many unique Bishop Museum experiences and work by some of the best talent in our community, from food to fashion.

We also celebrate the return of High Chief Kalani'ōpu'u's 'ahu 'ula (feather cloak) and mahiole (feather helmet). Gifted to Captain Cook in 1779 and after traveling around the world, it has made its way home, having been gifted to Bishop Museum for the people of Hawai'i by the Museum of New Zealand Te Papa Tongarewa. This cultural treasure remains on display in Hawaiian Hall for your next visit.

As my great-grandmother told my father, and he told me, the secret to happiness is appreciation. It's appreciation for both the big and the small things, especially during these difficult times, that makes every day not just bearable but good.

Melanie Y. Ide
President & CEO

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Aqua Men

Bishop Museum is home to generations of world-renowned ichthyologists who have pushed the boundaries of fish research as they race against time—and overcome tragedy.



In April 2020, famed Bishop Museum ichthyologist and coral-reef fish specialist John “Jack” Randall died at the age of 95. With more than 50 years of collecting and discovering fish species, he was known as Dr. Fish, and leaves an indelible legacy at the Museum. He described and named more than 830 fishes new to science (and discovered many more that he shared with his colleagues), wrote more than 900 papers, and authored 24 books. Though Randall formally “retired” in 2009 (but never actually stopped publishing new research), Bishop Museum remains at the forefront of reef fish research.

Eminent scientists such as Randall make Bishop Museum a magnet for talent across many disciplines, creating lasting, prestigious lineages of envelope-pushing thinkers. Carrying on Randall’s work is Richard Pyle, an O’ahu born-and-raised, self-proclaimed “fish nerd.” At 53, he is the new reef-fish expert—one of his two TED Talks has been viewed more than 450,000 times, he has appeared in many documentaries, and he is lauded by his peers.

The two men met when Pyle was an 18-year-old University of Hawai’i student, but didn’t get to know each other until a year later, after he dropped out of school to help establish an aquarium fish business in Palau. Randall arrived in July 1986 with a grant from National Geographic to do fish collection and surveys. Randall needed a boat and diving partner, and Pyle was more than happy to accommodate him.

On the last day of this dream expedition, Pyle almost died when he was stricken by a severe case of the bends, due to a faulty gauge and youthful pushing of limits. After being paralyzed for a week, he spent a year recuperating. But it was the start of a lifelong friendship, and the beginning of Pyle’s career—that perilous day made him realize he wanted to dedicate his life to looking for new species on deep coral reefs. Randall inspired him to pursue academia and offered Pyle a job at Bishop Museum.

The fish library and the race against time

On the makai edge of the Bishop Museum campus is an aging, nondescript 7,500 square-foot warehouse. The almost derelict façade offers no clue to the marine marvels inside.

Pyle began working at Bishop Museum in 1986, in a narrow, windowless office inside the warehouse, processing Randall's specimens collected from around the world. Thirty-four years later he is at a computer in the same office. Covering an entire wall is a map of the world dotted with pushpins marking Pyle's dive expeditions over the years.

Beyond Pyle's office is a crepuscular, cavernous space filled with metal shelves, each shelf crowded with glass jars holding ghostly marine life—from sharks the size of a human leg to palm-size reef fish—their color leached by the isopropyl alcohol that preserves them. Scientists from around the world visit this fish “Holy Grail” that reaches all the way back to 1864, when Captain Joseph Hammond gave the Museum its first specimen which remains in the collection today. The main collection starts with fishes collected in January of 1900 and includes the combined life's work of Pyle and Randall.

Each jar is labelled with essential information—where and when the specimen was obtained, its size, its sex. But, Pyle explains, there is other information that is priceless. Each specimen contains “chemical signatures”; chemical signatures in a fish from 100 years ago can be compared to fish today, and provide clues on key issues such as pollution.

“We haven't even begun to realize how much information is contained in these jars,” he says. “At first glance, it's just a dead fish, but there's so much more we can get out of it that we're only beginning to understand how to do.”

As Pyle continues to go on expeditions in search of new species, he is in a race against time, driven by two factors: climate change and extinction. Scientists estimate that we have identified only around 10 percent of all living species, which means there are a lot of species to discover, as climate change, deforestation, pollution and other factors hasten extinctions. Pyle sees our best solution as creating protected areas and mitigating climate change, while “hedging our bets to document as much as we can before it's gone.”

“Every species is like a book, the product of over four billion years of editing, and re-editing,” says Pyle. “Global biodiversity is Earth's greatest library. Each one of these books contains a unique story of survival.”

Expeditions in late 2019 took Pyle to the Solomon Islands, following years of planning. His finds from those trips have been added to the Bishop Museum collection.

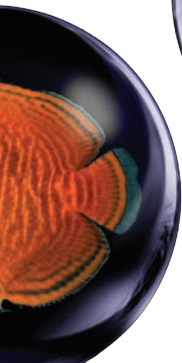
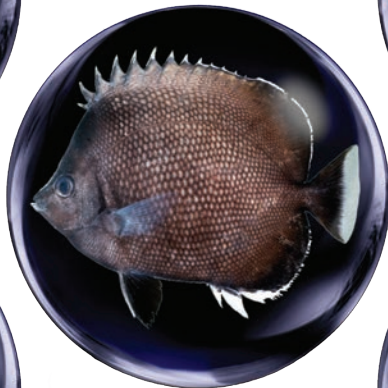
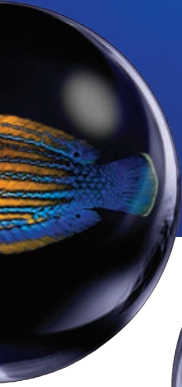
“Every species is like a book, the product of over four billion years of editing, and re-editing,” says Pyle. “Global biodiversity is Earth's greatest library. Each one of these books contains a unique story of survival.”

Which makes taxonomists like Pyle our librarians. When he is not doing dangerous dives in far-flung seas, Pyle is at his desk, turning those glass jars into data. In 1992, he created the fish collection database, and has gone on to become “the database guy” for all of Bishop Museum's collections.

As a member of the International Commission on Zoological Nomenclature, the group that oversees the scientific naming of animals, he created ZooBank. The open-access registry is where scientists can upload animal names, along with bibliography related to the species. Launched in 2008, ZooBank now lists more than 250,000 names.

Upper right: Dr. Richard Pyle, Bishop Museum Senior curator of Ichthyology, Director of XCoRE.





The Twilight Zone and rebreathers

As technology has changed, so has reef exploration. To find fish his mentor hadn't already discovered, Pyle had to go deeper. Randall was one of the first marine biologists to use scuba gear to explore coral reefs. From the Pacific Ocean to the Red Sea, if a fish lived within the first 100-200 feet of reef, Randall probably found it. But we now know that reefs go down to 500 feet or more, and Pyle realized 80 percent of coral reef habitat was ripe with unknown species. "We estimate one-third of all coral reef fishes are still waiting to be discovered," says Pyle.

And that's where he picks up Randall's torch. Pyle has dubbed the shadowy reef world beyond scuba gear's 200-foot limit "the Twilight Zone," and has made his name exploring it. Just as Randall was one of the first to use scuba, Pyle broke new ground as an early adopter of modern closed-circuit rebreathers. A rebreather is an electronic contraption that cycles a mixture of gasses through a breathing loop that includes a chemical filter to pull out carbon dioxide, allowing him to leisurely explore the caves and crevices in the descending reef wall for dives lasting up to eight hours at a time.

Today Pyle helps companies such as Sweden's Poseidon Diving Systems design and test rebreathers. Pyle and his colleagues have discovered up to 12 new species of fish per hour when on an expedition.

**"We estimate
one-third of
all coral reef
fishes are still
waiting to be
discovered."**

Next generation: New frontiers of discovery

Following in Pyle's footsteps was research assistant Joshua Copus, who was a master DNA detective. He did a DNA analysis of a specimen he and Pyle had recently collected in Pohnpei, and discovered that not only is it a new species, but a whole new genus. In addition, Copus was doing work on DNA extraction from specimens preserved in formaldehyde, which for chemical reasons makes the task difficult. Pyle says in another five to 10 years Copus would have "unlocked a whole cabinet of possibilities that is going to be incredibly valuable."

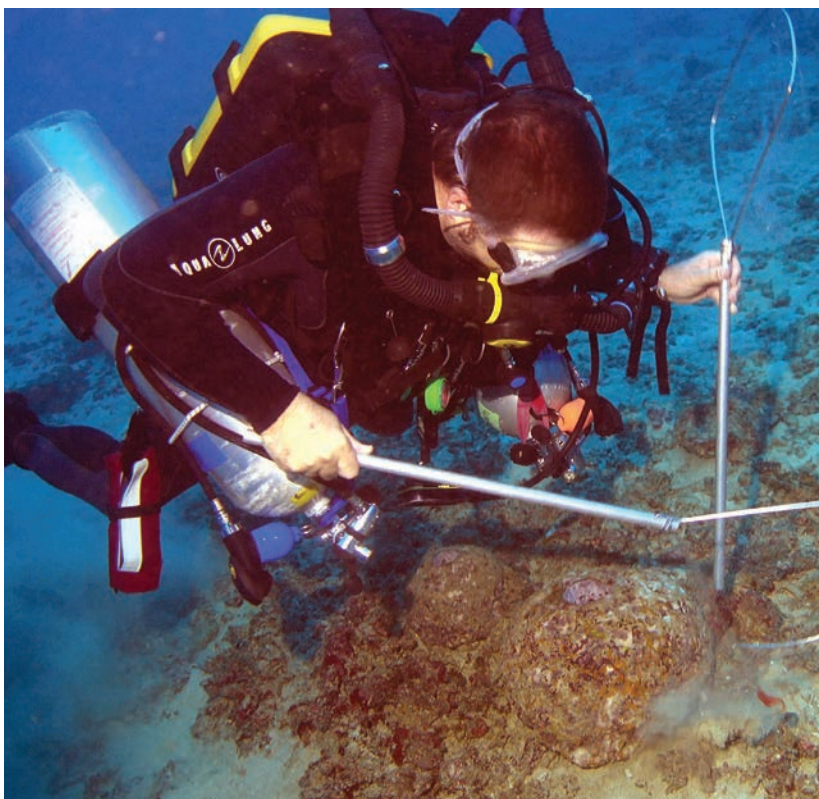
Tragedy struck Bishop Museum in November 2019, when Copus died in a diving accident while on an expedition in the Solomon Islands with Pyle. It eerily echoed Pyle's own experience 34 years ago. "The reality is that biology still involves actual exploration and there is a cost of this level of exploration," says Pyle, who is ensuring that Copus continues to be part of Bishop Museum's fish legacy.

In bittersweet kismet, the torch will still be passed—to a close friend of Copus. Brian Greene, who grew up in Kwajalein, had reached out to Randall and Pyle when he was a teenager already doing deep dives. He was on the dive trip in the Solomon Islands with Copus. Now back at the University of Hawai'i to complete a degree he had abandoned years ago, he is thinking ahead to his Ph.D. and working at Bishop Museum.

"Josh, Brian and I were already a group of three fish nerds," says Pyle. "Now that Brian is back on the academic track, the stars have come into alignment. Except Josh is no longer among us, which is very painful."

Left top and wbottom: Brian Greene.

Right: Josh Copus.



Bishop Museum Describes

First Native Hawaiian Snail Species in More Than 60 Years

Discovery provides hope that native populations may still exist in the face of a biodiversity crisis

For the first time in more than 60 years, Bishop Museum scientists have named a new species of living native Hawaiian land snail. The discovery provides hope that there may be other populations existing of this and other species of native land snails – an animal group known for its mass extinctions. The arduous research process that was required to give the species a scientific name also marks a massive step forward in preservation, and will enable researchers and cultural practitioners to better integrate their respective fields in understanding this species and conserving biocultural resources that are unique to Hawai‘i at large.

Since 1600, Pacific land snails have accounted for more recorded extinctions than any other group of animals. The Hawaiian Islands were once home to more than 750 species, with over half of these becoming extinct due to habitat loss, the effects of global warming and invasive species. Norine Yeung, Bishop Museum malacologist and the lead author on the study, said that the confirmation of this new species “brings that little glimmer of hope that this isn’t all a depressing story.”

“This is a happy story where we discovered a snail that is still around,” said Yeung. “There are so many things in our collection that we can no longer find in the wild. But in this snail’s case, we can finally put a name to it and describe it, which is huge for the conservation of this species.”

The new species, *Auricullela gagneorum*, is endemic to the Wai‘anae Mountains of O‘ahu and is a close relative of other O‘ahu tree snails. This new species has a small shell, less than five millimeters (two-tenths of an inch) tall when fully grown, and displaying significant color variation, ranging from burnished tiger’s-eye patterning to dramatic sable and white stripes.

The species was first discovered by Bishop Museum researchers in 1912, but remained in the collections without sufficient resources to conduct the research required to give it a scientific name, thereby confirming it as a new species. In 2013, a population of this species was rediscovered and a collaborative team of researchers from Bishop Museum (Yeung; Ken Hayes, Bishop Museum director of Pacific Center for Molecular Biodiversity; and Jaynee Kim, malacology collection manager), Florida Museum of Natural History (John Slapcinsky, invertebrate zoology collection manager), and the Smithsonian’s Natural History Museum (Ellen Strong, malacology curator), began the task of studying its shell, anatomy, and genetics so that it may be formally described as a new species. The naming of this species comes more than 100 years after its initial discovery, and marks the first new living native Hawaiian snail species to be described in more than 60 years.





Feather Cloak and Helmet Gifted to Captain Cook by Chief Kalani'ōpu'u **Permanently Returned to Hawai'i**

In July 2020, we celebrated together in the announcement that an 'ahu 'ula (feather cloak) and mahiole (feather helmet) gifted by Hawaiian Chief Kalani'ōpu'u to Captain Cook in 1779 have been permanently returned to Hawai'i by the Museum of New Zealand Te Papa Tongarewa.

In March 2016, the items returned to Hawai'i to Bishop Museum in Honolulu on long-term loan. On July 8, 2020 it was confirmed that the 'ahu 'ula and mahiole will remain in Hawai'i in perpetuity, being held in trust for the people of Hawai'i by Bishop Museum.

These stunning feather garments are among the most significant cultural treasures in Hawaiian society, and have an incredible story to tell about the history of the Pacific.

This historic repatriation is the result of a close partnership between the Office of Hawaiian Affairs (OHA), the Museum of New Zealand Te Papa Tongarewa, and Bernice Pauahi Bishop Museum. It is also supported by the descendants of Lord St Oswald, who donated the items to New Zealand's Dominion Museum in 1912.

"After more than a century in Te Papa's care, we are humbled to accept the kuleana (responsibility) of caring for the 'ahu 'ula and mahiole of Kalani'ōpu'u. Together with our partners at OHA and members of our community, we have witnessed these precious pieces of our cultural heritage return home. With their extraordinary presence, they give the people of Hawai'i a tangible connection to the past, and to ancestors whose mana remain strongly rooted. The impact of this gift will be felt for generations, and we will honor Te Papa's inspirational act of leadership and generosity with our commitment to strengthen the kinship between our peoples and institutions. We offer our deepest gratitude and aloha to our friends in Aotearoa, and look forward to all that we will do together as a Pacific community," said Melanie Y. Ide, President and CEO, Bishop Museum.



Neighboring Ulu by Kris Goto

E Ulu A Pa'a

Bishop Museum 2020 Fundraiser

AUGUST 23-30

Each summer for the past 21 years, Bishop Museum has brought our community together in support of the Museum's mission. With the safety and health of our 'ohana, guests, and partners in mind, we made the decision to postpone our Annual Bernice Pauahi Bishop Museum Dinner. This past August, we instead invited our community to join us on our digital platforms for our first online fundraiser E Ulu A Pa'a.

This weeklong fundraising campaign included a dynamic online auction celebrating the stories, people, and partners that contribute to our continued growth (ulu) and make it possible for the Museum to build a solid foundation (pa'a) as we continue to pursue our mission and serve our local and global community.

During a time when we are all navigating through unprecedented challenges, it was truly heartwarming to see community come together to help raise over \$185,000 in vital funds to ensure that the Museum continues to thrive as a primary resource of Hawai'i and the Pacific, and support the Museum's most critical work.

On behalf of Bishop Museum's staff, Board of Directors, and volunteers, mahalo to our 'ohana near and far for participating in E Ulu A Pa'a, and making our first online fundraiser a success!

"Bishop Museum is nothing without you, our community, and it is through your support that we are able to tell the stories of our people and the culture of Hawai'i for future generations. Mahalo nui."

MARQUES HANAIEI MARZAN, CULTURAL ADVISOR / THE WAYNE PITLUCK AND JUDITH PYLE CURATOR FOR CULTURAL RESILIENCE / ACTING ETHNOLOGY COLLECTION MANAGER



Numbers at a Glance!

1,709 bids placed

1,130 registered bidders

200 limited-edition stickers

180 unique auction items and experiences

70 participating artists and cultural practitioners

25 new or renewed members

13 virtual field trips donated to schools



“Bishop Museum is an incredible point of inspiration to our Indigenous artists and our Kānaka, and not even just those people here, [in Hawai‘i] but people who come from around the world.”

**MANAOLA YAP, HAWAIIAN DESIGNER
AND CULTURAL PRACTITIONER**

“I feel like it’s part of my kuleana to help the institutions such as Bishop Museum care for the items that most of us wouldn’t be able to care for on our own....taking inspiration from the Collection and creating new modern things, and it also allows us a place to showcase these things.”

**KAWIKA LUM-NELMIDA, CULTURAL
PRACTITIONER & FEATHERWORK ARTIST**



“E Ulu A Pa’a has to do with not only growing, but continuing the establishment of something that is really pono, that is a value to all of us. It allows for contemporary artists to utilize Collections and to integrate knowledge that is traditional, as well as contemporary.”

**MELEANNA ALULI MEYER, VISUAL ARTIST,
COMMUNITY EDUCATOR, AND FILMMAKER**



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Mai Kinohi Mai

SURFING IN HAWAI'I

Mai Kinohi Mai: Surfing in Hawai'i, which was on view in the Castle Memorial Building, celebrated Hawaiian surfing. Although the sport is worldwide today, and intrepid surfers go so far as to plunge into Arctic waters to perform it, surfing as we know it originated here in the Hawaiian Islands. We cannot say for certain where, when, or how humans first rode waves—but we can say that, centuries ago, Hawaiians brought surfing to its highest level of development. In ancient times, surfing was open to everyone: male and female, young and old, ali'i or commoner. Surfboards showed this, being constructed of different lengths and thicknesses for the many who used them throughout the indigenous culture.

Mai Kinohi Mai was the largest surfing exhibit that Bishop Museum has ever staged, and the caliber of the surfboards in it could not be duplicated anywhere else. The Museum is fortunate to care for the oldest-known boards in existence, and some of these treasures could never be loaned for display elsewhere. In addition, modern or recent boards were borrowed from an array of notable surfers to acknowledge not only the champions of the past, but those who are excelling today in this sport. All together, these wave-riding artifacts clearly showed the progression of sizes, designs, and materials over the years. Seeing this variety of boards together in one place was an opportunity that no enthusiast should have missed.

There could be no surfing without waves, and *Mai Kinohi Mai* explained not only how waves form, but showed how the Hawaiian Islands are situated in a perfect location to receive swells generated throughout the vast Pacific Ocean. The health of this ocean also is crucial for the continuance of surfing, meaning that all who use the world's waters for recreation must ensure that they are not poisoned or polluted with manmade trash.

One eye-catching and immersive experience appealed to everyone. The walls of the entire back room of *Mai Kinohi Mai* served as movie screens for a program of surfing films and photographs. Guests saw what it's like to actually be in the water at several O'ahu surf breaks, with waves approaching and then actually washing over them! Whether they were a surfer—or even if they have never gone in the ocean—there were certain to have found *Mai Kinohi Mai* fascinating and fun.

This exhibition is generously supported by:



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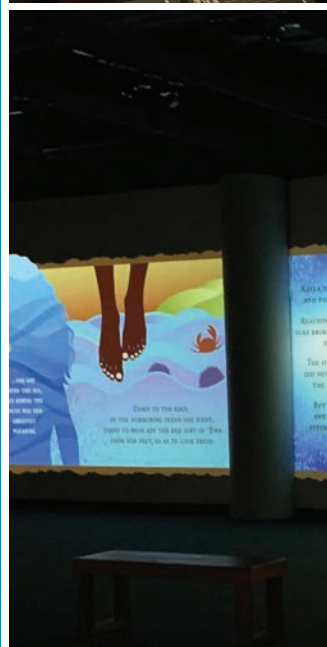
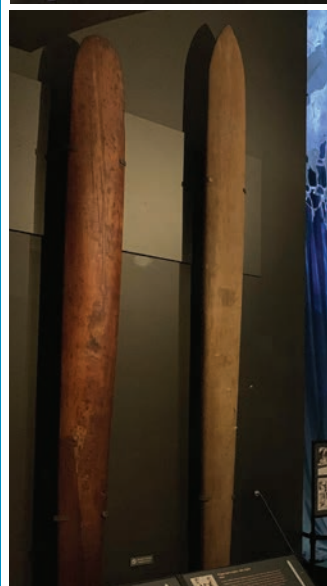
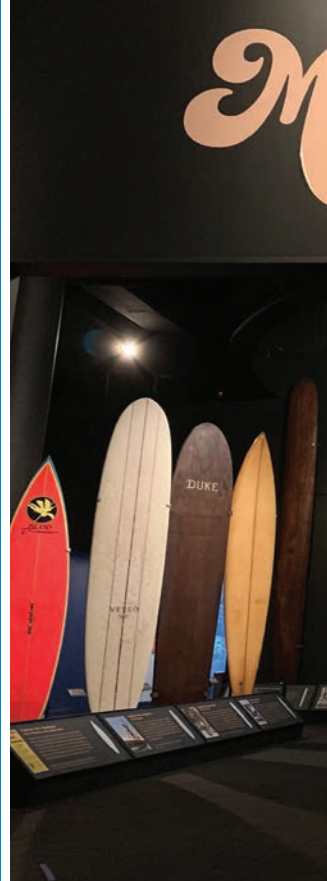
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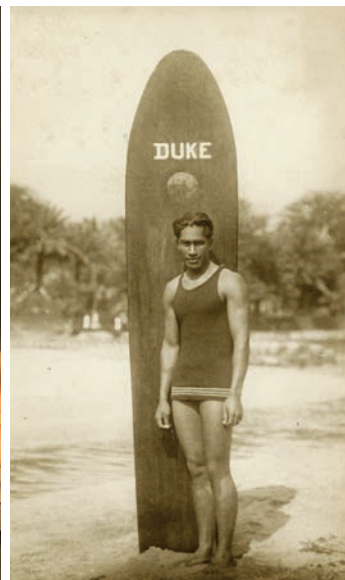
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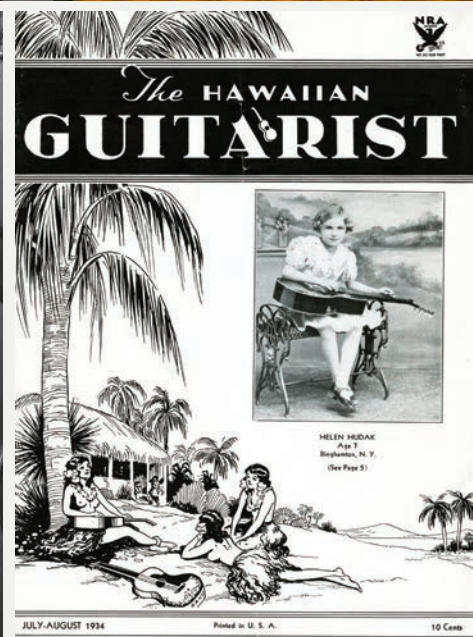
Outrigger Hotels & Resorts

Funding for the Plastic Free Pipeline installation provided by the Johnson Ohana Foundation, founded by Kim and Jack Johnson to support environmental, art, and music education.



Bottom right: Professional surfer Carissa Moore with her board on display in the exhibit, at the opening of *Mai Kinohi Mai: Surfing in Hawai'i*.





KAULA PIKO

The Source of Strings

Mahalo to our Contributing Sponsor:



First Insurance
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A Member of the Tokio Marine Group

Kaula Piko: The Source of Strings is a collaboration of Bishop Museum and Kealakai Center for Pacific Strings.

Kaula Piko: The Source of Strings, which ended its run in the J. M. Long Gallery in January, told aspects of a story that's familiar—but also almost unknown.

Hawaiian music is loved worldwide, but how it evolved from the late 19th century onwards, and how it influenced other genres of music in totally unexpected ways, is definitely not common knowledge.

Indigenous Hawaiian music only utilized one small stringed instrument, the 'ukēkē. This was played intimately, not for groups of listeners; the stronger percussive sound of objects that were beaten or struck against each other accompanied human voices for hula. But Hawaiians were very open to adapting introduced musical instruments once outsiders began visiting the Hawaiian Islands from 1778 onwards. The guitar in particular became an integral part of the music that Hawaiians created starting in the early 1800s. Melodic singing with stringed instruments soon joined the traditional chants in the native culture.

As western music was taught in churches and schools, Hawaiians came to excel at not only composing songs, but playing them as well on European and American instruments. By the 1890s, these influences came together in popular bands that used guitars, violins, and flutes. The invention of the acoustic steel guitar at this same time by Joseph Kekuku, a local schoolboy, was a revolutionary step that immediately caught the attention of the whole world. Hawaiians began traveling in the United States and internationally to disseminate their style of music to eager audiences of millions. It was the steel guitar in particular that changed the course of music, because when it was electrified in the 1930s to increase the volume of its sound, it not only became an intrinsic part of American country music, but it led to the development of the electric guitar. And in turn it was this instrument that would become the foundation of rock & roll in the 1950s. So without Hawaiian music, the music heard all over the planet in the 21st century would be vastly different.

Our exhibit, *Kaula Piko: The Source of Strings* not only told this story, it showed the instruments themselves that created it. Of course, the story was also heard and seen as well, with scores of historic photos and a wall-sized video screen on which performers from the past and present were seen and heard as they played and spoke. Attendees were able to learn and also enjoy the entire musical experience.

Honolulu Printmakers: Where Art & Science Meet

What happens when people step out of their comfort zones to discover new worlds? We explored this question with an intriguing cross-disciplinary project, *Where Art & Science Meet*.

Science and art are often considered to be opposites. However, when people exchange ideas and methods across fields, they tend to forge creative, innovative solutions and ways to work together on complex challenges. Cross-disciplinary collaboration can result in both new ideas and ways to see. With this project, we crossed that artificial divide between art and science and made unique and beautiful connections between the two disciplines.

Ten scientists from Bishop Museum partnered with 10 members of the Honolulu Printmakers to share scientific processes and insights into their respective practices. This collaboration has resulted in the artists' visual interpretations of the scientists' research work. The scientists, in turn, have created a scientific poster to explain the origin story or scientific concept for the artwork. With a variety of printmaking techniques and diverse fields of science, each partnership explored the relationship and met the challenge in different ways.

The final installation featured 10 stunning collaborative interpretations of nature viewed at the intersection of where art and science meet. Each unique composition featured a masterful one-of-a-kind print and an eye-opening scientific story which inspired the art.

Artists used various printmaking techniques to show their expertise through their chosen style and medium. The installation included prints created using techniques like intaglio, screenprinting, relief, pochoir, and lithography. Scientists created pieces that displayed their passion and expertise, some of which included prints of specimens from Bishop Museum's Natural Sciences collection. This collaboration showed how intertwined science and art truly are when viewed without constraints of each unique field. It allowed scientists and artists to experience each other's worlds and get a change in perspective.

Not only did this experience create bonds between the scientists and artists involved in this project, it also strengthened the relationship between the Museum and the local art community.

One of the most beautiful things we can experience is the mysterious. It is the source of all true art and science.

—ALBERT EINSTEIN



Spineless Wonders

Rising from the Deep



Photo by Susan Middleton

The exhibition, *Spineless Wonders: Rising from the Deep*, combined art and science in a truly unique and eye-opening way. It included stunning images by acclaimed nature photographer Susan Middleton and a complementary array of marine invertebrates from Bishop Museum's Natural Science collections. The Middleton photographs and invertebrate specimens were displayed side-by-side, an unprecedented arrangement that allowed guests to see these animals from both an artistic and scientific perspective.

There is one unifying goal that both art and science are driven toward: a greater understanding of the world around us. For the artist, the goal is achieved through revealing beauty and inspiring wonder. For the scientist, the approach is less aesthetic and more intellectual and comes through detailed analysis. However, when scientists and artists focus their attention on the same subject, the result creates a deeper and fuller understanding that would not otherwise be possible.

In the *Spineless Wonders* exhibit, the photographs displayed these animals alive and larger than life, and revealed details—colors, patterns, features—seen only through great magnification and much patience. The specimens not only showed guests the actual animals in 3D, but also offered a window into the research and efforts necessary to our understanding of the world of marine invertebrates. Both the photographs and the specimens help us know these animals better and appreciate the spectacular diversity residing just below the ocean's surface.

Of roughly 3 million marine invertebrate specimens housed in Bishop Museum's Natural Science

collections, a mere 125 were carefully selected for the exhibit to best tell the stories and showcase the biodiversity of invertebrates in the Pacific, especially highlighting those from Hawai'i. These specimens, collected for research, usually live in closed collections and do not see the light of day.

Discovery and research into marine invertebrates has greatly expanded our understanding of their importance to the balance of life as well as their interconnectedness to our own survival. Through this exhibit guests were able to go on a deep dive into Bishop Museum's history and learned what an important role this institution has played in the investigation of marine invertebrates through time, including serving as a home base for ocean explorers for over a century. From the earliest marine explorations in the 1800s to today's cutting-edge research being done by Bishop Museum scientists and its collaborators in the ocean's mysterious mesophotic coral ecosystems (also known as the "Twilight Zone"), this exhibit told stories of scientists who have plumbed the depths to explore the unknown.

This exhibition was generously supported by the John Chin Young Foundation.

Free from the constraints of having a spine, and growing in a weightless world unbound by the forces of gravity, marine invertebrates have evolved over millions of years into a vast array of spectacular forms and shapes.

Teresita "Tessie" Tabangcura



Teresita Alejandro Tabangcura was born on October 3, 1960, in Nagsupotan, San Juan, Ilocos Sur, Philippines. She graduated from The University of Northern Philippines with a degree in Accounting. In 1988 she married William and moved to Hawai'i. They had one son, Jake.

She began working at Bishop Museum on October 16, 1990. For nearly 30 years, Tessie was a fixture in the Museum's Accounting department. Through many changes in both the Museum and the Accounting department, she remained a steady presence and a model of consistency. She eventually worked her way up to Senior Accountant, a top-level staff position. Most recently, in her position, she directly assisted the Controller in many of her daily duties.

Besides her consistent and dependable work ethic, most Museum staff remember Tessie for her friendly and cheerful spirit. The Kamala trailer, which houses the Accounting department and the mailroom, sees a steady flow of staff throughout the day, most stopping to talk to the "Accounting Ladies," of which Tessie was one. Many staff members recall being cheered up each time they came to Accounting to talk with Tessie and the other ladies.

Outside of work, Tessie's hobbies included growing and fostering plants at home. She also loved spending time with her family and playing Mahjong on Saturday nights. Having worked at the Museum for so long, Tessie's cheerful spirit, helpful personality, and infectious laugh will be missed. We are grateful for all the years that she worked at Bishop Museum, making it a better place.

Dr. Roy Tsuda



Roy was a '57 graduate of 'Iolani School and the University of Hawai'i at Manoa (BA '63, MS '66), and obtained his Ph.D. from the University of Wisconsin-Milwaukee in 1970. His pursuit of scientific knowledge in the field of algae began during his early years at UHM, eventually leading him to continue his research and publications at the University of Guam. Roy served in many capacities including teaching professorship, Dean of Graduate School, Academic Vice President, and Interim President. Roy's scientific explorations took him to many islands in the Western Pacific where life-long linkages to his work and impact remain. In 1982, a very proud father (Thomas Tsuda) accepted the award of a "Distinguished Alumni" for Roy during the UHM 75th anniversary celebration.

Even after retirement from UOG, Roy maintained an active presence in the scientific community when he established the Environmental Services Division at Duenas and Associates, an engineering consultant firm. After 37 years on Guam, Roy and Sally relocated to Honolulu to be closer to his parents, and served as a research associate with the Botany-Herbarium Pacificum, Department of Natural Sciences at the Bishop Museum until the very end.

With all his professional successes, Roy's true joy came from reveling in his family's accomplishments and happiness. Beloved by his family who fondly cherish memories of him as the dedicated dishwasher/garbage collector, Roy will always be remembered and loved as our brother, husband, father, and grandfather.

Two Heroes OF ICHTHYOLOGY

By Richard Pyle

The world has lost two giants in the field of undersea research and exploration within the past year. Both were pioneers, pushing the limits of available technology to forge a new path in understanding the natural world. Both provided fresh intellectual insights that had the potential to alter history. Both forged their careers at Bishop Museum, and both will remain a part of the Museum's legacy forevermore.

John Ernest Randall, known to his friends and colleagues as "Jack," began his long and illustrious career as the Museum's Ichthyologist in 1967, and he continued to publish and work on manuscripts up until he passed away peacefully at home, in his sleep, with his wife Helen, daughter Lori, and granddaughter Sandra by his side, on April 26, 2020. Jack's legacy as one of the greatest ichthyologists in history has been celebrated in obituaries in the New York Times, Washington Post, and numerous other remembrances, as well as the memorial webpage dedicated to him (jerlegacy.com). Jack was my mentor, dive buddy, and friend; and was the eldest of three generations of marine explorers here at the Museum.

Joshua M. Copus, the third in this genealogical succession, considered me among his advisors, but I always regarded him much more as a friend and colleague, than as a student. He came to Hawai'i in 2011 as a graduate student in pursuit of a Ph.D. through the Hawai'i Institute of Marine Biology (HIMB) under the guidance of Dr. Brian Bowen. In the years that followed, Josh and I worked on many exploratory expeditions across the Pacific, including the Cook Islands, Pohnpei, Philippines, Okinawa, Guam, Palau, the Solomon Islands, and numerous expeditions throughout the Hawaiian Archipelago.

At the time of his tragic death during a diving accident in the Solomon Islands on November 13, 2019, Josh was in the final stages of completing his Ph.D. research. But he was much more than a doctoral candidate (indeed, he received his Ph.D. degree posthumously from the University of Hawai'i). He was much more than a marine biologist and cutting-edge researcher (combining his use of advanced diving technology with advanced laboratory techniques for genetic analysis). He was much more than a Curator at Bishop Museum (a title he achieved less than two

weeks before his death), playing an active and important role in reshaping the future of research at the Museum. He was all of these things, of course, but he was also something much rarer and more special: he was a genuine pioneer and explorer.

At a time in history when scientific discoveries are increasingly made in laboratories and on computers, Josh was doing the kind of true exploration emblematic of the great scientists of centuries ago. His preferred laboratory was among the coral reefs of the world, where he used the most advanced and sophisticated life-support equipment to plumb the deepest, darkest, coldest depths of coral-reef habitat in search of new discoveries. On many occasions, I joined Josh on dives to places where literally no one on Earth had ever been before, to discover species no one in history ever even knew existed. Josh possessed not only the talent, skills and fortitude to make such bold discoveries, but the strong intellectual insights necessary for recognizing their importance.

Josh experienced a life that few before him have, and fewer still ever will in the future. He genuinely inspired me to be a better scientist and a better person. He opened my eyes and removed the blinders in a way that inspired me to not only continue our exploratory efforts, but dramatically ramp them up. He urged me to reach higher, and it was largely through his energy and enthusiasm that we have begun a process for dramatically scaling up our research plans, including the establishment of a new Center at Bishop Museum dedicated to coral-reef exploration. Josh's inspiration remains the fuel behind that effort today, and will continue to be so long into the future.

**Both of these men have
earned their rightful place
among the giants upon
whose shoulders we stand.**

John Ernest Randall



Joshua M. Copus



Compared to Jack Randall, Josh's research career may have been short in duration, but it was long on substance. He authored more scientific publications during his time as a graduate student (including the introductory chapter for a recently published 1,000-page scientific book focused on deep coral reefs) than any other in his lab's history. He made many important scientific discoveries and lent valuable insights to our work on rebuilding research at Bishop Museum, and his spirit lives on through the research of his wife Cassie, and in the future of their young son Isaac and daughter Myka (born six months after his death).

Both of these men have earned their rightful place among the giants upon whose shoulders we stand. I am very proud to have known them, dived with them, and to count them both among my true friends. I also had the profound honor of joining each of them on their final scuba dives (with Jack on his 90th birthday;

and with Josh, sadly, on the dive that took his life). Together, the three of us spanned three generations of explorers, carrying on the enduring tradition at Bishop Museum to discover, study and understand the immense diversity of the Pacific. The contributions of both will continue, with important additional scientific research papers that will be published in the coming months and years. But more importantly, both have left an enduring mark on Bishop Museum's past, present and future. Their contributions to the Museum, and to science in general, will endure.

Top left: Jack Randall ready for adventure.
Bottom left: Joshua Copus.
Below: Joshua and author Rich Pyle preparing fish samples.



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If you have questions about this issue of *Ka 'Elele*, please contact the Bishop Museum Institutional Advancement Division at 808.847.8271.

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He 'ike 'ana ia i ka pono.

It is a recognizing of the right thing.

One has seen the right thing to do and has done it.

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