



Canadian National Committee for SCOR
Comité national canadien pour SCOR

Scientific Committee on Oceanic Research

CANADIAN OCEAN SCIENCE NEWSLETTER LE BULLETIN CANADIEN DES SCIENCES DE L'OCÉAN

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Table of Contents

OCEAN SCIENCE NEWS.....	2
Impacts of Human Activities on Marine Ecosystems.....	2
CNC-SCOR Eastern Tour Speaker.....	4
MEETINGS.....	6
OERA Webinars.....	6
Ocean Sciences Meeting 2020.....	6
Gordon Research Conference/Seminar - Ocean Mixing.....	7
52nd Liège Colloquium on Ocean Dynamics.....	7
POSITIONS AVAILABLE.....	8
Postdoctoral Research Associate - Marine Chemistry.....	8
Assistant Professor - Earth & Planetary Science.....	8
Assistant Professor Oceanography.....	9
Two Postdoctoral Research Positions.....	9
Assistant Professor Signal Processing in Applied Ocean Science.....	10
Post Doctorates RA - Coastal Modeling and Analysis.....	11
Coastal to Global Ocean Modeling Scientist.....	11
Ocean Circulation Modeling.....	12
Postdoc/Research Scientist.....	12
GENERAL.....	13
The Casco Bay Estuary Partnership.....	13
New SCOR Executive Director.....	14
Trevor McDougall Elected President of IAPSO.....	14
CMOS Bulletin V47 No. 4.....	15
NSERC Prizes – Science Promotion.....	15
2020 SCOR Visiting Scholars Program.....	16
Canadian Ocean Science Newsletter Le Bulletin Canadien des Sciences de l'Océan.....	17
CNC-SCOR.....	17



Impacts of Human Activities on Marine Ecosystems

Cathryn Clarke Murray

Institute of Ocean Sciences, DFO, Sidney BC

(Cathryn is the recipient of the 2019 CNC-SCOR Early Career Ocean Scientist Award. See the announcement in [Newsletter #107](#).)

In the age of the Anthropocene, marine ecological research has become focused less on how natural systems function and more on how they have been altered by a diverse and ever-increasing set of human pressures. From traditional fishing and shipping to emerging industries such as tidal power, marine ecosystems are under stress from multiple pressures interacting at local and global scales. Understanding and restoring affected ecosystems requires detailed data about each individual stressor and its impacts on all the components of the ecosystem and ideally, additional knowledge about the interactions between the stressors and any indirect effects. This is a monumental task and so we turn from classic experimental and observational science to model-based research. My own career path has followed this linkage, from detailed investigation of single stressors to highly complex modeling of cumulative effects.



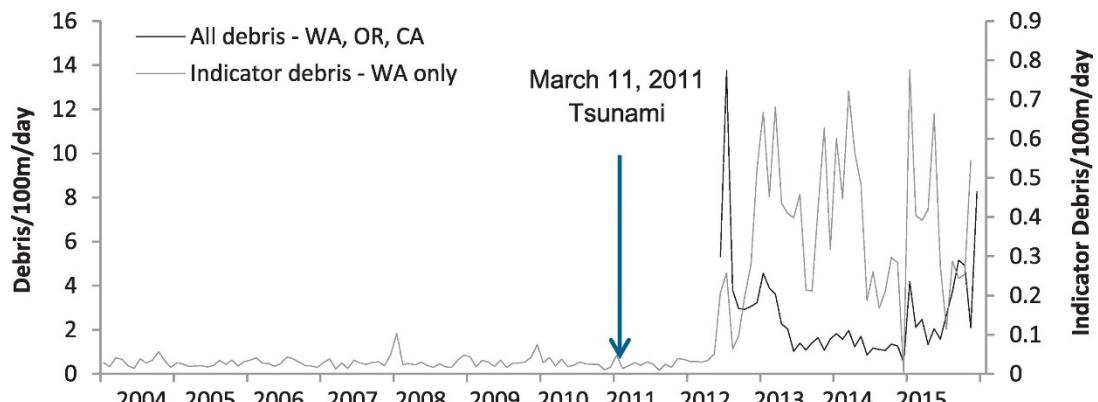
Underwater photo of me surveying the heavily fouled keel of a recreational boat for non-native species in one of British Columbia's many marinas and harbours. More than 25% of boats examined had one or more non-native species attached.



The diversity of marine debris washed up on remote Cape Scott, British Columbia. Photo courtesy of Andrew Clarke.

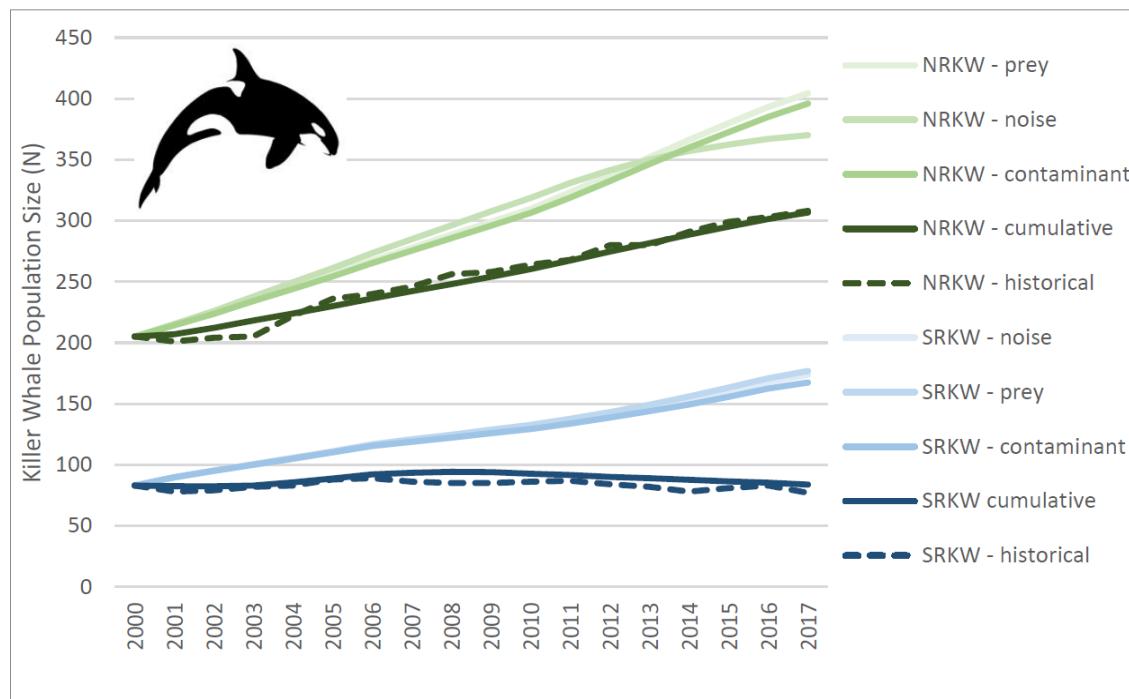
My doctoral research investigated a stressor of global interest - how recreational boating movements facilitate the introduction and spread of invasive species. It was the first comprehensive study of the recreational boating vector in Canadian marine waters. On SCUBA, I surveyed hundreds of boats *in situ* for associated fouling organisms and discovered nine non-native species were attached or entangled on the underwater surfaces, including a number of highly invasive species (Clarke Murray et al 2011). I combined the results of these field surveys with behavioural surveys of the boating community, laboratory experiments, and statistical analysis to show that the recreational boating vector played a stronger role in the current distribution of subtidal non-native species than the original vectors that first brought these species to North America, aquaculture and shipping (Clarke Murray et al 2014).

My postdoctoral work expanded my research on invasive species to a new vector, highlighted by the Great Japan Tsunami of 2011. This natural disaster generated an enormous amount of marine debris from a single origin at a known time. The Ministry of Environment of Japan commissioned the North Pacific Marine Science Organization (PICES) to investigate the tsunami debris event and its impact on ecosystems of the Northeast Pacific and I served as PICES Visiting Scientist. The PICES project ADRIFT brought together more than 30 scientists from three countries and as the scientific lead, I was privileged to work with leading scientists in the fields of physical oceanography, invasion biology, taxonomy, genetics and ecology. During the project, the documented field of tsunami debris had more than 370 species of invertebrates, algae, and fish that survived 1000s of kilometres at sea to arrive alive on the shores of North America and the Hawaiian Islands (Murray et al 2018a). The project generated a wealth of new knowledge and findings highlighted in more than 30 publications. The vast increases in marine debris and the increased risk of extreme weather events under climate change make this a stressor that bears further scrutiny. I am currently collaborating with physical oceanographers at University of Hawaii and invasion ecologists at the Smithsonian Environmental Research Center to further investigate how coastal species survive with debris in the Great Pacific Garbage Patch and may be traveling with marine debris across ocean basins.



Timeline of arrival of debris on the Pacific coast of North America in relation to the Great Japan Tsunami event of 2011. Indicator debris data going back twelve years was used to estimate that the tsunami event increased the shoreline debris load by at least ten-fold. Figure reproduced from Murray et al 2018b.

While diving deeper into key stressors of interest: marine debris and invasive species, I was also grappling with the problem of how to assess and manage multiple stressors in the emerging field of cumulative effects. My first research problem after being hired in the Ecosystem Stressors Program at Fisheries and Oceans



Comparison of simulation model scenarios for single threats and a cumulative effects model for Northern and Southern Resident Killer Whale Populations (NRKW in green and SRKW in blue). Individual threat scenarios (prey, PCB contamination, and underwater noise) and a cumulative effects scenario were compared to the census data (dashed lines) for each population to determine the most useful model.

While diving deeper into key stressors of interest: marine debris and invasive species, I was also grappling with the problem of how to assess and manage multiple stressors in the emerging field of cumulative effects. My first research problem after being hired in the Ecosystem Stressors Program at Fisheries and Oceans

Canada was to conduct a cumulative effects assessment of the struggling Northeast Pacific resident killer whale populations. These whale populations are one of the best studied in the world but we had to assess the cumulative effects using such disparate data as the results of laboratory experiments on model organisms with observational field survey data to forecast the fate of killer whale populations. My team and I had to research and combine the impacts of chemical contaminants, underwater noise and nutritional stress on marine mammals into a single assessment model. We compiled and updated existing data on the three main threats and their impacts on mortality and fecundity of the two populations. We used Population Viability Analysis simulation modeling to create model scenarios of individual and cumulative threats and compared each to the historical population data to determine which scenario best fits the real world data. The cumulative model included all three threats and interactions between them to successfully reproduce historic population patterns better than any single threat model. The cumulative effects assessment was reviewed and published by DFO's review process, Canadian Science Advice Secretariat (Murray et al 2019) and is now being used to inform recovery and management efforts for these endangered and threatened species.

References

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CNC-SCOR Eastern Tour Speaker

Each year CNC-SCOR selects someone from the West coast to give a lecture tour heading East, and someone from the East to give a lecture tour heading West. The person heading East gives talks, over 1 week at some combination of eastern oceanographic institutes and schools. The 2019-20 Eastern annual CNC-SCOR tour speaker is [Dr. Jennifer Jackson](#) from the [Hakai Institute](#) in Victoria.

She is a research scientist in physical oceanography at the Hakai Institute in Victoria, Canada. She received her MSc from the Department of Earth and Atmospheric Sciences at the University of Alberta and her PhD from the Department of Earth, Ocean, and Atmospheric Sciences from the University of British Columbia. She held postdoctoral positions at the University of Cape Town (South Africa), the University of Washington (Seattle, USA), and ASL Environmental Sciences (Victoria, Canada). Jennifer is known internationally for her work in Arctic and coastal oceanography, particularly bio-physical interactions and ocean climate. Jennifer joined the Hakai Institute in 2015 and currently leads the Hakai Oceanography Program. Her current research focuses on the British Columbia central coast, examining links between the open ocean and coast, particularly



the impact of climate anomalies on coastal regions. Jennifer serves on national and international committees, including CIOOS and PICES.

Her talk will be titled *A tale of three fjords: A comparison of marine heatwave impacts on three British Columbia mainland coastal systems*.

Abstract: The coastline of British Columbia (25,725 km in length) is lined by numerous fjords that were carved out by glaciers and whose bathymetry (length, maximum depth, sill depth) varies with specific geologic history. Some fjords, such as Bute, Knight, and Rivers Inlets, are still influenced by headwater glaciers whose seasonal runoff strongly influences the physical, chemical and biological properties in these inlets. In recent years, warm anomalies in the Eastern Pacific atmospheric system have led to enhanced glacial melt and a prolonged marine heatwave in subsurface coastal waters. Physical (temperature and salinity) and chemical (oxygen) profile data have been collected in these three fjords since 1951, yet this nearly 7 decade-long time series has never been examined in the context of climate change. In June 2019, all three fjords were concurrently sampled by the Raincoast Foundation's R/V Achiever (Bute and Knight Inlet) and by the Hakai Institute's small boat (Rivers Inlet). Data from these three inlets show the striking impacts of glacial melt and the 2014 to 2016 marine heatwave on the internal structure of temperature, salinity and oxygen within these fjords.

As this is work in progress, the title and material covered may change between now and the time of the talk, depending on developments in the research.

We hope to be able to announce the CNC-SCOR western tour speaker in the next newsletter.



This section of your newsletter provides an opportunity to highlight your research programs to the Ocean Science Community.

You are invited to send contributions to
David greenberg,
david.greenberg@dfo-mpo.gc.ca

Mettez en valeur vos programmes de recherche en publiant un article dans cette première section de votre bulletin.

Faites parvenir vos contributions à
David greenberg,
david.greenberg@dfo-mpo.gc.ca

MEETINGS

OERA Webinars

Online monthly, presently scheduled from October 2019 - February 2020

The Offshore Energy Research Association ([OERA](#)) [webinar series](#) highlights recent and ongoing petroleum and renewable energy research. Everyone is welcome to attend the live webinars. The aims are to share key research findings and create opportunities for researchers, industry representatives, students and government stakeholders to connect.



October 24, 2019 1:00pm - 2:00pm ADT, Phil Taylor and Jake Walker, Acadia University, [Using radar data to evaluate seabird abundance and habitat use at the Fundy Ocean Research Centre for Energy site near Parrsboro, NS.](#) [Register](#)

November 21, 2019 1:00pm - 2:00pm AST, Sue Molloy, Glas Ocean Electric, [Electrification of Marine Fleet \(Modeling of electric boats as energy storage\)](#) [Register](#)

December 12, 2019 1:00pm - 2:00pm AST, Etienne Mfoumou, NSCC Applied Research, [Developing Enhanced Marine Operations \(DEMO\) in High Flow Tidal Environments](#) [Register](#)

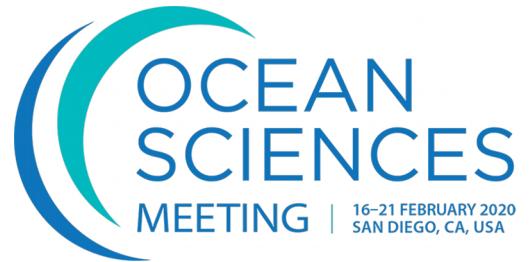
January 23, 2020 1:00pm - 2:00pm AST, Alex Hay, Dalhousie University, [Turbulence in High-Flow Tidal Channels](#) [Register](#)

February 20, 2020 1:00pm - 2:00pm AST, Mike Stokesbury, Brian Sanderson, Montana McLean, Jessie Lilly, Acadia University, [Quantifying Fish-Turbine Interactions Using New VEMCO Tagging Technology](#) [Register](#)

Ocean Sciences Meeting 2020

16-21 February 2020, San Diego, CA

The Ocean Sciences Meeting is the flagship conference for the ocean sciences and the larger ocean-connected community. As we approach the UN Decade of Ocean Science for Sustainable Development, beginning in 2021, it is increasingly important to gather as a scientific community to raise awareness of the truly global dimension of the ocean, address environmental challenges, and set forth on a path towards a resilient planet. The Ocean Sciences Meeting 2020 is co-sponsored by AGU, the Association for the Sciences of Limnology and Oceanography (ASLO), and The Oceanography Society (TOS).



Through the combined power of these three organizations, along with the broader conservation-focused community, this meeting provides attendees the opportunity to bridge disciplines, connect communities, and make lasting partnerships. This year's theme, **For a Resilient Planet**, centers around the concept that scientists, in partnership with governments and communities, have the power to affect change in fostering healthier and more resilient oceans, a safer and sustainable food supply, and to mitigate the impacts of climate change.

[Website](#)

Deadline for early registration January 9 2020

Gordon Research Conference/Seminar - Ocean Mixing

Seminar - June 13 - 14, 2020, Conference - June 14-19, Manchester, NH

This **Conference (GRC)** will be held in conjunction with the "Ocean Mixing (GRS)" Gordon Research **Seminar (GRS)**. Those interested in attending both meetings must submit an application for the GRS in addition to an application for the GRC. Refer to the respective websites: [Ocean Mixing \(GRS\)](#), [Ocean Mixing \(GRC\)](#)

The **Seminar (GRS)** will feature approximately 10 talks and 2 poster sessions. All attendees are expected to actively participate in the GRS, either by giving an oral presentation or presenting a poster. Therefore, all applications must include an abstract.



The seminar chair will select speakers from abstracts submitted by **March 13, 2020**. Those applicants who are not chosen for talks and those who apply after the deadline to be considered for an oral presentation will be expected to present a poster. In order to be considered for a poster, you must submit an application by **May 16, 2020**.

The **Conference (GRC)** will consist of nine sessions as listed on the website. The conference chair is currently developing their preliminary program, which will include the names of the invited speakers and discussion leaders for each of these sessions. The preliminary program will be available by **October 15, 2019**. Poster sessions are an integral part of the conferences, and offer all conferees an opportunity to discuss their research.



**Gordon Research
Conferences**

Frontiers of Science

There is funding available. The organization of Gordon conferences is different from most meetings, so it is wise to consult the [FAQs](#).

52nd Liège Colloquium on Ocean Dynamics

Liège, Belgium - May 25 - 29 2020

The complexity of the coastal ocean combined with the conjunction of multiple stressors pose significant challenges to scientists that have to develop the adequate innovative and robust science-based tools in support of a sound management. The colloquium would like to gather an interdisciplinary community of scientists in order to obtain an overview of the progress in our capabilities to understand, monitor and forecast the impact of human activities on coastal marine environments to guarantee a productive and healthy system as requested by the EU Marine Strategy Framework Directive and the UN Sustainable Development Goal 14. A special event gathering scientists, stakeholders and industries is foreseen for reviewing current knowledge and gaps on offshore wind farms impacts on biodiversity and biogeochemistry. The special event will set the scene for a follow-up discussion during a networking reception directly following the presentations.



[Details](#)

Abstract deadline January 17, 2020.

Early Registration March 30, 2020.

Please send meeting announcements to
David greenberg,
david.greenberg@dfo-mpo.gc.ca

SVP faites parvenir vos annonces de réunion à
David greenberg,
david.greenberg@dfo-mpo.gc.ca

POSITIONS AVAILABLE

Postdoctoral Research Associate - Marine Chemistry

The University of Southern Mississippi

Job Summary: Works closely with USM Marine Science faculty on research projects dealing with submarine groundwater discharge, testing of new sensors, and open ocean dissolved trace element distributions. Presents research findings at regional, national and international conferences, meetings and workshops. Publishes interdisciplinary articles in scientific journals that report on the results of collaborative research effort. Contributes to and/or writes new funding proposals.



Minimum Qualifications: Ph.D. in oceanography or related field, with emphasis on geochemical processes. Candidates must have demonstrable experience doing geochemical research in the field as well experience in geochemical analysis. Candidates must possess demonstrable experience in conducting science with peer-reviewed publications.

[Details](#)

Deadline: Open Until Filled

Assistant Professor - Earth & Planetary Science

University of California, Berkeley

The Department of Earth and Planetary Science at the University of California, Berkeley invites applications for an Assistant Professor faculty position with an expected start date of July 1, 2020. We seek outstanding candidates from any area of Earth and planetary science. Candidates whose research falls into this broad range of disciplines are invited to apply.



The basic qualifications required to be considered for this position are a Ph.D. or equivalent international degree, or enrollment in a Ph.D. or equivalent international degree-granting program at the time of application. A Ph.D. or equivalent international degree is preferred by the date of hire.

The department is committed to addressing the family needs of faculty, including dual career couples and single parents. We are also interested in candidates who have had non-traditional career paths or who have taken time off for family reasons (e.g., caring for children, the disabled, or the elderly), or who have achieved excellence in careers outside academia (e.g., in professional or industry service).

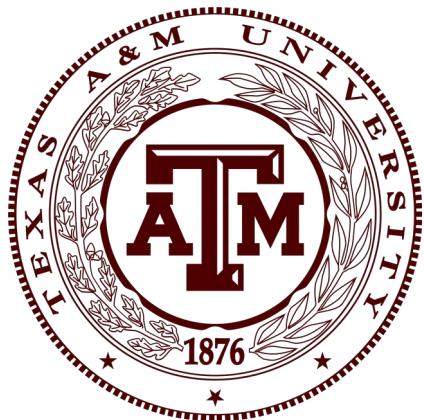
[Details](#)

Deadline: October 30, 2019.

Assistant Professor Oceanography

Texas A&M University, College Station, TX

Data Science in Oceanography spans disciplines from climate science to molecular biology. Its integration into Oceanography has the potential to change conventional research approaches by combining emerging data analytics technology with high-resolution and multidisciplinary ocean-related datasets. We seek an interdisciplinary early career scholar with a record of active research and publication in the area of Ocean Data Science to join the Department of Oceanography at Texas A&M University at the rank of tenure-track Assistant Professor. We expect this individual to play an active role in strengthening our existing interdisciplinary research programs by nucleating new research initiatives that utilize data analytics, information processing, and/or high performance computing to address problems in Oceanographic research. In addition to collaborations within the Department of Oceanography, the newly established Texas A&M Institute of Data Science (TAMIDS) (<https://tamids.tamu.edu>) provides an excellent platform to launch new Data Science related research collaborations. We welcome applicants with any disciplinary specialty in Ocean Data Science application and technology, including biological oceanography, ocean remote sensing, ocean and climate modeling, and others.



The Department of Oceanography at Texas A&M University, located in College Station, Texas is part of an alliance of Ocean Sciences that includes the Marine Biology and Marine Sciences Departments at TAMU Galveston, the Geochemical and Environmental Research Group, the International Ocean Discovery Program, and Texas Sea Grant. This alliance of Ocean Sciences represents a unique concentration of educational and research resources. The capacity is greatly enhanced by close ties to the College of Geosciences Departments of Atmospheric Sciences, Geography, and Geology & Geophysics, as well as the Berg Hughes Center, the Texas Center for Climate Studies and the International Laboratory for High-Resolution Earth System Prediction.

Applicants should have a Ph.D. (or equivalent) and at least 5 years of research experience in Ocean Data Science application and technology. Candidates for this position should submit a letter of application, curriculum vitae, and the names of three confidential references.

Details

Deadline: Review of applications has begun and will continue until the position is filled.

Two Postdoctoral Research Positions

Pacific Northwest National Laboratory, Seattle, Washington

The Pacific Northwest National Laboratory (PNNL) has an immediate postdoc opening in tidal energy, storm surge, turbulence and sediment transport modeling. PNNL seeks highly motivated postdoctoral researchers to join a well-established coastal ocean modeling team in the Seattle Research Center, Seattle, Washington, USA.

The selected candidate is expected to apply advanced coastal ocean models to conduct coastal modeling research related to tidal hydrodynamics, estuarine processes and storm surge. The selected candidate should



demonstrate 1) solid modeling experience and knowledge with state-of-the-art coastal ocean and wave models, especially unstructured-grid models; 2) strong writing and communication skills with good publication record; 3) strong problem solving skills and ability of working independently; 4) excellent scientific programming skills and knowledge of high performance computing.

A Ph.D. in physical oceanography, geoscience, ocean engineering, civil and environmental engineering, atmospheric science or related fields. For more information, please contact Dr. Zhaoqing Yangz (haoqing.yang@pnnl.gov).

Assistant Professor Signal Processing in Applied Ocean Science

Scripps Institution of Oceanography and the Department of Electrical and Computer Engineering, University of California San Diego

The Scripps Institution of Oceanography (SIO) and the Department of Electrical and Computer Engineering (ECE) in the Jacobs School of Engineering at the University of California San Diego (<http://scripps.ucsd.edu>; <http://ece.ucsd.edu>) invite applications for the joint faculty position listed below. We seek a motivated, broad-thinking scientist-educator to



establish a vigorous research program and provide intellectual leadership in their field while complementing existing expertise at SIO, ECE, and other UC San Diego departments. We are committed to academic excellence and diversity within the faculty, staff, and student body. The departments are interested in candidates who have demonstrated commitment to excellence by providing leadership in teaching, research, and service towards building an equitable and diverse scholarly environment.

Applicants are required to have a PhD or advancement to candidacy at the time of application in Engineering, Physics, Oceanography or a related field, a competitive record of publication and service, as well as evidence of ability or strong potential to secure extramural funding and conduct an active research program. The position requires teaching of University studies at the undergraduate and graduate level. Salary will be consistent with the applicant's qualifications and experience and with University of California pay scales.

[Details](#)

Deadline: Review of applications has begun and will continue until the position is filled or December 31.

Post Doctorates RA - Coastal Modeling and Analysis

Pacific Northwest National Laboratory (PNNL), Richland, Washington

As part of a new project on Integrated Coastal Modeling (ICoM), PNNL is recruiting three postdoctoral scientists to develop capabilities to model land and river processes and their interactions with the ocean in the coastal zone.

The candidates will work with a team of scientists at PNNL and LANL to extend the U.S. Department of Energy's Energy Exascale Earth System Model at <http://e3sm.org/> (E3SM) to represent human-land-river-ocean interactions on a unified surface grid for land, river, ocean, and ice. Building on the existing land and river models of E3SM, the candidates will improve modeling of river flow and water management, transportation of dissolved and particulate carbon, nitrogen, and phosphorous to the ocean, and three-way exchanges of water, heat, sediment and nutrient fluxes among the land, river, and ocean considering the impacts of flooding and storm surges in the periodically flooded zone. The candidates will also work on evaluating the models using observations and conduct numerical experiments to address important science questions related to human-land-river-ocean interactions. Working on the ICoM project offers exciting opportunities to develop coastal modeling capabilities in Earth system models and using the tool to test hypotheses about coastal processes, especially extreme events, in the complex human-earth system.



Details

Closing Date: 2019-10-19

Coastal to Global Ocean Modeling Scientist

Los Alamos National Laboratory, Los Alamos, NM

The Fluid Dynamics and Solid Mechanics group (T-3) at Los Alamos National Laboratory is seeking qualified applicants in the area of coastal model development and analysis. Candidates with experience in both unstructured coastal ocean modeling and Earth system modeling are especially encouraged to apply.

This position will be filled at either the Scientist 2 or 3 level, depending on the skills of the selected candidate. Additional job responsibilities (outlined below) will be assigned if the candidate is hired at the higher level.



The candidate will be expected to perform outstanding research in the field of global to coastal ocean modeling within a vibrant community of scholars focused on studying the earth system, which requires an ability to work well together in large, multi-disciplinary, collaborative team environments. The individual will also contribute to broader T-3 goals to provide innovative and creative solutions needed to solve technical problems across the Laboratory's missions, including energy security, stockpile stewardship, and global threat reduction.

Details

Ocean Circulation Modeling

Sofar Ocean Technologies, San Francisco, CA

[Sofar](#) is looking for a new team member to help drive their rapidly expanding global ocean weather forecast capabilities. You will take on the development and operational implementation of our global circulation models. You are exceptionally passionate about ocean modeling, and have extensive experience with both theoretical and operational aspects of numerical ocean circulation models and data assimilation. Most importantly, you are a quick learner, thrive in an environment that is focused on innovation and doing things differently, and you are excited about developing and applying new strategies to modeling and data interpretation across a breadth of applications. You are also excited about working as part of a team and help others excel.



Responsibilities

- Develop an operational implementation of ocean circulation model
- Establish metrics for model performance and scalability
- Work with the team to integrate with other models and observational data, and develop efficient assimilation strategies
- Help create a revolutionary new approach to ocean modeling and forecasting capabilities!

Bonus Points

- Working experience with either atmospheric or wave modeling.
- Experience in working with large datasets.
- Experience working with observational data
- Java / Fortran / C experience.

Details

Resume and a short cover letter explaining why you're excited about the open position to recruiting@sofarocean.com.

Postdoc/Research Scientist

MSEAS, MIT, Cambridge, MA

Pierre Lermusiaux of the MIT Multidisciplinary Simulation, Estimation, and Assimilation Systems (MSEAS) group at MIT has put out a call for a postdoc or research scientist position available now in numerical ocean modeling and geophysical fluid dynamics. Take a look at what [MSEAS](#) does and if interested send Pierre pierrel@mit.edu an email telling him about you and your work.



Looking for work? Try the CMOS site ([click](#)).

Vous recherchez un emploi? Visitez le site SCMO ([click](#)).

GENERAL

The Casco Bay Estuary Partnership

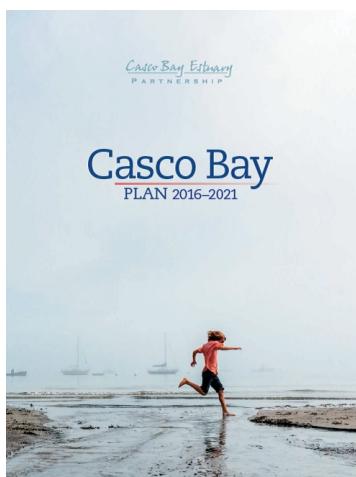
The Casco Bay Estuary Partnership is a good example of cooperative oversight of a small coastal region. The Partnership's mission is to help conserve the ecological integrity of Casco Bay and its watershed through science, public stewardship and effective management.

In 1990, Casco Bay was designated an "estuary of national significance" and included in the [U.S. Environmental Protection Agency's National Estuary Program](#), which was established in 1987 under the Clean Water Act to protect nationally significant estuaries threatened by pollution, development or overuse. As a result of this designation, the Casco Bay Estuary Partnership was formed. The Casco Bay Estuary Partnership, one of 28 National Estuary Programs nationwide, is a collaborative effort of people and organizations interested in protecting and restoring the Bay. Partners include local, state and federal government organizations; non-profits; local businesses; citizens; universities and more.

Activities benefit those that:

- live, work and play on the Bay,
- appreciate its natural beauty, and
- reap its economic benefits.

The Casco Bay Estuary Partnership's mission is to help conserve the ecological integrity of Casco Bay and its watershed through science, public stewardship and effective management.



The Partnership produces a newsletter [Casco Bay Currents](#).

It has developed a [five year plan](#) for the region.



It is a collaboration of all levels of government, university, research institutes and wide ranging environmental groups.

The Partnership is overseeing monitoring [programs](#), organizing [workshops](#), and hosting [resources](#) to build an increasing collection of graphics and signs, maps, as well as data sets.

More information can be found on their [website](#).

New SCOR Executive Director



The Scientific Committee on Oceanic Research (SCOR) is pleased to announce the appointment of its next Executive Director, **Dr. Patricia Miloslavich**. She will begin service with SCOR on 1 January 2020 and will assume the role of SCOR Executive Director on 1 February 2020. Patricia will be the fourth Executive Secretary/Executive Director in SCOR's 62 history, following George Hemmen, Elizabeth Gross, and Ed Urban.

More information about Dr. Miloslavich can be found [here](#).

Congratulations, Patricia!



Trevor McDougall Elected President of IAPSO

Trevor McDougall has been elected President of the International Association for the Physical Sciences of the Oceans (IAPSO). IAPSO, which interacts with UNESCO's Intergovernmental Oceanographic Commission, is the primary body responsible for maintaining and improving oceanographic standards and practices. It has the prime goal of "promoting the study of scientific problems relating to the oceans and the interactions taking place at the sea floor, coastal, and atmospheric boundaries insofar as such research is conducted by the use of mathematics, physics, and chemistry."



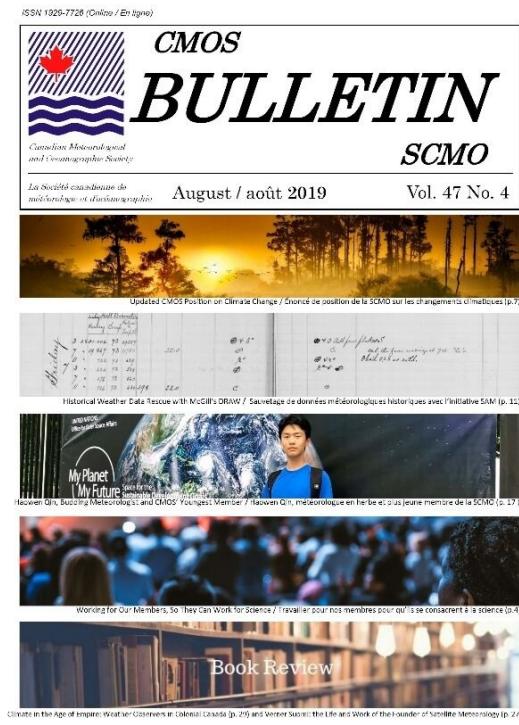
IAPSO is one of eight associations of the International Union of Geological and Geophysics (IUGG), which is constituted within the International Council for Science (ICSU)

Trevor is one of Australia's most decorated scientists. His awards include the Royal Society of Tasmania Medal, the Prince Albert I Medal of the International Association for the Physical Sciences of the Oceans, and Companion of the Order of Australia for eminent service to science, and to education, particularly in the area of ocean thermodynamics, as an academic, and researcher, to furthering the understanding of climate science, and as a mentor of young scientists. He is a fellow of the Australian Academy of Science, the Australian Meteorological and Oceanographic Society, the Institute of Physics, the Royal Society of New South Wales, the Royal Society (London). He is the Scientia Professor of Ocean Physics at the University of New South Wales.

Trevor describes his plans for the coming years in a [letter](#) on the [IAPSO website](#).

CMOS Bulletin V47 No. 4

CMOS Bulletin V47 N0. 4 is now available on line as a [web page](#) or [downloadable as a pdf](#). This issue of the CMOS Bulletin, has CMOS's UPDATED POSITION ON CLIMATE CHANGE, in support of the recently published Canada's Changing Climate Report (CCCR). It also includes some wonderful articles on citizen science projects, including a look at McGill's DRAW project by Victoria Slonosky. The DRAW project seeks to involve the public in the task of digitizing important historical weather data. Bulletin editor Sarah Knight interviews citizen scientist, budding meteorologist and CMOS' youngest member Haowen Qin. Two excellent book reviews, including one on the recent book by the aforementioned Victoria Slonosky, "Climate in the Age of Empire: Weather Observers in Colonial Canada" by Richard Leduc, are included. Society president Kimberly Strong shares her insights on the important work that CMOS does to support our members, and how she hopes to support growth in the society in the coming year. Als included are several items of interest to members, including some photos from the recent CMOS congress at the IUGG General Assembly in Montreal, books available for review, and more.



NSERC Prizes - Science Promotion

The NSERC Awards for Science Promotion honour people and groups that are inspirational in the way they promote science to the general public. The Awards are an opportunity for Canada's science community to recognize, support and encourage outstanding science promoters. NSERC invites all Canadians with an interest in science, including teachers and university researchers, to contribute to the success of this annual effort by nominating the people who are making others aware of what science means to all of us.

The achievements of individual and group recipients of the NSERC Awards for Science Promotion will be celebrated at a public ceremony. Individual recipients will receive a \$10,000 award and group recipients a \$25,000 award. In both cases, the funds are to support further science promotion activities. Funds paid to winners of this prize are subject to the [PromoScience Grants Guide](#).

Nomination deadline: **November 25 before 8:00 p.m. (ET)**. If the deadline falls on a weekend or federal holiday, your nomination must reach NSERC before **8:00 p.m. (ET)** the following working day.



Science promotion activities with award potential could include activities such as:

- organizing science camps, fairs, clubs or programs with youth organizations;
- creating new learning materials;
- developing science and engineering-related co-op programs or job shadowing initiatives;
- arranging demonstrations, visits and lectures;
- writing books and articles;
- creating radio or television programs;
- generating public involvement through multi-media programs.

[Nomination Form](#); [Terms and Conditions Form for Nominees](#); [Terms and Conditions Form for Nominators](#)

2020 SCOR Visiting Scholars Program

The application period is now open for the 2020 SCOR Visiting Scholars Program. Applications are due by **1 December 2020** and selections will be made by the SCOR Committee on Capacity Building by 1 January 2020.

SCOR began a program in 2009 to enlist the services of ocean scientists from both developed and developing countries to teach short courses and to provide more extended on-site education and mentorship at developing country institutions. This program is open to any Ph.D.-level scientist who has time available to spend teaching and mentoring in a developing country (see list [here](#)). The scholarships are not intended to directly support research, although such research is encouraged as an outcome of a visit.

SCOR will select Scholars through its Committee on Capacity Building, which will review the applications and the proposed work assignments at the host institutions. The number of scientists placed each year will depend on the number of applications received and funding available.

Application forms and instructions can be found [here](#).



Canadian Ocean Science Newsletter

Le Bulletin Canadien des Sciences de l'Océan

Previous newsletters may be found on the [CNC/SCOR](#) web site.

Newsletter #109 will be distributed in **November 2019**.

Please send contributions to David Greenberg
david.greenberg@dfo-mpo.gc.ca

Subscription

CNC-SCOR is changing the server that distributes the *Canadian Ocean Science Newsletter*. Until that is complete, please email david.greenberg@dfo-mpo.gc.ca if you want changes in your subscription status.

Les bulletins antérieurs se retrouvent sur le site web du [CNC/SCOR](#).

Le Bulletin #109 sera distribué en **novembre 2019**.

Veuillez faire parvenir vos contributions à David Greenberg, david.greenberg@dfo-mpo.gc.ca

Abonnement

CNC-SCOR est en train de changer le serveur qui distribue le *Bulletin Canadien des Sciences de l'Océan*. En attendant, veuillez envoyer un courrier électronique à david.greenberg@dfo-mpo.gc.ca si vous souhaitez modifier le statut de votre abonnement.

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Le Comité national canadien du Comité scientifique de la recherche océanographique (SCOR) favorise et facilite la coopération internationale. Il reflète la nature multidisciplinaire de la science océanique et de la technologie marine.

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The Canadian National Committee of the Scientific Committee for Oceanic Research (CNC-SCOR) fosters and facilitates international cooperation. It is a non-governmental body that reflects the multi-disciplinary nature of ocean science and marine technology.



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