ASL Environmental Sciences

Newsletter

Spring 2025

Spring 2025 ASL Newsletter. This issue:

Photo of Dr. Humfrey Melling (left) receiving the title Fellow of CMOS society (December 3rd) presented by David Fissel, Vice-Chair, CMOS Vancouver Island Centre and Dr. Matthew Asplin, Chair, CMOS Vancouver Island Centre. (photo credit Stephan Page)

Dr. Humfrey Melling Receives Recognition for His Contributions to Arctic Sciences

ASL Environmental Sciences Inc. is proud to honor and celebrate our most esteemed collaborator, whose unwavering partnership has been instrumental in our company story. DFO scientist Dr. Humfrey Melling was recently recognized for his significant contributions to Arctic oceanography and sea ice processes. In a ceremony held at the Institute of Ocean Sciences and co-hosted by the Canadian Meteorological and Oceanographic Society (CMOS), Dr. Melling was presented with a certificate bearing the title: Fellow of the Canadian Meteorological and Oceanographic Society (CMOS) "for fundamental contributions to advancing our knowledge of Arctic oceanography and sea ice processes, over the past forty-five years."

"Thank you for the many ice related scientific insights, the thoroughness of the ice profiling sonar data processing and general scientific collaborations. The Ice Profiling Sonar has been a bigger success with your involvement over the years." (Jan Buermans, ASL President)

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Students Gain Valuable Experience at UBC PRODIGY Field School in Patagonia, Chile

Comau Fjord. San Ignacio del Huinay Foundation lies at the mouth of Rio Lloncochaigua which flows from the snow-capped peaks of the Andes in the Hualaihué commune of the Los Lagos region in Chilean Patagonia. Photo taken with analog film by J. Chawarski.

Dotted with fjords, towering snow-capped peaks, and lush temperate rainforest, Chile's southern coast has many similarities to British Columbia. Both regions have vibrant and biodiverse coastal ecosystems which benefit from growing blue economies, including wild and farmed fisheries, but are rapidly changing due to increased meltwater runoff from large glacial rivers and potential stressors from industrial aquaculture and shipping. In February of this year, a group of Canadian students and researchers were joined by ASL's Julek Chawarski on mission to learn about coastal oceanography of these regions and apply emerging technologies to the study of remote fjord ecosystems, as part of the University of British Columbia's PRODIGY field school. The Pacific Rim Ocean Data Mobilization and Technology (PRODIGY) program supports a cohort of master's and PhD students at Canadian and Chilean universities who study biogeophysical processes in the Pacific and Arctic Ocean. Working together and with instructors at varying career stages and professions, students gain valuable skills in specialized fields related to marine science. This year's field school took place in the northern region of Chilean Patagonia, at the San Ignacio del Huinay Foundation field station in Comau fjord.

Arriving in Puerto Montt on Feb 10, the Canadians were joined by Chilean students and professors as part of cross-cultural training exchange for young scientists. At the University de los Lagos in Puerto Montt, students were offered a short course on hyperspectral remote sensing with aerial drones, emerging technology which may be used in the future to detect the formation of harmful algal blooms. After some cultural exploration of the local artesanal and fish markets, students and instructors traveled south along the Carretera Austral ('Patagonian highway') which combines buses and ferries to reach the remote communities of Comau fjord. Comau fjord extends from the Gulf of Chiloe (much like our Salish Sea), into the glacially carved valley lying below the towering Andes mountain range. (continued)

Students Gain Valuable Experience at UBC PRODIGY Field School in Patagonia Chile

After arriving at the San Ignacio del Huinay Foundation field station, students and instructors settled in with a welcome meal of traditional cazuela, a Chilean chicken soup served with corn and pumpkin. Students assembled handmade drifters with Dr. Rich Pawlowicz (Professor at UBC) and worked with Dr. Philippe Tortell (Professor at UBC) to set up a seawater flow through measurement system. Dr. Gonzalo Saldías (Uni. Bío Bío) brought a rapid CTD profiler for fine scale measurements, and Dr. Ursula Cifuentes (CIO) prepared students with a lecture on mooring design and deployment.

For three days, students rotated through several field activities include oceanographic transects across the fjord. Dr. Julek Chawarski brought ASL's newest product, the AZFP-nano, a small 200 kHz single-beam echosounder designed for easy profiling on CTDs. Students helped mount and configure instruments, deployed the CTD from a small winch, and processed data using custom algorithms written in R, Python and Matlab.

In the field. UBC and UVic students Grace, Becca, Christina and Hayden were joined by field station staff scientist Darinka Pecarevic and Julek Chawarski, biological oceanographer at ASL Environmental Sciences. Students learned how to conduct oceanographic profiling transects using a Seabird SBE25 profiler equipped with ASL's new AZFP-nano, a 200 kHz profiler.

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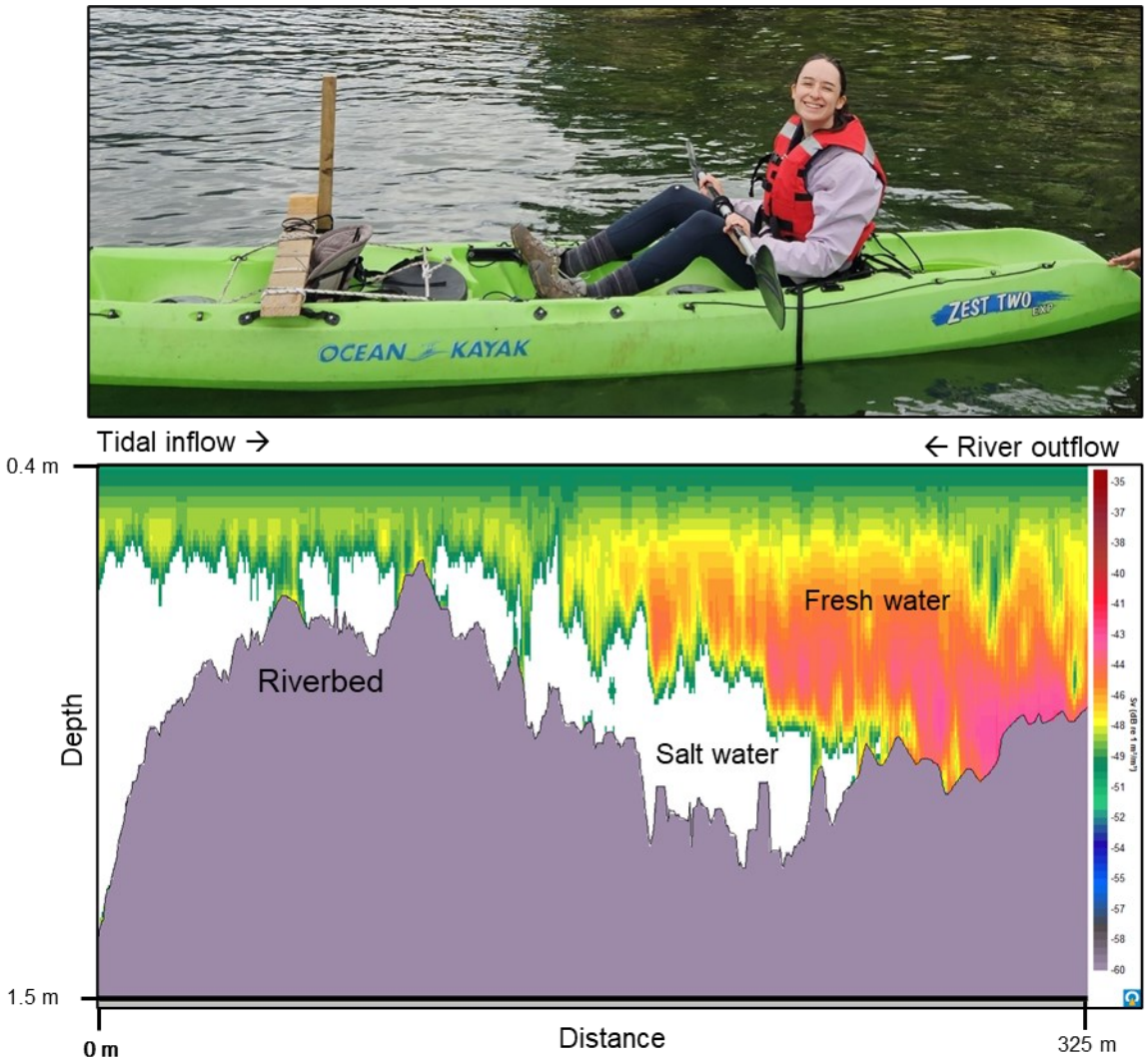
Students Gain Valuable Experience at UBC PRODIGY Field School in Patagonia, Chile

After several days of field work, students were then tasked with forming group research projects, investigating local oceanographic processes, and enhancing their field or analytical skills. Students worked closely with each other and with instructors who mentored them through complex data analysis and visualization. Becky Brooks, a master's student from UVic, was interested in the use of acoustics for imaging water mass density boundaries. Becky designed a custom mount for the AZFP-nano to conduct a small survey up the Lloncochaigua River to find the estuarine 'salt wedge.'



River survey with a kayak. PRODIGY student Becky Brooks, a master's student from UVic, designed a kayak mount for the AZFP-nano and paddled up the Lloncochaigua River to find the estuarine salt wedge. The turbulent freshwater flow of the river presented as a stronger scattering layer overlaying the rising tide, which had saltier (more dense) water.

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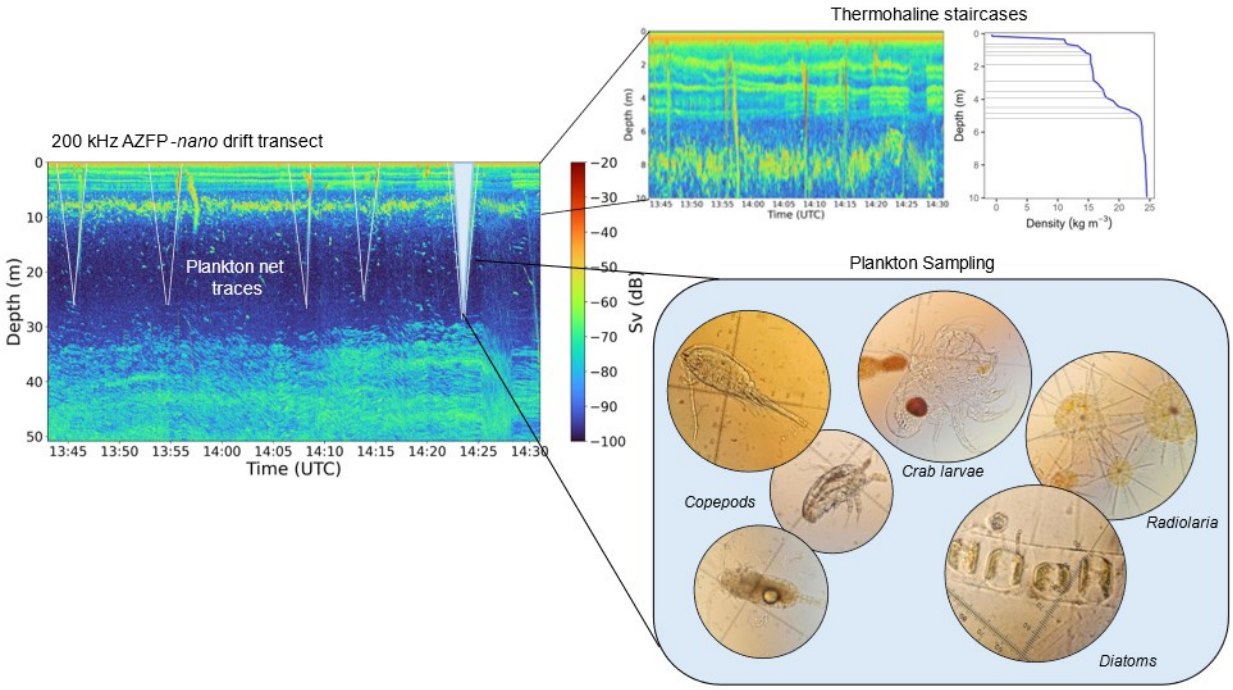

Drifting with the AZFP-nano. Students used the 200 kHz AZFP-nano, suspended below the water surface on a drift transect in Comau fjord. During the 45-minute drift, students lowered and hauled a plankton net to 15 m depth to collect plankton samples. Students identified zooplankton species, such as copepods and invertebrate larvae, which aggregate in acoustic scattering layers near the primary productivity maximum zone. Students also identified smaller plankton, including diatoms and radiolaria. Due to inflowing freshwater from the local glacial fed rivers, thin layers of increasingly dense freshwater called thermohaline staircases form near the surface with each rain event. Their density interfaces can also be visualized acoustically.

On one notable evening, several instructors and students sat around debriefing the days' activities. Rich Pawlowicz played live audio from a submerged hydrophone as the clicking and pops of underwater creatures and bubbles from breaking waves serenaded us. Students and instructors celebrated the week's achievements with a Chilean lamb roast, or 'asado', gathering around the fire, playing football, and dancing. Dr. Valeria Valle, an instructor with a background in musicology, invited all participants to join in a one-of-kind performance where she shared various ambient field recordings from the field school week and arranged snippets to be played from each participant's phone speaker, resulting in a grand cacophony of moving and immersive soundscape. It was a truly unique and memorable experience blending the science of acoustics with music and togetherness.

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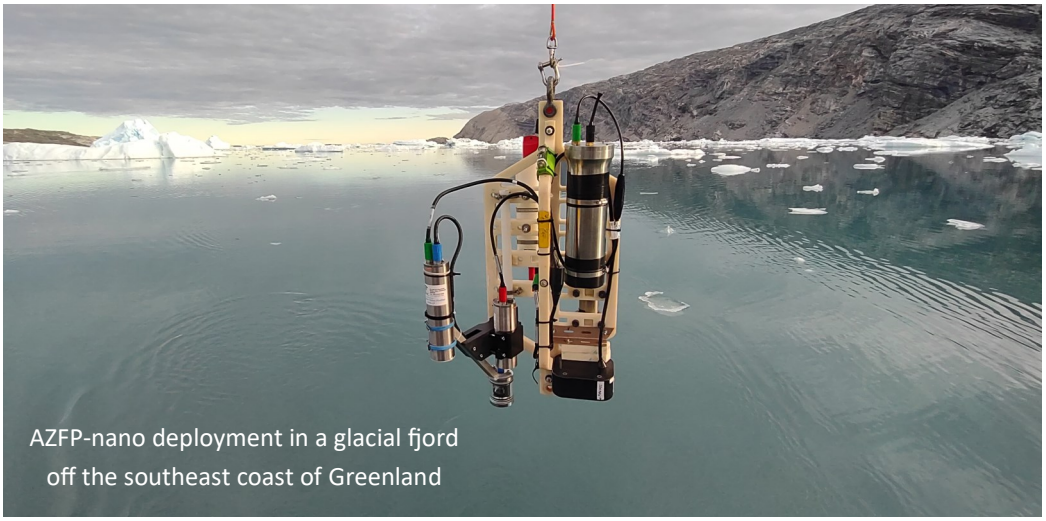
ASL Introduces the Compact Acoustic Zooplankton Fish Profiler-nano (AZFP-nano)

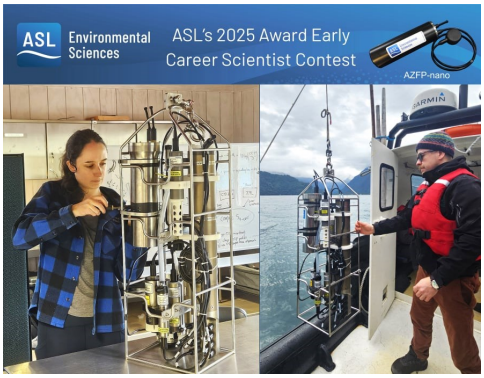


AZFP-nano deployment in a glacial fjord off the southeast coast of Greenland

ASL is proud to announce the addition of the Acoustic Zooplankton Fish Profiler (AZFP)-nano to its family of advanced acoustic instruments for aquatic environments. This compact, lightweight, single frequency scientific echosounder is a miniaturized version of the AZFP and is well-suited for applications in challenging environments where size and weight are important considerations. This advanced profiler was developed to measure a wide range of physical and biological parameters including zooplankton, fish, algae, bubbles and suspended sediments within the water column. The AZFP-nano has useful applications for fisheries sciences, oceanography and environmental monitoring and, due to its compact design, the AZFP-nano can easily fit on AUVs, CTD rosette samplers and other instrument packages.

The unit uses nine common D-sized batteries with enough power for multi-week deployments. The instrument comes factory calibrated with a 200 kHz transducer with other transducers soon to be added. In the summer of 2024, the AZFP-nano was part of an international climate research expedition off the southeast coast of Greenland where it was used to collect 14 kilometers of water column data in a study focused on glacial-ocean interactions.

ASL's 2025 Early Career Scientist Award Contest



In February of this year, ASL invited applications for the 2025 Early Career Scientist Award to win the use of the new AZFP-nano autonomous acoustic profiler for three months. The goal of this program is to support early career trainees in the oceanographic and limnological research community by lending, free of charge, a calibrated battery-powered Acoustic Zooplankton Fish Profiler™ (AZFP™)-nano with a 200 kHz single beam transducer for a three-month period along with the technical and analytical support from ASL's team of experts.

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ASL Environmental Sciences Announces Winner of 2025 Early Career Scientist Award

ASL Environmental Sciences is proud to announce Dr. Macarena Díaz-Astudillo as the recipient of the 2025 Early Career Scientist Award. Dr. Díaz-Astudillo's innovative research proposal titled "Understanding the drivers of zooplankton layers and aggregations over two contrasting submarine canyons" was selected based on her well-organized research objectives, her previous knowledge and experience of using hydroacoustics and her careful considerations to carry out both the field and analytical elements of this study.

The award grants Dr. Díaz-Astudillo the use of ASL's new Acoustic Zooplankton Fish Profiler AZFP-nano for a three-month period, along with full technical and analytical support from ASL's expert team.

Currently based at the Centro de Investigación Oceanográfica en el Pacífico Sur-Oriental (COPAS COASTAL) at the Universidad de Concepción, Chile, Dr. Díaz-Astudillo leads a multidisciplinary team investigating the dynamic biological and physical interactions within Chile's submarine canyons. The awarded project will focus on the Biobío Canyon (central Chile) and the Cucao Canyon (southern Chile), aiming to understand how canyon topography influences zooplankton layer formation, internal waves, and upwelling-driven productivity.

This research is especially relevant in the Humboldt Upwelling System, one of the most productive marine ecosystems in the world. By deploying the AZFP-nano, Dr. Díaz-Astudillo and her team will obtain high resolution backscatter data essential to characterize zooplankton layers with unprecedented clarity and precision. The study will fill a critical knowledge gap in submesoscale zooplankton dynamics and provide insights that can inform both ecological understanding and resource management. ASL extends heartfelt congratulations to Dr. Díaz-Astudillo and looks forward to the results of this important and timely project.

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Real-time Kelp Farm Monitoring with Smart AZFP-nano Equipped Spotter Buoy

Tom Campbell of West Coast Kelp showing off his newly seeded Macrocystis sp. seedlings at the kelp farm in Barkley Sound.

As a company, we aim to provide scientists and resource managers with accessible, low-cost, and effective tools for studying marine ecosystems. Through collaborations with clients and researchers, we're often introduced to emerging technologies that support these goals. Recently, we partnered with SOFAR Ocean and the Bristlemouth initiative to develop a real-time echosounder Smart mooring—our first demonstration of satellite-transmitted, condensed AZFP data. Built using the Bristlemouth protocol for rapid underwater data and power transmission, the system is designed to be scalable.

To test the concept, we deployed the smart mooring at a kelp farm in Barkley Sound, operated by Tom Campbell of West Coast Kelp. In discussions with Tom, we explored whether an echosounder could visualize kelp growing on submerged lines, potentially enabling future measurements of biomass growth and signaling optimal harvest or outplanting times. The Spotter buoy, which houses the satellite and cellular modem, also includes sensors that monitor wave height, sea surface pressure, and wind speed—key parameters for assessing local conditions and managing storm risk. After a month of deployment, the system continues to transmit acoustic and oceanographic data to an online server, where it is used to generate plots.

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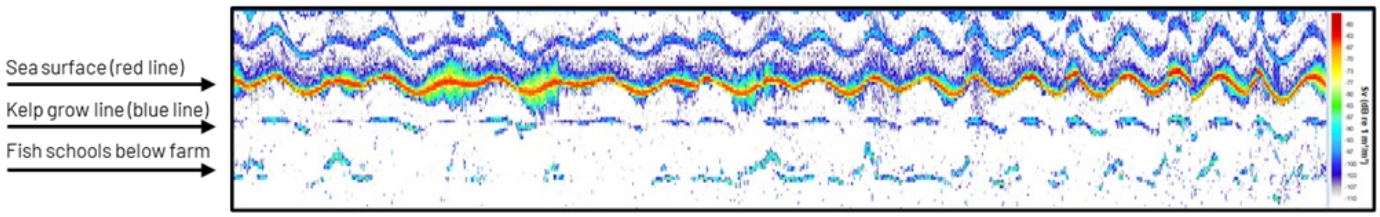

Ten-day time series (April 17-April 28) of acoustic backscatter at kelp farm. The echosounder is situated on the seafloor, facing upward, in about 15 m depth of water. The kelp line is submerged approximately 4 m below the surface.

Smart AZFP-nano equipped Spotter Buoy deployed at the West Coast Kelp farm in Barkley Sound.

An additional benefit of measuring acoustic backscatter is that we can assess how fish use the farm throughout the season. Wild kelp forests provide critical habitat services for a wide range of fish species in BC and there is some growing evidence that kelp farms provide shelter and habitat for species like herring. In fact, Tom recently found that pacific herring had spawned on macrocystis grown at his farm over the winter (LinkedIn Post). Looking toward the future, systems like this may help farmers growing kelp at large scales to effectively monitor growth, and habitat use, and oceanography from the comfort of their home or office.

Are you interested in using such a system for your own studies? We are actively seeking partners for further developing this technology and would love to hear your ideas and feedback. Get in touch with Dr. Julek Chawarski, our Biological Oceanographer at jchawarski@aslenv.com.

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Tidal Currents Study Under Way by ASL in Rigolet, Newfoundland and Labrador

ASL Environmental Sciences is proud to announce the successful completion of an initial multi-week study to measure tidal currents in collaboration with the Nunatsiavut Government and Oceans North. This initiative aligns with the Nunatsiavut Energy Security Plan to explore clean, renewable energy solutions for coastal communities and reduce dependence on diesel-generated electricity.

Current transect surveys were initially carried out with Acoustic Doppler Current Profilers (ADCPs) over the broader study area. ADCPs were then deployed on moorings at three strategic locations within the Rigolet Narrows waterway and recovered in September 2024. The data from this initial phase was used to inform the suitable site selection for a longer Phase 2 measurement period, which involves the observational study of tidal currents to capture the full annual tidal cycle. The second phase deployment was completed in the fall and is scheduled for recovery in the summer of 2025. The processed tidal current datasets from Phases 1 and 2 will provide valuable insights for assessing tidal energy potential, addressing operational challenges, and determining optimal placements for potential future in-water tidal turbines. A community consultation will take place during Phase 2 recovery to review the results.

ASL is excited to support the development of renewable marine energy infrastructure, contributing to preliminary front-end engineering design (PRE-FEED), construction planning, and site suitability assessments through excellence in physical oceanography measurement practices.

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ASL Participates in the 2025 Vancouver Island Science Fair

On April 6th, the 2025 Vancouver Island Regional Science Fair was held. ASL was one of the sponsors for the event, and is pleased to have been able to award four bright and deserving projects from the fair. These were the winning projects.

Kevin Su	Aquatic Wireless Batteryless Telemetry: A Self-Sustaining Fish Tagging Device with Enhanced Data Transmission	Gr. 11
Miles Horn/ Mariah Young	Glow-in-the-Dark Secrets: Investigating Bioluminescence	Gr. 5
Shuli Lu	Salinity Filtration: Which Filter Works the Best?	Gr. 6
Zenna Storry	Nature's Descent: Beach Objects in Quicksand	Gr. 6

VANCOUVER ISLAND REGIONAL SCIENCE FAIR
www.virsf.ca

We want to thank all of the students who participated in the fair for their hard work, and for sharing with us what they learned through their projects. Full results from the fair have been posted at www.virsf.ca.

We want to wish the seven students selected to go onto the Canada-Wide Science Fair from May 31 to June 7 in New Brunswick the best of luck. We are pleased that Kevin is numbered among them.

To all of the students who came to this year's fair, we hope that you had fun, and that you have become a better scientist or engineer because of the experience. We wish you well in your future studies, and look forward to hearing more about your research.

Students left to right: Shuli Lu, Kevin Su, Miles Horn, (Randy Enkin- VIRSF Past President), Mariah Young and Zenna Storry.

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ASL's Annual Beach Cleanup

A good turnout of ASL staff and families for the annual beach cleanup held at Island View Beach on Saturday April 26th. Special thanks to the CRD for supplying cleanup gear and support.

"Thank you to all who pitched in and for being part of the effort to give back a little bit to the ocean which supports us and allows us to do the fascinating things we do at ASL." (Keath Borg, Senior Oceanographer)

Conferences

Upcoming Conferences

9th Indigenous Resource Opportunities Conference 2025
June 18-20, 2025
Nanaimo, BC

Canadian Meteorological and Oceanographic Society - Canadian Geophysical Union CMOS-CGU 2025
May 25-May 29, 2025
Saskatoon, Saskatchewan

ISOPE 2025
June 1-6, 2025
Goyang/Seoul, Korea

Underwater Acoustics Conference & Exhibition
June 15-20, 2025
Halkidiki, Macedonia, Greece

International Conference on Port and Ocean Engineering under Arctic Conditions POAC 2025
July 13-17, 2025
St. John's, NL

Recent Conferences

Working Group on Fisheries Acoustics, Science and Technology WGFAST 2025
April 8-11, 2025
Hafnarfjörður, Iceland

Wind Europe 2025
April 8-10, 2025
Copenhagen, Denmark

Alaskan Marine Science Symposium AMSS
January 27-31, 2025
Anchorage, Alaska

Arctic Change 2024
December 9-12, 2024
Ottawa, Ontario

OEEC Offshore Energy Conference 2024
November 26-27, 2024
Amsterdam, Netherlands

Marine Renewables Canada
November 19-21, 2024
Halifax, Nova Scotia

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