NUHOU KANAKA PUKA

Summer 2021

Inside this issue…

Message from the Department Chair

Aloha alumni and the entire Earth Sciences 'ohana. As I write this message there appears to be light at the end of the proverbial tunnel! Yet, as I put on my glasses there appear to be two lights: One is the light that represents the coming of a post-pandemic future where once again we can engage in normal social activities as well as enjoy face-to-face educational and research experiences. I think we all are very welcoming of this overdue light and cannot wait for it to arrive (at light speed, please). Unfortunately, the other light seems to be the all-to-regular legislative train that aims to knock down anything that smacks of research. That is the world we live in and it has not really changed much over the years. I sincerely hope the State and UH leadership can find sensible solutions so UHM can continue to contribute solutions to the State's problems and allow your department to remain at the forefront of geoscientific research. The proposed UH Mānoa cuts, if implemented, would be catastrophic. Hopefully, my glasses are just too foggy and there is only that first light.

As I wrap up my third and final year as Department Chair it is perhaps useful to take stock of where we are and what will come next. I started my term trying to navigate a contentious situation related to the Department's undergraduate degree names, which were contested on campus but finally resolved with our choices of a BS in Earth Sciences and a BA in Environmental Earth Science. With that drama behind us we focused on

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Chair: Paul Wessel
Editors: Neil Frazer, Lily Shao, and the Alumni & Outreach Committee

delivering excellent courses and growing the degrees. The online introductory courses begun by former Chair Ken Rubin continue to do very well, the enrollment in our BA degree is trending nicely upward, and our task is now to grow enrollment in the BS. The curriculum committee is working very hard on this challenge with the support of the entire faculty, while recognizing that curriculum is only part of the solution.

For as long as most of us can remember, the Department Chair has also been the Graduate Chair [**read elsewhere of a break from this model**]. To those two hats I added a third: Head Janitor – which better fits my limited skill set. Before Covid-19 made us work from home I spent countless hours getting rid of material that had been piling up in the department's quarters over many decades. (Apparently nobody felt they had the authority to throw things away.) Adopting the motto "when in doubt, throw it out" I made good progress, but there is still more to do. Unfortunately, Covid-19 struck as we were about to undertake a full-on, Norwegian-style department "dugnad". Nevertheless, with much junk removed I decided to revamp our common areas. Both the undergraduate lounge as well as all our classrooms and seminar rooms have now been significantly upgraded. Alas, our new "Interactive Learning Center" (with seven 4K TVs for wireless casting, standing desks, black glass wallboards and a tracking camera) sat empty during the pandemic, but students will be pleasantly surprised when they return from distance learning to find these major instructional upgrades. I cannot take all the credit for these improvements: my better half developed much of the design as a volunteer (and alum); our student help, Chad Morita, designed the electronics in the ILC; and Phil Rapoza did the heavy lifting (literally).

While cleaning out my cubicle I found my "Deep Dive" assessment of the department following individual 90-minute interviews with every faculty member during my first month as Chair. It was bittersweet reading. In September 2019, I made three recommendations to the Dean: (1) Create a SOEST Code of Conduct, (2) Have SOEST faculty take self-awareness training or similar, and (3) Add more SOEST social events to build collegiality and unity of purpose. Sadly, nothing happened on any of these fronts and I decided to try to tackle them myself, but at the department level. We arranged a successful 2-day department retreat at the Turtle Bay Resort (paid for by an anonymous donor) where we examined all aspects of the department's activities (research, teaching, service), started the work of crafting the Earth Sciences Code of Conduct, and invited UH HR specialists to conduct a DiSC[1] training session to better understand our individual modes of operation and communication while we enjoyed getting to know each other better outside of the work environment. By the end of the year we had adopted the very first faculty code of conduct on campus, and it became a model for the long-awaited SOEST code of conduct. SOEST is in a much different place now, with lots of activity and engagement driven by faculty, staff and students in all the units on issues such as diversity, equity, and inclusion; yet permanent funding for these essential activities has yet to be identified (or prioritized). Hopefully, the end of Covid-19 may allow us to finally tackle the social gathering aspect of the three pillars listed above, including the commencement of our annual Alumni Days event. Personally, after more than a year in lockdown I am just desperate for some Boston North End pizza at our annual "back to school" party again. I will shove slices through a slit in my mask if that is what it will take.

In case you are still reading, I'll make my usual plea for financial support. The Legislature has a strong distaste for excellence in research and would much prefer that UHM were a community college. Research units such as Earth Sciences are always in their crosshairs. Given that our budget has hardly any funds beyond salary, we rely on generous gifts from faculty and alumni to offset the costs to students of field trips and sustain our

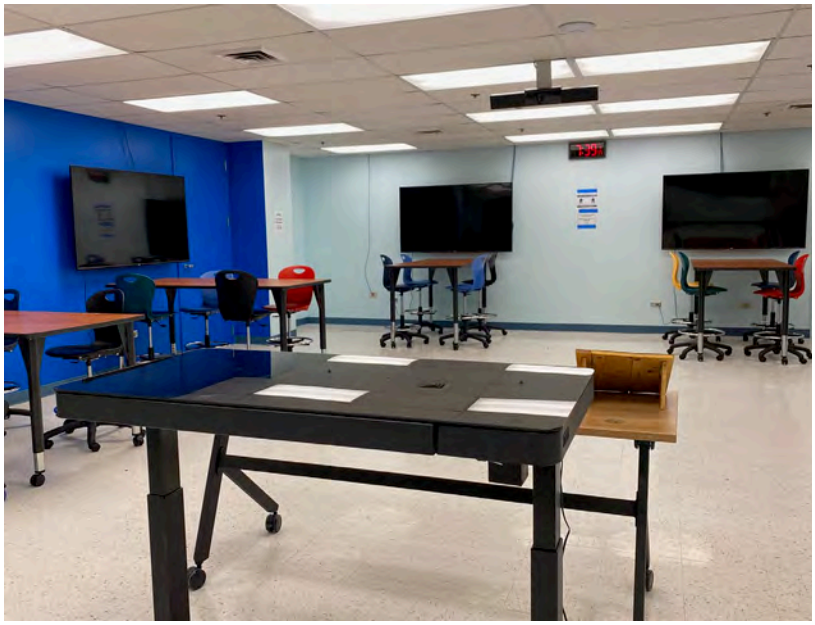
[1] DiSC® is a personal assessment tool used by more than one million people every year to help improve teamwork, communication, and productivity in the workplace.

seminar series with visiting scientists who update us on the latest research across a variety of fields. If your financial situation allows, please visit our **donations page**; it is always greatly appreciated.

Having passed the baton to incoming Department Chair Garrett Apuzen-Ito and his co-Chairs Henrietta Dulai (Graduate Chair) and Scott Rowland (Undergraduate Chair) I wish them great success in this new and exciting chapter in the department's history, and ask that you give them all the support you can muster as well. They have stepped up to the plate in these trying times, and deserve our gratitude. Finally, let me end by saying that I have thoroughly enjoyed being your Department Chair for the last three years, and I am very grateful for the experience and the support I have received. Without the excellent administrative support of Susan, Arlene, Lily and Connie, my steady Associate Chair, Jasper Konter, sage advice from past Chairs Ken Rubin and Greg Moore, and a great working relationship with the Dean's office it would have been a very much bumpier ride.

Mahalo for your support.

Paul Wessel, Chair



"Interactive Learning Center" POST 733

Seminar room, POST 723

Greetings from the Incoming Chair and Associate Chairs

Garrett Apuzen-Ito
Chair-elect

Henrietta Dulai
Graduate Chair-elect

Scott Rowland
Undergraduate Chair-elect

With Earth's new leadership structure, the Department Chair now works with the Graduate (Student) Chair and the Undergraduate (Student) Chair, who together are committed to making our graduate and undergraduate programs better than ever. One priority is to continue improving our standards on equity and inclusion, growing the participation of underrepresented groups for the advancement of the Earth Sciences as well as Hawai'i's broader society. Earth will also be rolling out a revised undergraduate curriculum designed to better prepare students for their chosen career paths and to provide more opportunities for research. We remain committed to ensuring that the faculty continue to produce the world-class research necessary to address the many pressing questions and issues in the earth, planetary, and environmental sciences.

We extend our whole-hearted gratitude to our outgoing chair, Paul Wessel. Paul worked tirelessly to make many improvements including the creation of the first departmental code of conduct on campus, the modernization of the POST 723 (TGIF) lecture room and the 733 Interactive Learning Center, the e-archiving of all Earth/GG dissertations, the creation of the Duennebier Collaboratorium, the hiring of 3 new faculty members, and facilitating many activities in research, curriculum, instruction and summer undergraduate research.

Mahalo nui loa Paul!

Garrett, Henrietta, and Scott

* * *

Alumni Days (not)

Sadly, because of the COVID-19 pandemic, we have again been forced to scrap plans for the 2020 Alumni Days events. Please stay tuned for 2022 alumni events, and check our **alumni Facebook page**. You might also enjoy the three prize-winning graduate student videos (**see below**).

* * *

Outreach

Research Experience for Undergraduates Program (REU)

The **Earth Science on Volcanic Islands (ESVI) REU Program** offers undergraduate students a unique 9-week summer research experience at the University of Hawai'i at Mānoa. Over the past 5 years (2017-2021), the ESVI REU has helped shape the academic careers of a diverse cohort of 50 students from across the nation, personally mentored by 30+ UHM faculty, pursuing scientific research on a diverse range of Earth science sub-disciplines (volcanology, environmental science, (bio)geochemistry, geophysics, etc.).

2021 REU students (and their faculty advisors): [row 1] Araela Richie, Diablo Valley College (Aaron Pietruszka); Madeleine Tan, University of Michigan (Helen Janiszewski); Silvia Alemany, Bryn Mawr College (Garrett Apuzen-Ito and Jana Schierjott); Aston Ramos, University of Hawai'i at Hilo (Henrietta Dulai); [row 2] Johanna Alén-Bella, California State Polytechnic University (Meghan Jones); Yulia Kornikova, Reed College (James Potemra and Bruce Howe); Brandon Duran, Georgetown University (Sloan Coats); Jacob Flores, Leeward Community College, UH (Alison Nugent and Giuseppe Torri); John Fast, University of Hawai'i at Mānoa (Shiv Sharma); Emma Layton, Columbia University (Alison Nugent and Giuseppe Torri)

In April 2021, the ESVI REU program rolled out as a hybrid summer research program, with 10 students participating on-site at the University of Hawai'i at Mānoa for 4 weeks (June 2021) and remotely for an additional 5 weeks (July 2021). In addition to their mentored research projects, students participated in professional development activities, including accelerated short courses in MATLAB and Python computing, ESVI-focused graduate student seminars, and workshops on Native Hawaiian culutural awareness, research ethics, and JEDI (justice-equity-diversity-inclusion) in the geosciences. Julia Hammer led a Big Island Field trip, Mike Garcia led field trips to East O'ahu, and Floyd McCoy led field trips to and Waikalua Loko I'a. We participated in a remote R/V Kilo Moana cruise to the **ALOHA Cabled Observatory** thanks to Chief Scientists Bruce Howe and James Potemra, two of our **2021 ESVI REU mentors**. Remote cruise activities included a pre-cruise workshop (where students met remotely with the science team to learn about the cruise, preparations, engineering/science involved), multiple live dives of the **Lu'ukai ROV** (via YouTube, with live Q&A with the KM science party), and an in-person tour of the ALOHA Cabled Observatory Lab at the UH Mānoa SOEST Campus. Our 2021 program ended with an impressive collection of oral and poster presentations at the **2021 SURE Symposium**. Mahalo nui loa to REU graduate "staff" Natália Gauer Pasqualon, Molly Cunningham, and Kristian McDonald, for pulling off a successful hybrid REU program!

Earth Planets-'Ike-Kuleana (EP'IK)

2021 proved to be a great year for **EP'IK (Earth-Planets-'Ike-Kuleana)**, an NSF-funded program to diversify & broaden participation in the geosciences through partnerships with local high schools. We offered a full two-week EP'IK Summer experience for local students and teachers, but in a hybrid format: seven days of online place-based thematic workshops, combined with three days of (optional) in-person field trips on O'ahu (virtual

2021 EP'IK students in the field.

field trips were offered to students from Hawai‘i and Maui, as well as to those who preferred not to participate in-person). Online curricula focused on: the solar system and Polynesian celestial navigation techniques, Hawaiian volcanoes, the Hawaiian water cycle, the geology of Hawaiian beaches, and ocean exploration, emphasizing commonalities between Hawai‘i's geologic environment and Native Hawaiian ancestral knowledge and cultural traditions. Three in-person field trips were the highlight of the program for many of our students: field trips focused on East O‘ahu geology (hosted by Jasper Konter), Windward O‘ahu geology (hosted by Scott Rowland), and a tour of the UH/SOEST campus and laboratories (hosted by Bridget Smith-Konter and Alyssa Anderson). For students unable to attend these field trips we offered three virtual field trips in our Zoom classroom, focusing on the watersheds of O‘ahu, a geological tour of the islands of Maui and Hawai‘i, and the 2018 Kīlauea eruption.

Thirteen inquisitive, highly motivated students safely participated, 83% of whom self-identified as Native Hawaiian or Pacific Islander. Eleven students were from O‘ahu, and two were from Maui and Hawai‘i. Our cohort also included two local high school teachers, from Kaimuki High School and Radford High School. Our EP‘IK Scholar program provided tuition scholarships for two Hawai‘i students, Alice Goldberg and Tia Oppegaard, as they earned college course credit for introductory Earth Science courses offered through the **UHM Summer Scholar program**. Congratulations Alice and Tia!

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Degrees, Awards & Honors

UNDERGRADUATES

Tianna Barber	**BS (GG) Spring 2021**
Caroline Canavan	**BS (GG) Spring 2021**
Catherine Rose Creadick	**BS (GG) Summer 2020**
Alayna Espeseth	**BA (EES) Spring 2021**
Kayli Hedges	**BS (GG) Summer 2021**
Emma Hon	**BS (GG) Fall 2020**
Schelin Malia Ireland	**BS (GG) Summer 2020**
Alexander James Marshall	**BS (GG) Summer 2020**
Deep Mohan	**BS (ESCI) Spring 2021**
Natalie Powers	**BA (GEOL) Summer 2021**
Carl Tobias	**BA (EES) Summer 2021**
Kianalu Woodhall	**BA (GEOL) Spring 2021**

MASTERS OF SCIENCE – PLAN A (THESIS)

Lucas Ellison – ***Geochemical and Stable Isotope Source Tracking of Terrestrial Nutrient Pollution to the Coastal Waters of Waialua Bay, North Shore, Oahu*** *(Advisor: C. Glenn, Fall 2020)*

Colin Ferguson – ***Exploration for Blind Geothermal Resources in the State of Hawai'i Utilizing Dissolved Noble Gasses in Well Waters*** (*Advisor: S. Rowland, Fall 2020*)

Jordan Mason – ***Tracing Groundwater Connections and Nutrient Flow Between Land and Sea Using UAV Infrared Mapping, Radon, and Numerical Groundwater Modeling: Waialua Region, North Shore, O'ahu*** *(Advisor: C. Glenn, Summer 2020)*

Kristian McDonald – ***UAS Surveys Reveal High Spatiotemporal Variability in Beach Morphology Including Subcell Sand Exchange and Accretion During Swell Events: Waikīkī, Hawai'i*** *(Advisor: C. Fletcher, Summer 2020)*

Kammie-Dominique Tavares – ***Rate of Beach Loss Greatest with Near-Term Sea Level Rise*** *(Advisor: C. Fletcher, Summer 2020)*

Kelly Truax – ***Quantifying Moss Response to Contaminant Exposure Using Laser Induced Fluorescence*** (*Advisor: H. Dulai, Fall 2020)*

Malia Zinn – ***Investigating Volcanic Eruptions at the Seamount Tafu: Chemical and Geographic Variation within the NELSC*** *(Advisor: K. Rubin, Summer 2020)*

MASTERS OF SCIENCE – PLAN B (NON-THESIS)

Gwendolyn Brouwer – ***Pressure-Driven Eruption of Liquid Reservoirs in Titan's Ice Shell*** (*Advisor: S. Fagents, Fall 2020)*

Tineill Dudoit – ***The Power of Place Teaching Geosciences Through Place-Based Education*** (*Advisor: B. Bruno, Fall 2020)*

Mackenzie Lach – ***The Elastic Plate Thickness and the Crustal Density Beneath the Elysium Volcanic Province Using the GMM-3 Mars Gravity Model*** (*Advisor: G. Apuzen-Ito, Fall 2020)*

Jonathan Tobin – ***UAV Detection via Deep Learning using Data from Smartphone Acoustic Sensors*** (*Advisor: M. Garces, Spring 2021)*

DOCTOR OF PHILOSOPHY

Caroline Caplan – ***The Jurassic Meteorite Flux: A Record From Extraterrestrial Chrome-Spinels*** (*Advisor: G. Huss, Fall 2020)*

Miles Egan – ***Character of Signal and Noise Sources in Dispersive and Static Fourier Transform Remote-Sensing Raman Spectrometers*** (*Advisor: S. Sharma, Summer 2020)*

Trista McKenzie – ***Multi-Tracer Approaches for Groundwater Discharge and Anthropogenic Pollution in the Pacific*** (*Advisor: H. Dulai, Fall 2020)*

Macey Sandford – ***Innovative Remote Spectroscopic Techniques for Planetary Exploration*** (*Advisor: S. Sharma, Summer 2020)*

Lingzhi Sun – ***Lunar Geology Survey with Remote Sensing and Apollo Samples*** (*Advisor: P. Lucey, Fall 2020)*

Brian Shiro – ***Geological and Geophysical Investigations on Kīlauea and Mauna Loa Volcanoes, Hawai'i*** (*Advisor: S. Rowland, Spring 2021)*

Brett Walker – ***Eruption Dynamics of 21st Century Hawaiian and Strombolian Volcanism: Insights from High-Resolution Videography*** (*Advisor: B. Houghton, Spring 2021)*

STUDENT AWARDS

AGATIN ABBOTT MEMORIAL AWARD

Presented to the outstanding senior, annually, in memory of department faculty Agatin Abbott.

Orion Hon and Alayna Espeseth

TOBY LEE ARCS AWARD

Awarded by the Achievement Rewards for College Scientist Foundation, in memory of Toby Lee.

Chiara Ferrari-Wong

FRED M. BULLARD FELLOWSHIP

Endowed by Thais Freda Bullard in memory of her father, Fred M. Bullard, a pioneer in the studies of Volcanology and general Geology & Geophysics.

Rena Lee and Rebecca deGraffenried

DONALD A. SWANSON AWARDS

Amy Kitchener and Molly Cunningham

Amy will use an interactive discursive approach within the community to assess the potential for the land buy-out scheme to result in a more resilient Lower Puna. Molly will analyze Kīlauea samples using the electron microprobe at UH, and oxygen isotope ratios using laser fluorination mass spectrometry at University of Oregon.

HAROLD T. STEARNS AWARD

Natália Pasqualon

Natalia will perform geochemical analysis of samples from Trindade Island using an MC-ICP-MS for a comparative volcanic island study.

AMERICAN MINERALOGIST UNDERGRADUATE AWARD

Tanis Leonhardi

GRADUATE STUDENT AWARDS FOR BEST SHORT RESEARCH VIDEOS

The following are the three winning entries from the 2021 University of Hawai'i at Mānoa, Department of Earth Sciences student video contest. These videos and their contents are used by permission of the authors, who are graduate students in the UHM Earth and Planetary Sciences program.

Eleni Ravanis: "How we see Mars"
https://youtu.be/EvNgP1wd2FA

Chiara Ferrari-Wong: "The search for hydrogen-carbon compounds on the Moon"
https://youtu.be/MSrbAgFAJzA

Noah Paoa Kannegiesser: "Probabilistic sea level rise modeling using ROMS analysis"
https://youtu.be/L0AOTBNRGIs

FACULTY AWARDS

Eric Gaidos was awarded a prestigious **Ida Pfeiffer Visiting Professorship** at the University of Vienna for the summer of 2021. The citation reads, in part, "Eric Gaidos is an astronomer, planetary scientist, geobiologist and professor in the Department of Earth Science at the University of Hawai`i at Mānoa. His research is on the formation, evolution, detection, and characterization of habitable planets around stars, and the potential distribution of life (astrobiology)." The award interview with Eric can be found **here**.

Eric Gaidos, Ida Pfeiffer Awardee

Bruce Houghton, 2021 Regents' Honoree for Excellence in Research

Bruce F. Houghton received one of only three UH Board of Regents Medals for Excellence in Research. These medals recognize scholarly contributions that expand the boundaries of knowledge and enrich the lives of students and the community. The citation reads in part: "Bruce is the Gordon A. Macdonald Professor of volcanology in the UH Mānoa School of Ocean and Earth Science and Technology. He is also Hawai'i's state volcanologist and science director for the National Disaster Preparedness Training Center at UH Mānoa. His research specialty, and that of his students and postdoctoral fellows, is the eruption dynamics of explosive eruptions, particularly at Kīlauea and Stromboli volcanoes. Houghton played a leading role in collaboration with the Hawaiian Volcano Observatory in the science response during the 2018 eruption of Kīlauea. He works across the interface between volcanoes and society, collaborating with world leading disaster psychologists and sociologists. He has published 267 papers in international journals, including four papers in *Nature* in the first four months of 2021, and has received 13,700 citations. Described by his colleagues as a 'giant of volcanology,' Houghton was a 2017 recipient of the highest accolade from the International

Association of Volcanology and Chemistry of the Earth's Interior, the **Thorarinsson Medal**, the ninth recipient of the medal in the 100-year history of the association."

Scott Rowland is the recipient of a 2021 Regents Medal for Excellence in Teaching. The award citation states in part: "Among his colleagues, Rowland is viewed as being the one faculty member that all our students know and love, who leads by far the most field trips, a local born-and-raised bridge to the Native Hawaiian community. In his ERTH 104 course, he provides students opportunities to create a stone implement according to ancient Hawaiian methods while learning about stones from a western geological perspective. He strives to motivate each student, sparking their desire to learn on their own and pass on their knowledge. His work ethic and unique teaching methods have inspired a recent student to become a teacher in the community upon graduating from UH. The student described Rowland as going above and beyond the call as a college professor by visiting high schools to lead Earthquake Labs." Rowland is described as "truly the beating heart of the department's undergraduate program while maintaining a strong research profile." Ho'omaika'i, Scott! *(The number of congratulatory emails Scott received from his colleagues on the occasion of this award was truly impressive. -Ed.)*

Scott Rowland, 2021 Regents' Honoree for Excellence in Teaching

Greg Moore, Wing Ip Medalist

Greg Moore (now emeritus) was awarded the Asia Oceania Geosciences Society Wing Ip Medal, for unselfish co-operation and leadership in geoscience in the Asia Oceania region. The (condensed) citation states: For more than 40 years Professor Moore has advanced our understanding of plate convergent systems in East and Southeast Asia through his research achievements, his leadership of international programs in the Asia-Oceania region and his mentorship of young geoscientists in Southeast and East Asia.

In the early years of his career, Professor Moore developed a strong interest in the Sunda subduction system, which later brought him back to Southeast Asia's geological community. After joining the University of Hawai'i in 1988 he continued his marine geological research in Asia, participating and serving as the Chief or Co-Chief Scientist on dozens of oceanographic expeditions and Ocean Drilling Program (ODP) cruises. His scientific footprints are now on many important plate convergent boundaries in Asia, including the Sunda, the Mariana, and the Nankai subduction zones, and the accretionary prism offshore Taiwan.

His research achievements along the Nankai Trough and other plate convergent boundaries led to Professor Moore being Visiting Scientist or Visiting Professor at many Asian institutions, including the University of Tokyo, Earth Observatory of Singapore, and the Japan Agency for Marine-Earth Science and Technology (JAMSTEC). His scientific vision led to the establishment of the multi-nation, multi-year NanTroSEIZE drilling program, which has revolutionized our understanding of structural activity and evolution in accretionary wedges.

With his knowledge, wisdom, and passion for research, Professor Moore has mentored and inspired numerous young scientists in Japan, Taiwan, Myanmar, and Singapore, helping them overcome language barriers to publication of results in international journals.

Over the past two decades, Professor Moore has actively participated in many geoscience societies in East and Southeast Asia, including the JpGU, the Myanmar Applied Earth Sciences Association, and of course the AOGS. He attended his first AOGS meeting in 2014 in Sapporo, and was one of the key members of the team to invite AOGS to Hawaii in 2018. His service as Chair of the Local Organizing Committee made the 2018 meeting one of the most successful AOGS meetings. He has participated several times in the “Meet the Experts” program at AOGS meetings, mentoring Asian students on-site.

In view of Professor Moore's profound contributions, collaboration and leadership in geoscience in the Asia Oceania region, the 2021 AOGS Wing Ip Medal is a particularly well deserved distinction. - J. Bruce H. Shyu, Distinguished Professor, National Taiwan University

AWARDS TO ALUMNI AT UH

President's Distinguished Faculty Specialist, Barbara Bruno is with the Hawai‘i Institute of Geophysics and Planetology in the School of Ocean and Earth Science and Technology (SOEST). Barb's extraordinary services to the scientific learning communities in SOEST, the university and the public have enhanced access to STEM research and classroom learning. In the words of Barb’s nominators, “her efforts have changed lives.” Her contributions include numerous publications, cross-campus efforts such as establishing a STEM Summer Bridge program from Kapi‘olani Community College to UH Mānoa, undergraduate research programs, and professional development programs for staff, graduate students and postdocs. She supports herself and other faculty, staff and students through extramural grants, and served as co-PI for EPSCOR and CMORE. Bruno spearheads the effort to bring place-based educational methods to SOEST and across the system. Her vision, empathy and drive have fostered collaborations, mentored students, improved student success, championed diversity and inclusion, and broadened participation among underrepresented students, particularly women and Native Hawaiians, as she continues to inspire and train the next generation of scientists.

Barb Bruno

Dr. Amefil "Amy" Agbayani Faculty Diversity Enhancement Award Honoree Jennifer (Jenny) Engels is a research affiliate with the Hawai'i Institute of Geophysics and Planetology in the School of Ocean and Earth Science and Technology (SOEST). Jenny has been a visionary and compassionate leader in diversity, equity and inclusion (DEI) initiatives at UH Mānoa for more than 20 years. She was the driving force behind bringing the Search Advocate Program to UH Mānoa: a hiring framework for DEI that is proving to be transformational for the campus climate. In addition, she is spearheading a new campus wide Hawaiian Place of Learning-focused proposal and DEI strategic plan for the university. She was fundamental to the creation of SOEST's interim director for DEI position and is working to enhance it. As a result of her efforts, SOEST has the highest increase in rates of hiring women and underrepresented minorities of any UH Mānoa college. Engels addresses structural change through intersectional and proactive initiatives that have great impact at the department and college level, benefitting the entire UH Mānoa community.

Jenny Engels

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2020-2021 Earth Sciences Faculty Research & Teaching Highlights

Garrett Apuzen-Ito has completed a study with **Greg Moore** in which they used numerical models to characterize how stresses and spacing of faults at accretionary prisms are controlled by its material properties [*Ito & Moore* 2021]. Garrett is also glad to have completed a study with **Imani Guest** (REU, 2018) and **Mike Garcia** in which they used the mineralogy of xenoliths in the Salt-Lake Crater tuffs to show that the lithosphere beneath Hawai'i has been nearly halved in thickness due to magma that has penetrated it to form the islands [*Guest et al.* 2020]. Congratulations to **Kenzie Lach** who successfully completed her MS on Martian volcanos, and will be entering the PhD program in Astronomy at UC Irvine. **Daniel Douglas** (M.S.) has successfully defended his study of the rheology of the oceanic lithosphere using 3D solid-mechanics models of lithosphere flexure beneath the Hawaiian islands. Garrett welcomed post-doctoral researcher, **Jana Schierjott**, who is working on 3-D models of faulting and magmatism at mid-ocean ridges.

Henrietta Dulai The Dulai Lab had a busy year: **Casey McKenzie** started her MS project on tracking nitrogen and contaminant sources in mix-use watersheds and is busy tracing micropollutants from different land-uses showing up in groundwater. **Kelly Truax** completed and defended her MS thesis on quantifying metal contamination in moss using remote sensing technique -a project which is a collaboration with HIGP's **Anupam Misra** and colleagues from the Savannah River National Lab. We are excited that Kelly is staying on for her PhD. **Trista McKenzie**, who has been with us since 2014, receiving both BS and MS in the department, defended their PhD dissertation on tracing wastewater pollution in groundwaters. Trista received multiple awards and

Graduate student and Sea Grant Fellow Casey McKenzie collecting coastal groundwater samples for her project that looks at chemical fingerprints of land uses. (H. Dulai photo)

fellowships - literally too many to list here, and is now a postdoctoral researcher in the Department of Marine Sciences at the University of Gothenburg, supported by a Marie Curie Fellowship. We could not be more proud of all her achievements!!! We also welcomed undergraduate students U'I **Jesse-Kealanahele, Haley Currier, Sofia Suesue** and **Aston Ramos** who are working on projects ranging from water quality, environmental pollution, image analysis, and various data processing tasks. As usual, over the past year we have had the privilege of working with multiple community partners whose generosity of time and resources has been invaluable. Mahalo!

Postdoc Trista McKenzie joined us for field work and is saying "good bye" to the sunny coastlines of her PhD, before relocating to Sweden later this summer. (H. Dulai photo)

Robert Dunn's research group is deep into the analysis of the geophysical data he collected during two recent research cruises, one to the Emperor Seamounts and the other locally, to the Hawaiian Ridge. He and PhD students **Brandon MacGregor** and **Chong Xu** are analyzing seismic lines that reveal the internal structures of the volcanic edifices, the oceanic crust, and the mantle. These studies are part of a larger NSF-funded collaboration between UH scientists and scientists at Northern Arizona University, Lamont-Doherty Earth Observatory, Oxford University, the USGS, and GEOMAR. Robert's group and his ERTH304 students continue mapping the gravitational field of the southeastern portion of O'ahu as part of a long term project to provide research experiences to undergraduates. Congratulations to former graduate student **Charu Lata** for publishing her work on the magmatic evolution (from a seismologist's perspective) of the Eastern Lau Spreading Center. Robert's sabbatical at Oxford continues to be postponed due to global, extenuating circumstances.

Aly El-Kadi's Hydrology Group Researcher **Chris Shuler** led a study which is a part of a project funded through NOAA's Pacific Regional Integrated Sciences and Assessments (RISA). The study, recently published in the Hydrogeology Journal: Regional Studies, applied a geospatial water-budget approach to Tutuila Island (American Samoa). This approach provides high-resolution, whole-island, groundwater recharge estimates for use in water resources management. In addition, the study assessed potential future change in recharge by incorporating dynamically downscaled global climate model predictions into the analyses. Chris's predictions will provide water resource managers with the information needed for adaptation and island-scale planning. Model scenarios will help to identify high priority areas for maximum impact land-use management and opportunities for adaptation to predicted climate stressors. Chris is also developing a web-mapping tool so users can access the results as a website in any browser and be able to interactively explore the water budget model components in the form of a dynamic map. **Brytne Okuhata** is wrapping up her time as a graduate scholar on 'Ike Wai, a multidisciplinary project funded by NSF EPSCoR. The objective of Brytne's research was to develop a groundwater model for the Keauhou basal aquifer (Hawai'i Island) to assess nutrient transport from sources to coastal discharge points. Example model applications were introduced, including assessment of relative contaminant source contributions, and aquifer response concerning water level, salinity, and nutrient concentrations due to land-use and climate change, and sea level rise. Model results show that nutrients detected in the basal Keauhou aquifer are primarily sourced from onsite disposal systems (OSDS; including septic systems and cesspools) and the upland aquifer, as supported by a nitrogen isotope mixing model. While the model is set up for west Hawai'i, the land use applications are universal, and the adopted approaches and procedures are suitable for managing water

ASPA student interns and ASPA technician Matt Erickson help with weather station installation in American Samoa. (C. Shuler photo)

resources of similar coastal aquifers. Brytne is now working with economists, marine scientists, botanists, and resource managers to apply the model to future scenarios to assess the impacts of increased development, cesspool conversions, and land cover changes. She is also using multiple geochemical tracers to assess groundwater influences and residence times across West Hawai'i.

Neil Frazer In Fall 2020 I was on sabbatical, working with scientists in British Columbia to study the amplification of viruses by sea-cage salmon farms and the consequent risks to wild salmon. The two-week quarantine in 2020 was tedious, but was nowhere near as bad as the quarantine in 2021: two Covid tests in Honolulu in order to be sure of having a result less than 72 hours before landing in Canada, a red-eye from Honolulu to Vancouver, compulsory Covid testing in Vancouver airport at traveller expense, a mandatory three-day stay at a hotel in Vancouver, which cost more than the return airfare from Honolulu, another flight up the coast, followed by an eleven-day quarantine, reporting to a government agency every day, a second Covid test on the 8th day of quarantine. The irony is that, with two Pfizer-BioNtech vaccinations, I was probably the safest person in Canada! Nobody else there had more than one vaccination at the time. However, the quarantine circus was worth it to get away from the computer and be out on the water doing the kind of science that could result in policy changes to help the wet part of the biosphere. ***Teaching:*** With a face made for radio and a voice made for print, I had no choice last fall but to write a custom textbook for my Bayesian Data Analysis (ERTH 695), which was pleasant because BDA is such a beautiful thing. That said, it has been a great relief to return to in-person teaching this fall. ***Research:*** In addition to the salmon virus stuff, I continued to work with **Rhett Butler** on the Cascadia subduction zone while helping **Paul Wessel** and his student parse hotspot tracks into relative hotspot motion and plate motion. The math for the latter problem was great fun—the first time I've ever thought hard about plates moving around on a sphere. It reminded me that many years ago I might have done a PhD with Jason Morgan if I'd had more courage. Jason wanted a student, but at the time I could not imagine being paid for that type of work, so economic insecurity kept me in seismology. Oil companies ruled the world then, and seismologists were what they needed. The oil companies' day is nearly done, thank goodness, and now, at the end of my scientific career, I finally get to think about plates and use the word *hotspot* as if I knew what it meant. Well, yes, just one plate, but it's a start. Life is good!

Eric Gaidos led another installment of his graduate science writing class in the spring of 2020. He and the five participating students published a review paper on “Lava Worlds” in the journal *Geochemistry*. A picture of the Kīlauea lava taken by ES colleague **Tom Shea** graces the cover of that issue. This spring, Eric again teamed up with **Dan Huber** at the Institute for Astronomy to teach a data-intensive course on planets around other stars (exoplanets). This past fall semester, Eric began working with two new students, **Rena Lee**, a Bullard Fellow in the Earth and Planetary Science M.S. program, and **Suchitra Narayanan**, a graduate student at the Institute for Astronomy. Among other research highlights, Eric and several colleagues from the Hawai‘i Institute for Geophysics and Planetology (**Bin Chen**, **Elena Dobrică**, and **Gary Huss**), and Institute for Astronomy are co-investigators in a new NASA Astrobiology program to study the role of light elements in planetary atmospheres and the origin of life.

Helen Janiszewski has continued her work using seismic imaging to understand volcanic systems, as well as investigations of seismic data from ocean bottom seismometers (OBS). Her move to UH has not gone exactly as planned—lockdowns began only three months after her arrival last year—but she has been making the best of those disruptions. She served as co-chief scientist for scientific cruise RR2003 aboard the R/V Roger Revelle which recovered 30 OBS instruments (deployed in the South Pacific to study oceanic plate structure and mantle convection processes as part of the Pacific ORCA project), and conducted several successful dredges near

American Samoa. The cruise involved colleagues, postdocs, and students from UC Santa Barbara, Brown University, and Northern Arizona University, as well as marine technicians from Scripps and Lamont. Quarantine requirements drastically changed the cruise environment. All participants completed two weeks of quarantine in a San Diego hotel prior to boarding the ship. The cruise itself sailed from San Diego to ~ 35°S to our OBS array, and returned to Honolulu. In total, they spent 48 days at sea, logging over 10,000 nautical miles in order to successfully retrieve instruments that are collectively used in the national OBS fleet (and the important data they recorded for a year). Many thanks to all who participated in the cruise, as well as the personnel at Scripps, UNOLS, and OBSIC who worked so hard to make safe cruises possible during these extenuating circumstances. Back ashore, Helen continued efforts in the marine seismology realm by serving as a co-organizer and speaker at the virtual Marine Seismology Symposium.

All-hands on deck for the breakdown and packing of a recovered OBS.

Bruce Houghton's Physical Volcanology Group **Brett Walker** is our contributor to the HVO eruption response team for the ongoing 2020-2021 Halemaʻumaʻu eruption. Brett has defended her PhD dissertation on Kīlauea and Stromboli eruption dynamics and is making final required revisions for the May deadline.

Figure 1. Fountaining/jetting explosive activity at the most active of the Geldingadalir vents on 21 April, 2021.

Despairing of the trials of inter-island travel, and half-hearted lava lakes, Bruce Houghton put his cameras to work with UH alum **Thorvaldur Thordarson** in the field on the science response to the 2021 Geldingadalir eruption in Iceland. Bruce and **Caroline Tisdale** will work with UI colleagues on the fine-scale resolution of the eruption dynamics of this wonderfully diverse, small eruption. Two images are attached to this article. It is a stunning, well-orchestrated, deliberately low-key exercise in visitor management. It will be an excellent validation for the codes that Caroline is utilizing to characterize switches in eruption behavior on sub-second time scales.

Wendy Cockshell is combining her MS studies in the department, with the Urban and Regional Planning certificate in Disaster Management and Humanitarian Assistance. Her MS project is focusing on the western end of the spectacular Fissure 17 from the 2018 eruption. Wendy has also essentially completed a massive overhaul of the FEMA Volcanic Crisis Awareness course from a 2-day to a 1-day format.

Figure 2. Five-meter-high front of an active lava flow, 500 m from the source vent visible in Figure 1.

Amy Kitchener has re-joined us for an MS study focused on the recovery process and land-owners' decision-making following the 2018 eruption. Like Wendy, her MS is combined with the DURP certification.

A lot of the year under COVID-19 restrictions was given over to analysis and manuscript production linked to the 2018 LERZ eruption of Kīlauea. We contributed to four Nature papers published this semester, and one longer paper in JGR Solid Earth. Nature is now creating a video built around the eruption research.

The conference and workshop program was gutted by COVID restrictions, but Brett presented a virtual paper at Fall AGU.

Steve Martel (now emeritus): Steve and his wife Linda relocated to Corvallis, Oregon at the end of September of 2020. After several months of unsuccessful house-hunting during the height of the pandemic, they signed a contract for a new home in a new development. When not monitoring construction of the new house or hitting the hiking trails, Steve is investigating fractures in the Swedish bedrock (an issue for nuclear waste disposal), modeling the stress field within Hawaiian volcanoes, and working on the lab manual to accompany the **structural geology textbook** he co-authored with Dave Pollard. Steve hopes all our alumni and their families are well and can look forward to the end of the pandemic.

Steve looking for cracks (what else?) in the foundation of their new house.

Greg Moore's group continued work on both Nankai (Japan) and Hikurangi (New Zealand) subduction zones. Graduate student **Hannah Tilley** finished her first paper on the Nankai proto-thrust zone (published in *Geosphere*) and is nearly done with her second paper on subducting sediments' influence on seismicity. She

presented these results at last fall's on-line AGU meeting. She was also awarded one of the inaugural Seyb Fellowships.

After "officially" retiring last August, Greg completed work on papers with Garrett Ito (published in Tectonophysics) and former student **Jason Lackey** (published in G-cubed) as well as two papers with international colleagues. He also helped with a proposal for drilling the oceanic crust on the NE Hawaiian Arch with the Japanese drill ship Chikyu (positively reviewed by IODP). His main effort has been the interpretation of our 3D seismic data set over the subducting plate along the Hikurangi margin – significant erosion by bottom currents has made the interpretation very time-consuming.

Like everyone else, Greg has been forced to conduct most collaborative work via Zoom. A post-drilling meeting in New Zealand, a Visiting Professorship at University of Tokyo and another trip to Myanmar were cancelled. He has not travelled since returning from the Andaman Islands in March 2020, the longest interval between flights since entering Graduate School in 1973! This has made more time available for late afternoon canoe paddling.

Brian Popp continues his isotope biogeochemical research, focusing on nitrogen cycling in marine environments and marine food web studies. Three new graduate students joined the laboratory in Fall 2020. **Ching-Tsun "Joyce" Chang** has a 3-year fellowship that she brought from Taiwan to follow her passion of understanding the ecology and migration patterns of ocean sunfish (Mola). Joyce will also work on a new ONR grant that will focus on ecology and migration of blue whales. **Mario Kaluhioklani** will use his Hau'oli Mau Loa Foundation Graduate Fellowship to study the balance between autotrophy and heterotrophy in Hawaiian scleractinian corals using amino acid isotope compositions. **Michael Dowd** is working on understanding the effects of potential deep-sea mining on the ecology of mesopelagic organisms in the eastern tropical Pacific. **Elizabeth Miller** continues her studies of particle degradation in the deep ocean and how it affects the ecology of deep-sea organisms, and **Connor Shea** is working on the isotope biogeochemistry of zooplankton as part of the large EXPORTS program. In Fall 2021 we will welcome **Blake Stoner-Osborne** to the laboratory. Blake is an NSF Graduate Research Fellow interested in how efficiently nutrients supplied from islands affects pelagic food webs. The laboratory continues to be a wonderful place to work even during the COVID pandemic thanks to **Natalie Wallsgrove** and **Tamara Allen**. We continue our outreach efforts with Kanesa Duncan Seraphin (UH Sea Grant Center for Marine Science Education) and recently produced two more episodes of Voice of the Sea, a local television show that highlights marine research.

Scott's ERTH 306 students measuring water quality and temperature near Kaimukī High School.

Scott Rowland It was a junk year in many ways for many people, me included. Online teaching is no fun and most students don't like it. But what choice do we have? All the 101L labs were entirely on-line both in the fall and spring, as were all my lectures. Fortunately, UH gave the

Department a waiver so that ERTH 333 and 303 could do one field trip each in the fall. Even better, they also gave waivers so that ERTH 305 could meet on Saturdays (but no Mojave), and 306 could do some outdoor labs. I still did a bit of Mars work and a bit of Red Hill fuel tanks work, and PhD student **Brian Shiro** will have defended by the time you read this.

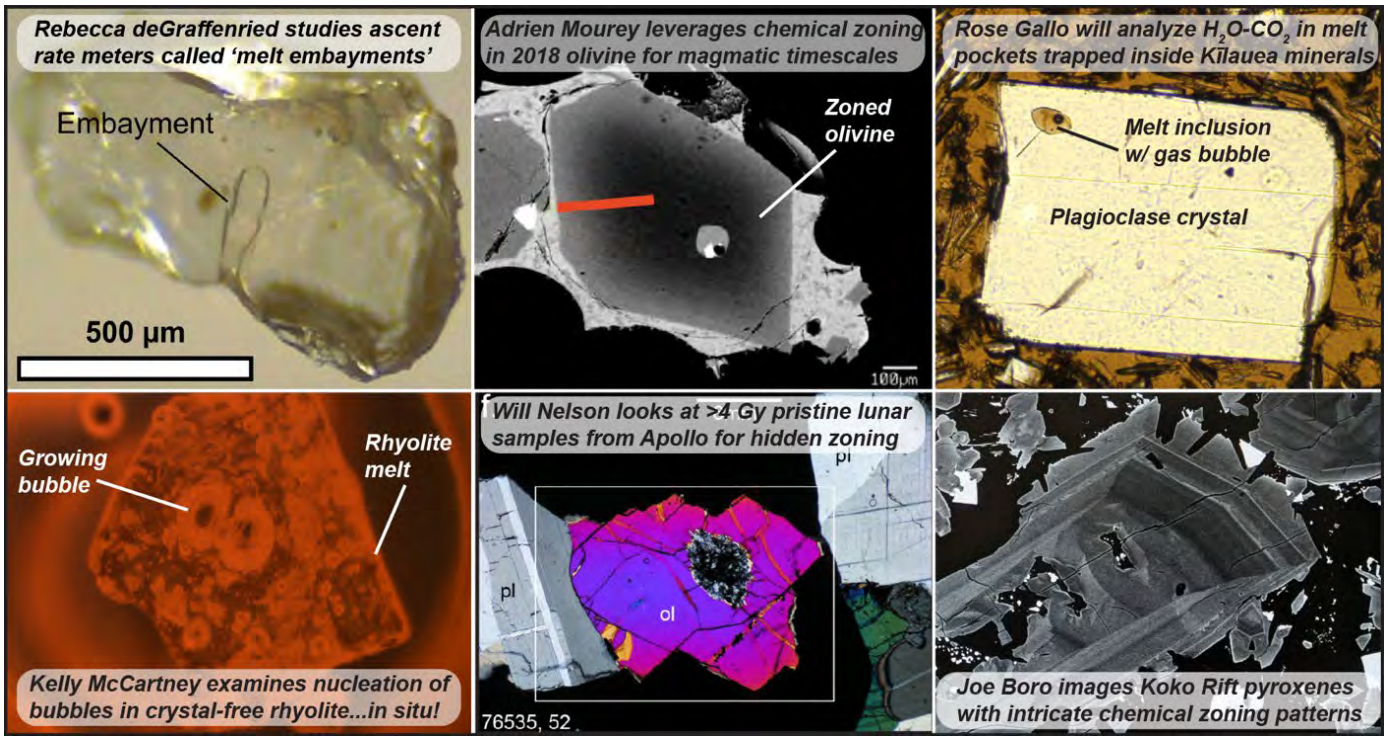
Mahalo to the GG101L TAs for their hard work this past year: **Keng-Hsien Chao** (F 20, S 21), **Rebecca deGraffenried** (F 20), **Amy Kitchener** (S 21), **Kelly McCartney** (F 20), **Brandon MacGregor** (F 20, S 21), and **Tisha McKinney** (S 21).

Scott's Earth 305 students at Kamaile'unu ridge, one of the mapping sites we used in lieu of the Mojave desert over spring break.

Tom Shea: Since last year, Tom received a NSF Petrology & Geochemistry Grant to work on eruptions that have occurred in the last ~230 years in the Lower East Rift Zone of Kīlauea Volcano, in collaboration with Cheryl Gansecki (UH Hilo) and Paul Wallace (Univ. of Oregon). A new PhD researcher **Rose Gallo** arrived in January this year to start working on this project, and investigate the depth of storage and longevity of magma reservoirs in this populated area of the volcano. She will do this by examining droplets of melt trapped in minerals (melt inclusions) from the ca. 1790, 1840, 1955, 1960, and 2018 eruptions. In her first 5 month here, Rose has made tremendous progress and organized two field campaigns, and we are stoked to have her join our group! **Rebecca deGraffenried** (PhD candidate) published a paper in G-cubed on 3D diffusion modeling work she carried out on small unsealed melt pockets in minerals to better understand uncertainties associated with magma ascent rate calculations. She also submitted another manuscript to Bulletin of Volcanology, which focuses on lava flow

models applied to the 2018 eruption. Rebecca defended this summer and moved to a postdoctoral position in Bochum Germany, where she will work with world leaders in the growing field of diffusion chronometry. **Adrien Mourey** (PhD candidate) continues his exploration of petrologic information enclosed in the products of the 2018 eruption of Kīlauea Volcano. He submitted a paper in fall that shows a ramp up in magma recharge to the summit reservoirs prior to the 2018 eruption using elemental zoning in olivine crystals erupted 40 km away from the summit! Using trace elements in olivine from different eras, he is currently figuring out whether changes in the mantle source conditions (P, T, composition) may be to blame for important shifts in long term effusive or explosive activity at Kīlauea. Tom also collaborates with **Julia Hammer** and PhD researchers **Kelly McCartney** and **Will Nelson**. Kelly has been effervescent in determining whether bubble nucleation in nominally crystal-free rhyolite magma can actually be favored by the presence of micro- to nanoscopic magnetite. She uses in-situ experimental techniques (heating stages), textural analyses of natural pyroclasts and magnetic measurements to tackle a problem fundamental to the efficiency of degassing in some of the most explosive eruptions on earth. Will is still over the moon about recent discoveries (in pristine Apollo igneous samples) that minerals thought to show very slow cooling of lunar samples preserved chemical zoning that could only be preserved through rapid cooling! This once-in-a-blue-moon discovery was submitted to Nature Communication, and he is currently investigating whether similar patterns are preserved in other space samples called chondrules. The group also welcomed new postdoctoral researcher and electron microprobe lab manager **Joe Boro** in March this year. Joe is an expert volcanologist/petrologist/analyst that works on a broad variety of volcanic systems (the Bandelier Tuff for his PhD). He is finally getting swayed into entering the world of more basaltic systems like Kīlauea and other Hawaiian Volcanoes, and has brought life back to our microprobe facilities. Joe is keen on technique development and has already taught a lot of new tips and tricks to the facility users to modernize their analytical routines. Welcome Joe!

Tom also recently received a 5-yr NSF CAREER award that carries a research component on the cooling of the 1959 Kīlauea Iki lava lake and an educational component aiming to bring hands on experimentation to secondary and early college students. This CAREER project will support two new incoming students, **Nabila**



Some petrology images from various projects in the Julia-Tom group

Nizam (PhD) and **Andrea Tonato** (MSc). We look forward to both of them joining our team! Tom also continues to teach a variety of classes including Geology of Hawai'i (ERTH103), Igneous & Metamorphic Petrology (ERTH302) and Lava Flow Rheology and Morphology (ERTH605). The group enjoyed going out for field work to collect missing samples from the 2018 eruption in March. Despite the pouring rain, being outside after a difficult year was refreshing, even if down to our socks.

Photos of a field campaign in March 2021 at Kīlauea Volcano. Everyone was stoked to be away from screens, zoom meetings and enjoying the slightly humid outside weather for a week.

Julia Hammer has kept the doors open to the electron microprobe (EMP) lab and the experimental petrology (ExPet) lab during the pandemic, allowing students and researchers to stay productive while also safe. Both facilities are again experiencing high usage, with ongoing synergistic research projects by **Rebecca deGraffenried, Will Nelson, Kelly McCartney**, and **Joe Boro**, as described and pictured in Tom Shea's entry (above). Toward the end of March 2020, just before the travel ban went into effect, visitor Camila Pineda (Universidad de Chile) completed the EMP analyses of run products synthesized in the ExPet lab as part of a study that sought to constrain the storage conditions of >130 km3 rhyolite magma that erupted ~150 kya, forming the Diamante Caldera of the Southern Volcanic Zone, Chile. Hammer is also midway through a collaborative project involving Einat Lev (Columbia Univ), Alan Whittington (UT-San Antonio), and Ed Llewellin (Durham Univ) that is looking at the rheology of multiphase flow using a diverse data stream for the Fissure 8 flow of Kīlauea 2018 LERZ eruption. This project engaged recent ERTH undergraduate major, **Alex Marshall**, in the processing of backscattered electron images from the EMP. Also within the theme of materials characterization involving SOEST instrumentation, Hammer is working with Phil Ooi from the Dept of Civil and

Environmental Engineering and **Przemek Dera** (HIGP) to understand the chemical, mineralogical, and mechanical properties of soil underlying Kualakai Parkway (North-South Road), Kapolei.

Paul Wessel finds himself in a similar spot to last year, with an unfulfilled sabbatical and travel plans due to ongoing COVID-19 restrictions. After handing over the reins of the department to the next leader(s) on July 1, he is enjoying some peace and quiet time after three years in the hot seat as department Chair. Job number one, now accomplished, was to ensure that student **Andrew Chase** wrapped up his MS thesis on plume motions this summer. Paul is now preparing for a long-delayed treat as a Leverhulme Visiting Professor at the University of Oxford next spring. Meanwhile, he continues work on the GMT ecosystem, now with new GMT postdoc **Meghan Jones** who is working remotely from New York City. This summer is likely to see several GMT-related workshops for both users and developers, all offered remotely via zoom.

* * *

Distinguished Alumnus

Floyd McCoy (BS 1962 and MS 1965 in Geology & Geophysics)
Professor at Department of Natural Sciences at Windward Community College, University of Hawai‘i

Marking the occasion of his retirement this year from Windward Community College, **Floyd McCoy** was awarded the Department's 2021 Distinguished Alumnus Award for his inspirational teaching and research over decades. The following is a sample of the congratulatory messages and reminiscences we received in honor of Floyd.

Floyd leading a tour at Akrotiri.

From Earth Chair, Garrett Ito: Before a distinguished career as a Professor of Geology and Oceanography at WCC, before appointments at Lamont-Doherty, Woods Hole, and Scripps, before a doctorate at Harvard, Floyd was—and will always be—one of us. Growing up in Hilo, he earned both his B.S. and M.S. degrees in our Department before another volcanic island, Thera (Santorini) drew him away. The volcanic cataclysms and ancient societies of that storied island became the focus of his life's work, but fortunately for us his personal path led back to Hawai‘i, where he has taught and mentored students at the interface of geology and archaeology ever since. Along the way he picked up a few shiny things: a Fulbright Senior Scholar award, an Alexander Onassis Senior Fellowship, a UH Regents' Medal for Excellence in Teaching, the Joukowsky Lecturer of the Archaeological Institute of America, and Fellow of the Geological Society of America. Through Floyd's rich career, he has been an inspiring instructor at Windward CC, bringing to life the wonders of the geological sciences while embracing indigenous Hawaiian culture through classroom instruction, field work, rock analyses, and storytelling. Congratulations, Floyd!

From Gary Stice (UH Geology graduate with Floyd, 1960s): I first met Floyd McCoy at the UH Geology Department in 1962. We worked together on the first baseline studies of the Hawai‘i beaches and shorelines. Then we were involved with various projects including helping Jim Moore during the 1965 eruption of Makaopuhi. We would run across the active lava lake on floating lava crust with a leveling rod while Dallas Peck took lake-level readings from a safe spot, and then one of us sampled the lava-lake… tricky and kind of, well, stupid!!!

In 1962, Prof. Macdonald called in his graduate student (me) and Prof. Moberly’s bumbling-along graduate student – Floyd to ask if we wanted to map the Manu‘a Islands in American Samoa. We represented two of the four students in the brand-new graduate program in G&G (as it was called then). Harold Stearns had returned from reconnaissance work there and it was time for detailed mapping. So off we went. Floyd mapped the islands of Ofu and Olosega for his MS thesis and I did Ta’u and the petrology of Manu‘a for my doctorate. It was an incredible experience: the geology was astounding, people were wonderful and we were adopted by the High Chief… we returned skinny and happy -- Floyd with hepatitis and ultimately a thesis. We were also dismayed at Margaret Mead’s misinterpretation of Samoan life and culture. But it resulted in a happy graduate faculty. Prof.

Macdonald was delighted with the mapping and Prof. Moberly was no doubt delighted that Floyd had finally focused on something and finished!!

After UH Floyd went on to receive his PhD at Harvard studying Eastern Mediterranean sediments. Then—after working at the Smithsonian Institute, and cruises with Scripps, WHOI, Lamont, Duke, the Italians, and Israel and the Greeks, plus 4 DSDP and IDP legs—he was at Lamont in charge of the coring facility. Next he returned home to Hawai'i and replaced me as professor of geology at Windward Community College in 1992. Since then he has been teaching courses in Geology and Oceanography, as well as underwater archeology and topics pertaining to the Hokulea. He also continued to offer individual courses in the field geology of each of the major Hawaiian Islands. These courses have been proven to be of great value in motivating student interest in Volcanology and Marine Geology. During retirement he plans to continue his decades of research in Greece especially on Santorini and Crete.

Floyd sampling the lava lake by hand (a don't ever). (Gary Stice photo)

From Rhonda Suka (G&G graduate MS, 2013): Time spent with Floyd McCoy in the Greek Islands can be magical, inspiring and occasionally a steep learning curve. First you quickly come to appreciate that in this part of the world "Doctor Floyd" is viewed as a minor deity whose presence alone is cause for celebration. Sightings of Floyd cause a stir wherever he wanders, whether it's the bustling main street of Thera or a dusty outcrop outside of Kato Zakros.

Anywhere in Greece, when we arrive at the taverna the owner recognizes Floyd before we step off the street. Greetings are exchanged and tables are hastily pulled together under the shadiest of the ancient olive trees. Bottles of water appear and reappear as our motley crew of dusty students and scientists slack their thirst earned from hours under the summer sun. Mezzes arrive and everyone sets to the serious work of deciding what to have for lunch. After a Greek salad, fried fish and a nice cold bottle of Mythos, the chances are very good that Floyd McCoy will tell one of two stories (or both if you're lucky). One is outrunning a tsunami. The other is about his early field work days. That story goes something like this.

In the early 1970s, on the tiny Greek island of Thirassia, a sliver of the shattered Santorini shield volcano, Floyd McCoy found himself seeking accommodations. A simple place to sleep and a hot meal to recover from long days trekking around the shadeless, windswept, pumice-covered island. A local farmer was found who offered a corner of, what Floyd describes as, a cross between a barn and a tool shed. As the story goes, Floyd would rush back at dusk to share an evening meal with his host who would afterwards turn off the generator for the night. When Floyd asked about a place to clean up, his host pointed out the water trough used by the mules in front of the house. While Floyd was concerned about the rather exposed location along what served as the main street of the island's largest town (of 100 people), the host offered a simple solution. Just wait until after dark when the mules are tied up and everyone has gone to bed. And so Floyd's most enduring memory of his PhD research and one of his favorite "back in the day" stories became his moonlight soaks in the mule trough on the main street of Manolas.

‘Minor deity’ Doctor Floyd, atop his pumice throne in Greece

Only spectacular settings are allowed for Floyd’s famous storytelling

That was the early 1970s. Fast forward 50 years and a visit to tiny Thirassia is touted as a romantic step back in time. Floyd can tell you it's nothing like the 1970s. There are electric lights that turn on when you flip a switch, hot water, showers and even a handful of cars to carry you along the single paved road from the port. From there it's only a short walk down the main street, now devoid of troughs (but not mules) to the taverna overlooking the caldera.

Since the first time I joined Floyd in Greece in the summer of 2008 I have returned a dozen times. Each time has been a mix of revisiting old favorites and exploring new places in that fascinating country. Fieldwork is still demanding, and ephorates are hard to please, but as Floyd taught me years ago, and has shared with countless others, summer in the Greek Islands will change your life.

Field work with Floyd

Thank you Floyd for your unwavering excitement and curiosity that has inspired so many. Because of your encouragement and perseverance, those early days of pulling urchin spines out of our backsides and the volumes of scribbled field notes eventually became 3D images of Bronze Age antiquities. I am so grateful to have shared many incredible adventures with you and look forward to many more. Yamas!

Fris Campbell: As a fellow member of the inaugural graduating class of the Geology Department at the University of Hawai‘i, 1963, you have represented us well. As a friend of your family I know they would have been very proud of all your accomplishments.

From Shellie Habel (PhD 2019): Floyd McCoy is a renaissance man when it comes to teaching. He is a world class professor on things such as the powerful natural history of the Hawaiian Islands, the enjoyment of the finer things on the slopes of Greek islands, and to how to wisely prioritize the best things in life. For many, he provided some of the first experiences in conducting research and showed how much fun it can be to apply critical thought to a good question. His field courses were fantastic and took you to places like sitting in a nine-seater airplane looking at the cliffs of Molokai, watching an active lava flow march toward you while being astonished at how similar it looks to underlying flows 100+ years older, snorkeling above active Minoan archeological sites,

nerding out on mega-tsunami deposits…the list goes on. For many, he also provided the first glimpses of hope that anyone could aspire to graduate school grandeur if they just had the passion and courage to take the first steps. While it's not certain how many life courses he's altered towards the better in his many years of teaching, I am positive that he has bettered mine. Thank you, Floyd, for all the good things that you do and that you are.

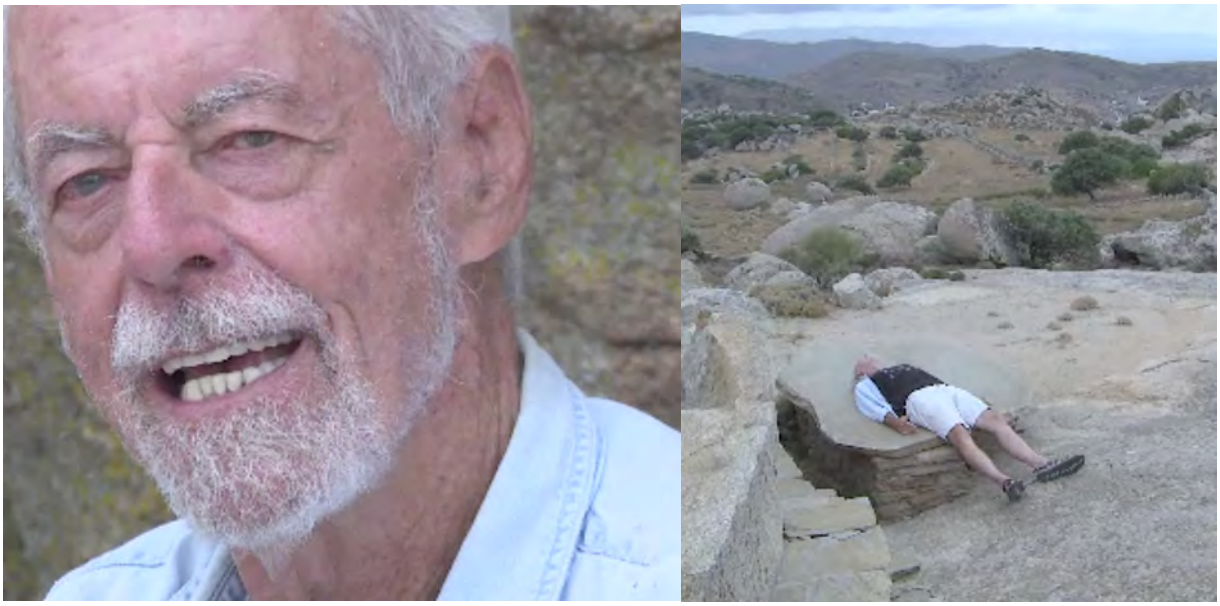
Shellie Habel on the right, with Floyd in Greece...

...and on the left with Floyd at Mauna Kea

From Tianna Barber (BS, 2021): I first met Floyd at WCC when I took his Oceanography course back in 2013. At the time I was unsure of which direction I wanted to take my education, but I knew I wanted it to be in the science field. After I took my first Geology course, I felt that it could possibly be the right option for me. The professor at the time saw I was interested in pursuing it and brought Floyd to talk to me about SOEST and UH Mānoa. He was very kind and believed in me more than I believed in myself. As I write this, I am a week from graduating with a BS in Geology and Geophysics and I really owe it all to Floyd that I have made it to where I am today. From the bottom of my heart, thank you, Floyd.

From Scott Rowland (PhD 1987): Many times, when I tell someone I'm a geologist they say "You're a geologist? Do you know Floyd McCoy? I took a class from him at Windward and it was the best class I had in college!" My favorite Floyd quote comes from a presentation he gave at the 1997 GSA Cordilleran Section meeting in Keauhou: “Patience is a word from ancient Greek, not modern Greek”.

From Tina McGeorge (Institute of Archeology University of London): Floyd McCoy retiring? That seems impossible. Something one cannot imagine about an oak of a man who has weathered the seasons and yet seems totally unchanged since I first met him twenty years ago in the Mediterranean, where he is a highly regarded scholar. Archaeologist colleagues invariably seek his opinion and benefit from the unfathomable depths of his knowledge, worn very modestly.



Floyd talking about rocks and resting on Tenos Island

Floyd’s most recognisable and lovable personal characteristics are his amiability, his anecdotes and much-appreciated spontaneous witty asides, usually delivered *sotto voce*! In recent summers spent on Crete, we became quite close friends and often dined together at the end of the working day, trying out different restaurants. My most hilarious recollection is when we dined one evening at a waterfront restaurant in Ierapetra, on the very edge of the quay, to the air of gently lapping waves. Alone at the next table was a young couple. In the gloaming, the young man suddenly rose, dropped to his knees and offering a ring asked her to marry him. It was a very private moment – including copious tears of surprise and joy – but taking place right in front of my eyes, so I whispered to Floyd not to turn his head. Shortly afterwards, obviously arranged beforehand, waiters trooped across the main road towards the happy couple’s table bearing sparklers, desert and champagne.

We paid our bill and prepared to take our leave, but Floyd insisted that we "really ought to" congratulate them. So we did… But it turned out not to be a brief congratulation! Floyd struck up a conversation and learned that the couple were from Oxford. The girl from Poland was at the university and the young man, who ran a pharmacy, had discreetly visited the girl's parents in Poland and sought their permission to marry. Floyd went on to tell them about archaeological research in Crete, in Santorini and so on… This went on for a time, the girl and I for the most part spectators, while I, now and again surreptitiously tugged Floyd's sleeve, thinking they might prefer to be left alone. That extraordinary evening is for me an ineradicable memory of Floyd, as I imagine it must be an indelible and amusing highlight of the couple's memories of the moment they decided to share their lives.

The vivid memory of that evening is an illustration of how irrepressibly sociable Floyd is and that I am sure is why he is loved by everyone. Another delightful attribute is his steadfast and utter devotion to his subject and his steadfast devotion to Ann. The brilliant story of their volcanologically-themed wedding cake is so amusing that I never tire of hearing it retold. If you haven't heard it, you must ask for a recitation!

From Krista Evans (MS 2020): Four years ago, I applied to several universities for my master's degree in Geology and Geophysics including the University of Hawai'i at Mānoa. When I received my acceptance letter in Spring 2017 stating that Dr. Floyd McCoy would be my advisor, my first thought was who is this person? The next day, I received an e-mail from Floyd, who was in Athens on sabbatical at the time, explaining his work on Crete and Santorini. I remember reading his e-mail at least two or three times before I realized why the name finally sounded familiar. I dug out this research paper I wrote for my geology thesis during my undergraduate career at the University of Wyoming on the Late Bronze Age eruption of Santorini. Then there it was, at least half of the citations in my paper were from Heiken and McCoy or vice versa. That is when I knew I could not pass up the opportunity to study under Floyd McCoy.

During my time at UH Mānoa, I learned so much from Floyd. Floyd is a wonderful teacher and a great mentor. When he sees promise and dedication in his students, he pushes them to strive for greatness. As his master's student, he had me going to multiple conferences to present our work on the precursory eruption of the Late Bronze Age eruption of Santorini. The first conference I attended was an archaeological conference in Heidelberg, Germany focusing on the Bronze Age. Several attendees asked me about my work and who I was working with at the university. When I mentioned Floyd was my advisor, almost everyone immediately started telling me stories about Floyd. Floyd is just so well-loved and makes friends and leaves impressions on people wherever he goes. My few years of working directly with Floyd were an amazing experience. I learned so much from Floyd, met some wonderful people because of Floyd, and built some great connections. I will be forever grateful to have worked with Floyd for my master's and look forward to continuing working with him on various projects in the future. Floyd may be retiring from teaching, but I know there is a long list of things he still wants to accomplish, and he will always be remembered by his colleagues and students.

Floyd's coffee

From James Berles: My favorite quote ['floydism'] from Floyd in his Oceanography class at Windward: "Fish gotta swim (birds gotta fly)..."

* * *

Alumni News

Katie Dungan (BS 2014) I recently celebrated four years at EnviroServices & Training Center. For the past few years, I have been working as the public outreach coordinator and as a supporting technical writer on behalf of DOT's Storm Water Management Program. I recently helped put together some fun animated online learning modules for third-graders (and anyone interested in stormwater!). If you're interested, check it out at **stormwaterhawaii.com/hawaiistormpatrol**! It's been a quiet year for outreach events, but as the state reopens you can find me at places like the Auto Show and the BIA Home and Remodeling show teaching the public about stormwater water and pollution awareness! I'm still living in town with my little family and zoo: my fiancé Val, our three-year-old Raylin Rose, three cats, one dog, and five fish!

Katie Dungan with partner Val and daughter Raylin Rose. Thanks for raising awareness of stormwater, Katie!

Julie Hood (PhD 1990) - 1st to be HOODed by Barry Raleigh for the newly formed SOEST! Since then I've had various academic adventures: as a PostDoc in Washington, DC at the Naval Research Laboratory, followed by a faculty position with the University of Miami. My research included work as a physical properties specialist aboard the JOIDES Resolution several times with variety awesome port stops, before settling into high school physics teaching. My public school is a Marine Theme magnet program, located right on the shores of beautiful Biscayne Bay in Miami, on our own little island next to Key Biscayne. I also do a lot side consulting for the College Board with their AP Physics program, providing teacher summer institutes in various locales and writing/scoring

AP exams. Good times. My work with high school students has afforded many travel opportunities, taking them on adventures to Moscow and Azerbaijan, Berlin, Prague, Budapest & Krakow, all over Spain, Italy, France, Japan, China & Hong Kong, Vietnam, Cambodia and Thailand. Sadly, COVID crushed our Spring 2020 trip to Machu Pichu in Peru, and my summer adventures (sans teenagers) to celebrate my 6th decade of living in Ecuador and the Galapagos Islands. But I've now been vaccinated and will get back on the travel circuit ASAP! • When I'm not working or traveling, I like to enjoy a hearty IPA at the beach with my wife of 20 years - legally for 5! Or take our dog for walks and tend to our vegetable and herb garden.

Julie Hood with her students at Tra Prohm temple in the Angkor Wat temple complex, Cambodia

Isaac Ishihara (BS '13) and **Kendra J. Lynn** (PhD '17) moved back to Hawai'i with their two cats last summer and settled down in Hilo. Kendra is now a Research Geologist at the Hawaiian Volcano Observatory and was kept busy with the new eruption at Kīlauea a few months into the new job. Isaac continues to work remotely for Acer Associates in New Jersey as they get settled.

Brian Iwatake (MS 1982) My wife, Jennifer, and I enjoy walking on the sands of Cape Cod at low tide (photo on the next page). My daughter, Allison, is working as a barista in Chatham while she decides whether to resume college at St. Andrews, Scotland, or elsewhere. I'm still at the Naval Undersea Warfare Center in Newport, RI. I got to take magnetometer measurements in Narragansett Bay a couple of years ago, but otherwise don't get out much. Classmates visiting Rhode Island or the Cape - feel free to look me up!

Samantha Jacob: This has been quite the year! In July 2020 I published my first peer-reviewed first author paper! This paper was all about my research with multispectral data from the Curiosity rover. Fast forward several months and a rocket launch to Feb 18th 2021, Perseverance and Ingenuity landed safely on Mars!!! I got to be part of the ASU press webinar for the landing and have helped operate the Mastcam-Z cameras on Mars

Brian Iwatake enjoying the sands of Cape Cod.

Our own Samantha Jacob, mars team member at NASA.

time ever since. Mars time is when the Perseverance science and operations teams work around the clock 7 days a week, with our shift start times varying every day since a Mars day (sol) is slightly longer than an Earth day. While I may be a bit sleep deprived, the experience has absolutely been worth it. Looking forward to another year of my PhD exploring Mars with Curiosity and Perseverance. Aloha from Mars!

Haunani Kane was recently **featured** on the ARCS Foundation website for her work in modeling coastal change in low-lying Pacific islands.

Joe Kennedy: It's been quite the adventure since graduating with my M.S. in 2016. I started working for the USGS Pacific Islands Water Science Center (PIWSC) in October of 2016. I was extremely fortunate to work on a variety of intriguing projects and travel all over the state on a regular basis. Unfortunately after 3 years at the PIWSC, the commute to Ford Island took its toll on me and I began looking to move to the mainland. Hawai'i was too crowded and I was part of the problem. An opportunity I couldn't pass up presented itself and I transferred to the USGS Oregon Water Science Center to start working with Steve Gingerich to begin learning all about groundwater modeling. The transfer locked in my hydrologist career path with the USGS as I am now a permanent USGS employee. The down side to this is that I arrived 4 weeks before the world went on lockdown due to COVID-19. Luckily, as a cyclist, the remote outdoors were not shut down and I began exploring all over the PNW with my bicycles. I've had some amazing adventures across Oregon, parts of Washington, Idaho, and down into Nevada and Utah. Somehow, what could have been the worst possible time ever to make such a drastic life change has turned out rather well.

Joe Kennedy at Uhebe crater in March of 2021

Amy Kitchener in her cancer-research coiffure.

Amy Kitchener After my unknowingly last travel trip before the lockdown to Las Vegas in March 2020, I shaved my hair off with my family for cancer research. While dealing with this pandemic, I was able to work part-time with Waianae Mountains Watershed Partnership and start my graduate career in Fall 2020. These two sources of socially distant contacts have kept my sanity. I am sick of living through major historical events and am looking forward to seeing people in person again.

Margaret Millman: Brian and I and our three daughters are settled in upstate New York, in Oneida, a city of 11,000 at the northeast tip of a rural county of rolling hills (glacial deposits), ponds, sugar maples, and dairy farms, halfway between Syracuse and Utica. The Erie Canal runs through here, which nowadays people can bike along; and just south of us is the Gerrit Smith Estate which was a hotbed of the abolitionist and women's suffrage movements. I am a Senior Geologist and Project Manager at FPM Remediations, helping to clean up legacy contamination at Department of Defense sites around the country. I have also gotten involved in local politics, and in 2017 I served 7 months appointed to the Madison County NY Board of Supervisors, as well as various government and political committees. This year I am running for mayor. I have to say that it is not what I would have expected for myself ten years ago, but maybe it is not so surprising to people who have known me to poke at things for not being "the way they

Margaret Millman-Barris with her active family. We hope you win the race for Mayor, Margaret. The world needs scientists like you in public service.

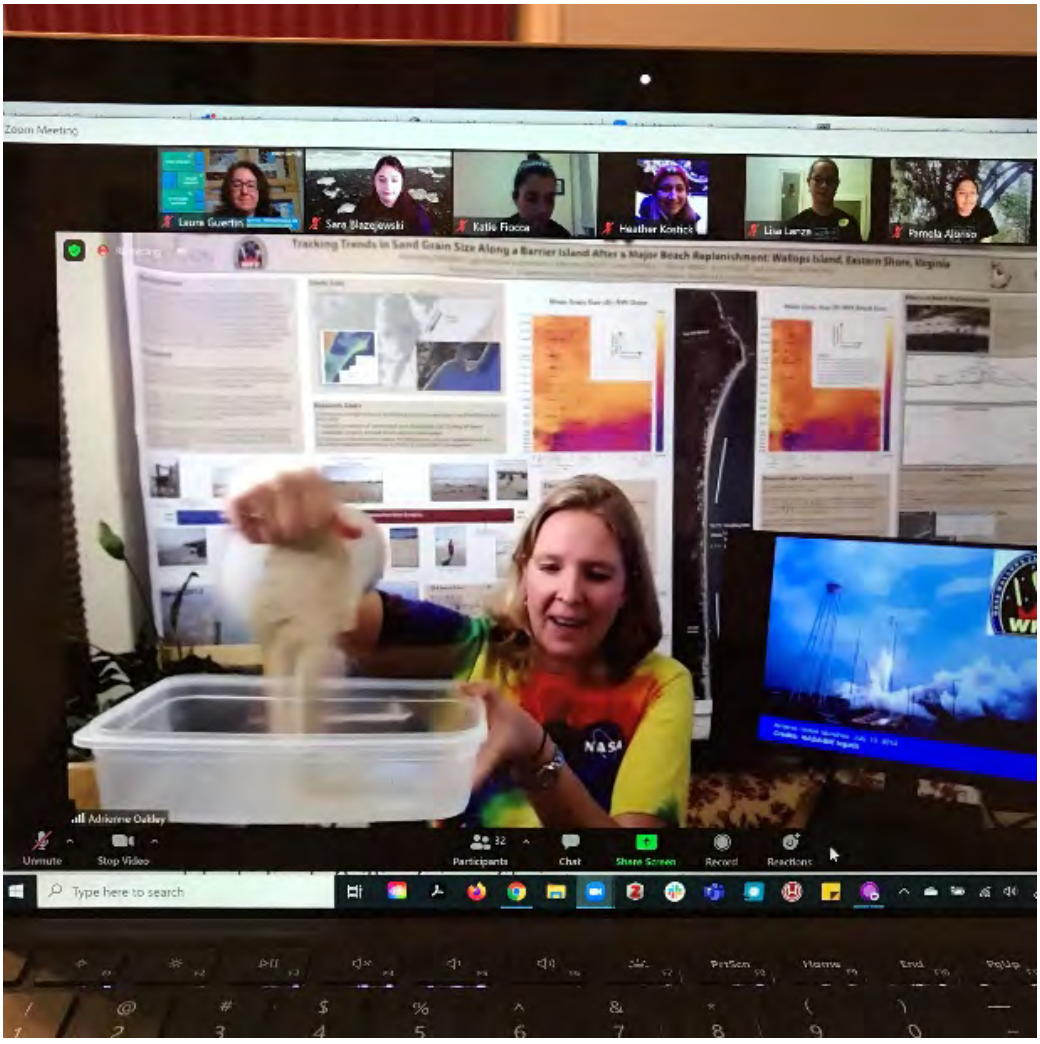
should be". It's kind of neat to know that there are people in this town who like the idea of having a geologist for mayor. If you are interested in this adventure you can follow my Facebook page "Margaret Milman-Barris for Mayor".

David O'Brien: Hello Fellow G&G Alumni! After I graduated from UH Mānoa in 1990, my wife Irene and I moved to Anchorage Alaska (out of the frying pan into the freezer!). I then worked for an environmental consulting firm working on the Exxon Valdez oil spill; later I was writing oil spill contingency plans and developing environmental databases. After 8 years I decided to change careers so I could spend more time with my two very young boys. I got a job as the data analyst for the Alaska Cancer Registry in the state health department (wow, yes that was quite a change!). This job was a lot more flexible and I was able to attend my children's school events and participate with them in cub scouts and boy scouts. I have been working in the cancer registry for the last 22 years. My wife Irene and I like to travel around Alaska in our motorhome during the summer and for the last 6 years (except during Covid) we like to go on a Carnival cruises in the middle of winter. I also keep busy with community volunteer work. I'm still a committee

Dave O'Brien at home in Alaska

member with my old boy scout troop of which I used to be the scoutmaster (even though my boys aged out of scouting a decade ago). I'm also on the board of directors of the Anchorage Unitarian Universalist Fellowship and hold the office of Past President. Anchorage is blessed with many miles of cross-country ski trails that become bike trails in the summer. I have included a photo of me from a few weeks ago on one such ski trail that is just a 5-minute drive from my house. My wife and I enjoy working in our flower and vegetable gardens during the summer and each fall we make jams, jellies, and liqueurs from our red currents & raspberries, and we make apple sauce and hard cider from our apples from our apple trees. I fondly remember my days living in Hawai'i and hiking up to see real live lava on the Big Island with professor George Walker during his volcanology field trips.

Adrienne Oakley (PhD 2008) (Adrienne is currently Associate Professor of Geology and Marine Science at Kutztown University in Pennsylvania): It has been a strange and challenging year. I taught fully in-person for the 2020-2021 academic year. Although we were unable to do our usual fieldtrips and hands-on learning experiences in my geology and marine science courses, the students appreciated the in-person labs and opportunities I could provide. The students demonstrated incredible flexibility, perseverance, and good humor throughout the school year. In November, I participated in Soapbox Science Philadelphia 2020, a public outreach event that promotes women working in science and the research that they do. My talk: ***Sea level rise, shifting sands, storms and space. Studying the shrinking island where NASA launches rockets to the international space station*** was presented over Zoom to an audience of all ages. After I finish up exams this week, I plan to spend some time in the garden. Later this summer I will finally be back in the field doing research with undergraduates and teaching my field-based Marine Geology class at the Chincoteague Bay Field Station in Wallops Island, VA. Wishing everyone a happy, healthy rest of 2021!



Adrienne in a Zoom for "Soapbox Science" family outreach, sponsored by The Association for Women in Science

Madison Pancake (BS 2020): After graduating last year, in what was the strangest semester to end my undergrad, I was admitted to a Graduate program in New York City. My program is based out of the American Museum of Natural History and I will be graduating this August with a Master of Arts in Teaching with a specialization in Earth Science (shout-out to Jasper Konter for mentioning this program during his Geochemistry course). I will be fully certified to teach 7-12 in New York State. Before this, I will have completed 2 semesters of student teaching in New York City public schools, I have been teaching out of Roosevelt High School in Yonkers, NY. I have been using my experiences in Hawai'i to give examples and photos to my students and they have been receiving them very well. The 'ohana email chain has also been helpful in giving students current events! They are amazed by the different scenery that is over 2,000 miles away from them. Most of the geology they are familiar with comes from the stone skyrises in Manhattan. I have been really enjoying student teaching and look forward to beginning my first year of teaching this coming fall! Also, this winter was my first experience with snow, and let me tell you I really am missing the humidity and sun Hawai'i offers.

Madison Pancake, student teacher in New York

Loyc Vanderkluysen (PhD 2008) Meryl McDowell (PhD 2009) and I are thrilled to share the news that our son Tristan was born on January 1st, 2021! The pandemic has made parenthood a bit overwhelming, but the family is doing well and couldn't be happier to welcome its new member! I am associate professor of geoscience at Drexel University in Philadelphia, and Meryl works for a company specializing in radar data analysis in nearby Bryn Mawr, PA. Cheers and much aloha to you all!

Rob Yonover writes that the historic SpaceX launch on Wednesday, May 27th will have his SeeRescueStreamer technology on board to protect astronauts Bob Behnken and Doug Hurley as they are transported on the first commercial flight by SpaceX up to the International Space Station. You can read more about this **here**. Congratulations, Rob!

* * *

Donation

Remember when…

You held your first rock specimen in a class or took your first geology field trip?
You made your first map, learned about a useful isotope, or looked at a seismogram?
The GG/ERTH department became your academic home, a place of learning with friends and colleagues?

Help others have that experience with a gift to the Earth Sciences department. Your donation will maintain and replace aging teaching infrastructure, support field excursions, and provide modern computing and audiovisual equipment for our classrooms and computer lab.

Please contribute to the Earth Sciences department fund at the University of Hawai‘i Foundation and help make those *geo-dreams* come true for a new group of emerging geoscientists.

Consider making a gift today through the **UH Foundation website**.
Or click the "donate' button on the **Earth Sciences home page**. *Thank You!*

Editor's note: My apologies for the lateness of this letter, and many thanks to all those who contributed, especially our alumni. Here's hoping that many of you will be able to attend an **in-person** Alumni Days next spring. -NF