Dr. Matthew Asplin, Chair of the Vancouver Island CMOS Centre presenting David Fissel with Fellow award certificate.

ASL's David Fissel Named a Fellow of the Canadian Meteorological and Oceanographic Society (CMOS)

The Vancouver Island CMOS Centre and ASL co-hosted a reception and award presentation ceremony at the University of Victoria, University Club, Thursday October 6th to honour those that have contributed significant scientific achievements. At this ceremony, ASL's David Fissel was named a Fellow of the Canadian Meteorological and Oceanographic Society (CMOS).

David Fissel was educated at the University of British Columbia, earning a B.Sc. in Honours Physics in 1971 and an M.Sc. in Physical Oceanography in 1975. His graduate research, carried out under Professor Steve Pond, was followed, in 1975, by working as a Physical Oceanographer at the Government of Canada's Institute of Ocean Sciences. His initial studies focused on currents in the Strait of Juan de Fuca and circulation patterns in the eastern half of the Northwest Passage.

In 1977, he joined Arctic Sciences Ltd. as a founding partner and Director of Oceanography, leading a 1977 physical oceanographic study of Lancaster Sound. Over the next 45 years, David played a major role in the evolution of Arctic Sciences Ltd. and its successor ASL Environmental Sciences Inc. which is a major contributor of products and expertise to Canadian and world markets for environment knowledge and services. During this period, his formal title varied to reflect current balances in his scientific, administrative and leadership interests and responsibilities.

The breadth and intensity of those interests combined with his legendary store of energy drove significant advances of knowledge in the form of 40 journal publications and well over 100 conference papers, in almost all aquatic areas relevant to Canada and its international scientific responsibilities.

This reality was apparent in his directorship roles on numerous university, government and private sector organizations' advisory and collaborative panels as well as his executive positions, including President, of CMOS from 2009–2012 and leading the CMOS Congress 2021 organizing team.

Since 2017, he has carried on at ASL on a part-time basis as a Senior Scientist while continuing to reside in Brentwood, B.C. with his wife, Bernadette, and faithful dog, Meena, except when he is travelling to check up on his four offspring or the Toronto Bluejays baseball team.

ASL Has a Long History of Successful Oceanographic Consulting Projects

ASL Environmental Sciences Inc. is Canada's largest physical oceanography company, and was founded in 1977. ASL has 45+ years of experience in physical oceanography, numerical modeling, and has successfully carried out over 1200 oceanographic consulting projects. ASL also offers a related line of oceanographic instrumentation, an extensive lease pool of metocean instrumentation, and subsea mooring design and deployment services. ASL has extensive experience operating real-time systems monitoring currents, waves, water levels, and ship traffic in busy harbour approaches such as the Port of Vancouver.

ASL is presently offering advanced data processing techniques in bioacoustics and biological oceanography for datasets collected using ASL's Acoustic Zooplankton Fish Profiler (AZFP), and a variety of other echosounders. ASL also features expertise in acoustic equipment design, manufacture and sales, water quality, water levels, Geographical Information Systems, data management, and remote sensing. Our portfolio of services include the following activities:

- Wave and current measurements, water quality, turbidity
- Monitoring of real-time currents, water levels, and ship traffic in busy harbours
- Active acoustic monitoring of zooplankton and fish using the ASL Acoustic Zooplankton Profiler (AZFP)
- Active acoustic monitoring of sea ice using the ASL Ice profiling Sonar (IPS)
- Oceanographic equipment leasing (*more information available at* https://aslenv.com/lease.html)
- Custom mooring design and sensor placement configurations on subsea moorings and ocean gliders
- Biophysical ecosystem monitoring
- Engineering design criteria for offshore structures (ISO 19901-1)
- Ships and Marine Technology – Offshore Wind Energy – Port and Marine Operations – ISO 29400:2020(E)
- Metocean consulting services and desktop studies
- Remote sensing.

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2022 Field Season Highlights: Labrador Coast

ASL Environmental Sciences Inc. is looking forward to our upcoming fall field program in Newfoundland and Labrador, Canada, a continuation of a program commenced in early 2020. A number of oceanographic moorings with ASL Ice Profiling Sonars (IPS), ADCPs, and other water quality sensors (CTD, DO, Turbidity) will be deployed on behalf of the Nunatsiavut Government at unique sites near coastal Labrador Inuit communities to support environmental management studies, and better understand variability in seasonal sea ice cover. This work includes continued collection of ice and oceanographic data in Strathcona Run, a narrow waterway due east of Nain, where there is ongoing interest in the biophysical environment and sea ice.

Ariel view of the study area near Nain, Labrador.

In addition, ASL is also pleased to announce a partnership mooring and surface buoy study in collaboration with C-Core, Memorial University and the Department of Fisheries and Oceans, with in-kind partnership support from the Nunatsiavut Regional Government. This IPS mooring will be deployed on the Makkovik Bank, near a previous DFO deployment site operated during the previous decade. The site is ideally situated to study ice dynamic processes and characteristics along the continental shelf of Labrador. The planned deployment will span the 2022–2023 ice season (October–July) and will provide an updated understanding of sea ice floes (draft, size, motion) that drift southeast along the coastal margin.

New Equipment Added to ASL's Lease Pool

ASL is continually adding to its collection of lease pool instruments to aid in the research and monitoring endeavors of our clients. Our most recent addition is another JFE Alec AROW optical Dissolved Oxygen (DO) logger. This joins three other DO loggers in the lease pool. This phosphorescent DO sensor has a high-speed response time and is suitable for fixed depth or profiling deployments. It is equipped with a mechanical wiper to clear the optical window to remove biofilms and its titanium pressure case is depth rated to 200 m. The DO detection limits are 0 to 200% saturation and it has an internal memory capacity of 2 GB.

The JFE Alec AROW DO logger is ideal for studying the following:

- Aquaculture water quality monitoring Hazardous Algal Blooms (HABs)
- Hypoxia
- Dissolved oxygen conditions of lakes, streams, rivers, estuaries, and coastal waters.

Example deployment of a JFE AROW DO as well as a JFE CLW Chl/Tu logger, on a cage suspended from a surface buoy.

For more information about leasing click here or contact Rick Birch.

ASL Announces Dr. Philip Matthews as the 2022 AZFP Award Contest Winner

Swarm of adult *Chaoborus edulis* midges blowing ashore in Nkhata Bay.
Photo credit: Joakim Sundstrom

ASL Environmental Sciences is pleased to announce Dr. Philip Matthews as the winner of the sixth annual Acoustic Zooplankton Fish Profiler (AZFP) early career scientist award contest. Dr. Matthews is an Associate Professor in the Department of Zoology at the University of British Columbia (UBC) and runs the Comparative Respiratory Physiology and Biomechanics Laboratory.

Dr. Matthews will be using a multi-frequency AZFP to understand the physiology and ecology of the deepest diving insect in the world—the *Chaoborus edulis* of Lake Malawi in southeastern Africa. He will be leading a team of two UBC graduate students, a fisheries research officer from Malawi and a UBC associate professor.

Lake Malawi is recognized as being rich in fish biodiversity with its waters teeming with more fish species than any other lake in the world. This lake is also home to *Chaoborus edulis*, remarkable Malawian midges that number in the billions and that regularly erupt from the lake surface forming vast twisting clouds that extend hundreds of meters above the lake (see figure). In their aquatic larval stages, this species has an unmatched diel vertical migration of well over 200 m where it dives deep into the lake's hypoxic zone to escape fish predation during the day and ascends back to the surface at night.

To accomplish this impressive daily vertical migration, *Chaoborus edulis* larvae control their buoyancy with internal air-filled bladders. The complex mechanisms that govern this process have only recently been discovered through the ground-breaking research carried out by Dr. Matthews' laboratory. Their work revealed that these midges use a pH-powered mechanochemical engine to regulate their buoyancy.

How deep this species dives, how their air-sacs can function at these depths, and how their daily mass migration influences the distribution of their zooplankton prey and predatory fish are all critical questions which remain unanswered. As the air-sacs present an acoustic target, tracking these migrations with a multi-frequency AZFP combined with a suite of water quality monitoring instruments will begin to reveal how this insect's unique physiology is shaping the ecology of one of the most biodiverse lakes in the world. In addition, zooplankton net samples of the upper 100 m will be collected to examine the *Chaoborus edulis'* physiology.

ASL Hires Mitchell Bonney for the Position of Remote Sensing Scientist

ASL is pleased to announce the appointment of Mitchell Bonney to the position of Remote Sensing Scientist as part of our remote sensing team. Before joining ASL, Mitchell had been serving as a limited term Assistant Professor (Teaching Stream) at the University of Toronto Mississauga (UTM), where he taught courses in remote sensing and spatial statistics. Mitchell completed his Doctoral degree at UTM earlier this year, and in 2017 completed his Master of Science at Queen's University (Kingston), both in Physical Geography with a specialty in remote sensing.

Mitchell is passionate about applying remote sensing to answer environmental questions, having utilized multispectral satellite and aerial time-series to explore northern Canada climate-induced shrubification, Australian fire history, temperate forest growth-decline dynamics, and southern Ontario urban forest histories in comparison with social-demographic change. Mitchell has published his work in high-quality scientific journals, including *Remote Sensing of Environment*.

Mitchell will participate in research and development projects and apply cutting-edge methods to help solve our clients' problems. He will be developing methodologies and automating workflows that include image processing, classification, target and anomaly detection, change detection/monitoring and time-series analysis using optical and radar data from multiple sources. Mitchell will bring his expertise to our ongoing project *Artificial Intelligence for Earth Observation*, where we use deep learning techniques on image time-series data to monitor landscape change and forest health over large areas.

ASL Hires Dan Walters for the Position of Data Scientist

ASL is pleased to announce the appointment of Dan Walters to the position of Data Scientist as part of our remote sensing team. Dan previously served 20 years in the Royal Canadian Air Force (RCAF) as a pilot before leaving to join the civil sector. He holds a Bachelor of Science in Honours Physics and a Master of Defence Studies from the Royal Military College of Canada. Most recently he completed a Master of Science in Aeronautics and Astronautics from Purdue University. Dan is an avid astrophysicist, with published papers in both dynamics and astronomy. Notably, he created a deep learning tool to help unravel the mysteries of galactic evolution. Dan brings a wide breadth of experience with the military, academia, and personal research and is eager to join the team.

Dan will be developing and applying cutting edge deep learning tools for earth observation data analytics, including automated object detection, identification, and semantic segmentation in satellite imagery. He will help expand ASL's existing capabilities that utilize deep learning for automatic site monitoring; detection of anomalous behavior based on temporal, spatial and spectral information; and wide area monitoring of natural and anthropogenic changes in the landscape (e.g., forest health, wildfires, disasters, industrial/urban development).

ASL Hires Devin Ireson for the Position of Software Developer and IT Specialist

ASL is pleased to announce the appointment of Devin Ireson to the position of Software Developer and IT Specialist. Devin brings over a decade of experience as an IT systems analyst to ASL, along with a recently completed B.Sc. in Computer Science. He will be responsible for support of ASL's IT infrastructure and to design, test, code, analyze, and maintain software programs and applications.

Devin's studies encompassed a wide range of IT systems administration and design topics, in addition to exploration of programming topics such as artificial intelligence, and data mining. While working towards his degree, Devin further developed his skills through IT roles within government and consulting. His breadth of experience has allowed him to develop familiarity with a variety of technologies and the needs of those who utilize them.

ASL Hires Amanda Dash for the Position of
Machine Learning and Computer Vision Specialist

ASL is excited to announce Amanda Dash's appointment to the Machine Learning and Computer Vision Specialist position as a part of our team. She contributes over five years of experience in research in Machine and Deep Learning and over a decade of software engineering and development. Amanda will be bringing her expertise to various projects at ASL.

Before her appointment at ASL, Amanda completed a Computer Engineering Technologist diploma at Saskatchewan Polytechnique and a Bachelor of Software Engineering at the University of Victoria. She has published research on bird population estimates, video summarization, classification and segmentation of images during her studies. Additionally, her studies have taken her to Beijing, China and Iqaluit, Nunavut, on various internships.

During her graduate studies, Amanda received the President's Fellowship in Research-Enriched Teaching in 2019 and taught the Computer Vision course at the University of Victoria for three semesters.

Amanda is currently completing a doctorate in Computer Vision at the University of Victoria. Amanda brings a wealth of knowledge and insight into using Machine Learning, Computer Vision and other data analytics to the study of remote environmental systems and is eager to develop new algorithms and tools for environmental monitoring.

# A Note From Keath Borg ASL's GoByBike Team Leader

Each year ASL participates in Victoria's Bike to Work Week. With COVID, this has evolved into GoByBike, which encourages people to try alternate forms of transportation for commuting and other activities to reduce greenhouse gas emissions and get people out exercising. GoByBike is interested in any kilometers logged such as trips to the office or grocery store. Additionally, other activities which help to reduce greenhouse gas emissions like rollerblading and walking are included.

ASL's eight person team collectively travelled 491 km over a total of 53 trips. They took steps to fight the extra weight gained over COVID as they burned 14.7 Mcal. We're all breathing a little easier as 106 kg of greenhouse gases were saved. Plans are to return strong for the Bike-To-Work event next May.

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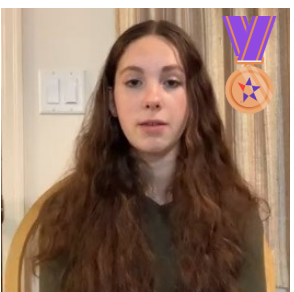**www.aslenv.com**

Vancouver Island Students Receive Top Marks at the 2022 Canada-Wide Science Fair

Nathan Hellner-Mestelman
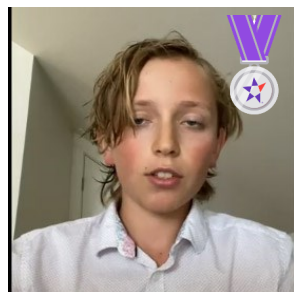
Evan Papps

Katherine Morley

Eunjo An

ASL would like to congratulate all of the participants in the Vancouver Island Regional Science Fair and would like to recognize those that went on to receive recognition at the 2022 Canada-Wide Science Fair.

In April, ASL was proud to sponsor the fourth-prize winner of the Vancouver Island Regional Science Fair. This prize was awarded to Nathan Hellner-Mestelman for his project entitled "Breakup is a Drag - Using a Lower CubeSat Orbit to Protect Space Infrastructure," a study on how to reduce space debris by adjusting satellite orbits using a cost-efficient delivery system. Nathan, along with six other Vancouver Islanders (see results virsf.ca) were selected to continue on to the nationals.

The Canada-Wide Science Fair saw many innovative and complex studies demonstrating a broad range of skills from young up-and-coming scientists. A total of four Vancouver Islanders received awards at this high level competition. Nathan was awarded a silver medal in the Curiosity and Ingenuity category and a Western University Scholarship. Following the path of other Vancouver Islanders, Evan Papps, also within the Curiosity and Ingenuity category, won a silver medal for his project entitled "Can Slime Mold Adapt and Communicate?" Evan studied how these organisms can learn and share information with other slime molds. Results from his study suggest potential innovations in nanotechnology. Evan was also awarded a Western University Scholarship.

Another key topic for Vancouver Islanders was the Environment and Climate Change category where Katherine Morley won a bronze medal for her work "Coagulant Conundrum: Exploring the Efficacy of Natural and Chemical Coagulants on Microplastics." In addition to the bronze medal, she was also awarded the Nanotechnology for Sustainable Society Award sponsored by the Waterloo Institute for Nanotechnology.

Eunjo An's work entitled "Orange Peels as Biosorbents in the Treatment of Heavy Metals Wastewater " won her a bronze medal in the Environment and Climate Change category as well as two additional awards including the Sanofi Biogenius Canada Award and a University of Ottawa Entrance Scholarship.

A job well done!

ASL's Dr. Matthew Asplin and David Fissel to be Guest Editors for a Special Journal Issue "Advances in Sea-Ice Remote Sensing Involving Upward Looking Sonar"

ASL is pleased to announce the appointment of Dr. Matthew Asplin and David Fissel as guest editors for a special issue of the *Remote Sensing* Journal titled Advances in Sea-Ice Remote Sensing involving Upward Looking Sonar.

Details for submissions can be found here: https://www.mdpi.com/journal/remotesensing/special_issues/8T3V0FIT0B
Our guest editors summarized the aim of this special issue below.

Dear Colleagues,

Narrow beam upward-looking sonar instruments, using rapid sampling rates of a few seconds, have provided invaluable in situ ice draft data, and information on ice motion and ice floe size, when paired with an ADCP in the bottom-tracking mode. Time series in situ data will continue to be invaluable to the scientific community, particularly when combined with advances in satellite-based remote sensing of ice thickness data, and underwater autonomous vehicle technology. These datasets will continue to provide information on sea and lake ice annual cycles and permit the scientific community to monitor changes to local and regional ice regimes at very high spatial and temporal resolution. The aim of this Special Issue is to feature advances in technologies, and data processing techniques, such as machine-learning advances. Papers that aim to synthesize other data sources with upward-looking sonar data are also encouraged for submission. Submissions are encouraged to address one or more of the following themes: 1) monitoring Arctic and Antarctic sea ice dynamics and processes using novel technologies and deployment configurations; 2) shifting Arctic sea ice cover, from a multi-year to first-year ice regime; 3) applying machine learning to upward-looking sonar ice draft datasets and 4) validation of sea ice studies using remote sensing or other measurement methods.

Dr. Matthew G. Asplin   David B. Fissel
Guest Editor   *Assistant Editor*

Conferences

Upcoming Conferences	Recent Past Conferences
ABCMI Business Opportunities Conference Nov 8–9, 2022 Vancouver, BC	**Aquaculture Canada and WAS North America** August 15–18, 2022 St. Johns, Newfoundland
Annual Meeting of Asian Fisheries Acoustics Society AFAS 2022 Nov 4–16, 2022 Busan, Korea	**American Fisheries Society AFS-2022** August 21–25, 2022 Spokane, Washington, USA
Marine Renewables Canada Nov 22–24, 2022 Halifax, Nova Scotia	**International Conference on Hydraulic Efficiency Measurement - IGHEM** October 3–5, 2022 Grenoble, France
ArcticNet ASM 2022 Dec 6–9, 2022 Toronto, Ontario	**Oceans 2022** October 17–21, 2022 Virginia Beach, Virginia, USA