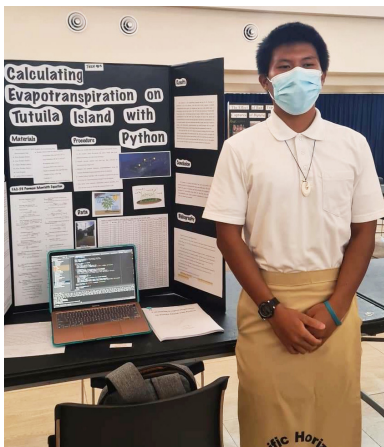


HIGH SCHOOL STUDENTS BASE THEIR PROJECTS ON UNIVERSITY OF HAWAII WRRC RESEARCH

September 2021

Congratulations to Victor Chen, Jade Cox, and Mavis Liang!

Among the finalists at the 2020 American Samoa Island Wide Science Fair were three students supported by the University of Hawai'i WRRC through National Institutes for Water Resources (NIWR) grants, in part or as needed through mentoring, funding, access to equipment, or data material. The U.S. Geological Survey (USGS) and NIWR developed an internship program that is a collaborative effort providing undergraduate (and graduate) students with the opportunity to participate in USGS activities (e.g., working in the field, laboratory, and research). These outstanding finalists focused their research on the sustainability of American Samoa's water resources: overall co-winner Victor Chen, who used WRRC data for his project; third-place winner Jade Cox; and finalist Mavis Liang.



Victor Chen

Victor Chen's winning entry, *Calculating Evapotranspiration on Tutuila Island with Python* focused on evapotranspiration (ET) on the Island of Tutuila. This is important to American Samoa with its limited water sources since ET is the evaporation of water from land surfaces and other transpiration to the atmosphere. Victor's project incorporated a rigorous mathematical equation to help understand ET while factoring the components of this energy balance. He was provided access by Mr. Matt Erickson and Dr. Chris Shuler to research-grade instruments and sensors throughout Tutuila. The high interval, meteorological data he obtained was used in a Penman-Monteith Equation, a standard method used by the United Nations Food and Agriculture Organization to calculate ET. Victor was able to write a Python script that queried the data and expedited the computational process, which generated crucial information to understand and manage Tutuila's fragile and finite freshwater resources. Through this process, Victor hoped to not only better understand ET values, but also make the data more accessible by making it searchable.

The objective of **Jade Cox's** project *Stormwater Infiltration Injection Well* was to address four perennial problems that American Samoa faces: (1) flash flooding, (2) eroding roads, (3) lack of fresh drinkable water, and (4) overuse of plastic bottles. She was able to collect water pressure and rain measurement data from the established WRRC rain gauge(s) in an area that determined an infiltration injection well could provide a safe, economical, and sustainable solution. Jade worked with local land owners to gain permission to install flow tracker instrumentation in the storm drainage systems to better understand the velocity of stormwater runoff through this flood-prone area. Jade also came up with conceptual designs for capturing this storm water runoff into useable household water.

Mavis Liang's project *How Much Water Can American Samoa Sustainably Harvest from Its Streams?* explored the possibility of using surface water for household uses and



Jade Cox



Mavis Liang

agriculture that is cost-effective and environmentally friendly. She collected data from weather stations located near Leone, Nu'uuli, Afono, and Fagaalu streams to determine their monthly and yearly rainfall and applied that information to her hypothesis. The weather stations are from a WRRC NIWR project "Providing information and technology in support of hydrological research in American Samoa." However, the results did not support her initial assumption and requires further study.

The American Samoa Science Fair is a STEAM (Science, Technology, Engineering, Arts, and Math) related competition to inspire young scientists, engineers, and innovators of the future and presents a venue to showcase academic excellence. The top ninth to twelfth grade winners in their categories were eligible to represent American Samoa at the 2020 Regeneron International Science and Engineering Fair (ISEF) in Anaheim, California. Regeneron is a leading biotechnology company that invents life-transforming medicines for

people with serious diseases. They were founded over 30 years ago by physician-scientists, which has provided them with the ability to translate science into medicine with a commitment to service their patients beyond laboratories.

Due to COVID restrictions, the 2020 Regeneron ISEF was held virtually. In a normal competitive year, Regeneron ISEF finalists vie for almost \$5 million in awards, prizes, and scholarships. While no awards were given in 2020, Victor Chen was among the 1,300 finalists who were honored in the online publication of the 2020 Virtual Regeneron ISEF.

The virtual 2020 Regeneron ISEF finalist directory (<https://sspcdn.blob.core.windows.net/files/Documents/SEP/ISEF/2020/Virtual/Finalist-Directory.pdf>) includes the American Samoa winners Victor Chen, Vincent Maverick Jagon (Determining the Effects of Natural Mulching Components on Bok-Choy Plant Growth), and Yasminna Sanchez (The Impacts of Human Habitation on the Health Condition of Variations of Fish Caught in Industrialized vs. Non-Industrialized Watershed Areas).

In March and April of 2021, Victor Chen's hard work and exceptional achievements in academics and extracurricular activities were rewarded with a series of outstanding celebratory moments (<https://www.talane.com/2021/04/06/its-a-three-peat-for-victor-chen/>). He was accepted with fully qualified appointments to three prestigious Service Academies (The United States Naval Academy in Annapolis, Maryland; The U.S. Military Academy at West Point; and The U.S. Air Force Academy). Victor was overjoyed and grateful to accept the appointment to his first choice, the Air Force Academy.

Congratulations to all the participants of the American Samoa Island Wide Science Fair!