

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

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**PhD Research Position in Bio-physical Modeling of Ice-covered Seas**

Quebec-Ocean, University of Laval

Application (Letter and CV) deadline: Thursday 31 March 2005

Québec-Océan leads multidisciplinary, international research programs to quantify and model the response of Arctic and subarctic marine ecosystems to the on-going reduction in sea ice cover. General circulation models (GCM) predict unanimously that global warming due to greenhouse gases will be most severe (up to 5-8oC in 2070) over the Arctic Ocean and its ancillary seas. However the geochemical component of the Arctic Ocean and its interactions with

climate remains largely unknown, especially the carbon sink via the biological pump. Our goal is to develop ecosystem models for northern Baffin Bay (North Water) and the Beaufort Sea and to couple these models to sea ice-ocean circulation models.

**Plankton production model:** The trophic structure of ecosystems depends on primary production which is determined by local physical conditions such as turbulence, vertical velocity or tidal mixing. The goal of this PhD project is to develop a NPZD (Nutrients, Phytoplankton, Zooplankton, Detritus) ecosystem model, possibly including the two main plankton trophic pathways and their interactions, and to couple this model to physical models of Baffin Bay and the Beaufort Sea.

**Tertiary Production: Individual Based Model (IBM) of Arctic cod early survival.** The Arctic cod is a key component of the arctic marine food web that effect most of the transfer of carbon from plankton to higher trophic levels (mammals and birds). The goal is to transpose an existing IBM of Atlantic cod larvae (*Gadus morhua*) in the Gulf of St. Lawrence to the Arctic cod (*Boreogadus saida*) in the North Water and the Beaufort Sea. IBM models allow to track the dispersion, growth and individual survival of thousands of virtual larvae released in an ocean circulation model.

Minimum support of \$15,000/year available for 3 years, but priority will be given to students with or eligible to a scholarship. Scholarships incremented by \$2000/year.

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### **Doctorats en modélisation bio-physique des mers glacées**

Quebec-Ocean, Université Laval

Les candidatures (lettre, CV) sont à envoyer avant le 31 mars 2005

Les chercheurs du groupe Québec-Océan développent des programmes de recherche d'envergure internationale pour quantifier, comprendre et modéliser le fonctionnement des écosystèmes marins arctiques et subarctiques et d'en prédire le devenir face à la réduction actuelle de la banquise. Les modèles de circulation générale (GCM) anticipent unanimement que c'est au-dessus de l'Océan Arctique et de ses mers ancillaires que le réchauffement climatique dû à l'effet de serre sera le plus intense (5-8°C d'ici 2070). Or la composante géochimique de l'Océan Arctique et ses interactions avec le climat sont encore largement méconnues, notamment le piégeage du carbone via la pompe biologique. L'objectif du groupe est de développer des modèles d'écosystème pour le nord de la Baie de Baffin (Eaux du Nord) et la Mer de Beaufort et de coupler ces modèles biologiques aux modèles de circulation océanique et de couvert de glace.

Modèle de production planctonique: La structure trophique des écosystèmes est fonction de leur productivité qui elle-même est déterminée par les conditions physiques du milieu (turbulence, vitesses verticales, mélange due à la marée). L'objectif de ce projet de doctorat est de développer un modèle d'écosystème planctonique NPZD (Nutrients, Phytoplankton, Zooplankton, Detritus) incluant éventuellement les deux principaux types de chaînes trophiques planctoniques et leur compétition, et de coupler ce modèle aux modèles physiques des Mers de Baffin et de Beaufort.

Production tertiaire: modélisation IBM de la survie larvaire de la morue arctique. La morue arctique est une espèce clef du réseau trophique qui effectue la majeure partie du transfert de carbone entre le plancton et les niveaux trophiques supérieurs (mammifères et oiseaux). L'objectif est de transposer un modèle IBM (Individually Based Models) existant de la phase larvaire de la morue atlantique (*Gadus morhua*) du Sud du Golfe du St-Laurent au cas de la morue arctique (*Boreogadus saida*) des Eaux du Nord et de la Mer de Beaufort. Les modèles IBM permettent de suivre la dispersion, la croissance et la survie individuelle de plusieurs milliers de larves virtuelles relâchées dans un modèle de la circulation océanique.

Un appui financier minimum de \$15 000 par an est disponible, mais la priorité sera donnée aux étudiant(e)s détenant ou éligibles à une bourse d'excellence. Les bourses d'excellence seront augmentées de \$2000 par an.

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### **ASL's Ice Profiler at LNG Terminal Site**

Report by Colleen McQuade, ASL Environmental Sciences, [cmcquade@aslenv.com](mailto:cmcquade@aslenv.com)

The port of Gros Cacouna on the St Lawrence River downstream of Quebec City is the proposed site of an LNG offloading terminal. Trow Engineering, on behalf of TransCanada and Petro-Canada, hired ASL Environmental Sciences to collect and process current, wave and ice data at the proposed terminal location. From October through November 2004 an ADCP was moored on site and provided high quality current and wave data. The current data were supplemented by drogued drifter tracks collected by ASL's project partner, Procean Environment Inc. In November an ASL Ice Profiler was added to the mooring to collect ice draft data over the coming winter. A second ADCP was also added as, at present, the RDI ADCPs cannot simultaneously collect wave and bottom track data. The bottom-track data are needed to measure the ice velocity. The project is planned for one year, but may be extended.



### **Robert William Stewart, 1923 – 2005, In Memoriam**

From McCall Brothers, Funeral Directors Ltd, Victoria, B.C.

**STEWART** Robert William, O.C., F.R.S., F.R.S.C., Ph.D. Passed away peacefully in Victoria on January 19, 2005. Bob is survived by his wife Anne-Marie; his children Anne (Jack), Brian (Rosemary), Philip (Nicole) and Colin (Terry); his grandchildren Lara (Darryl), Michael, Alex and Caitlin and his great-grandson Julian. Bob was born in Alberta on August 21, 1923, raised in Olds and Calgary. He received his B.Sc. and M.Sc. from Queen's University and his Ph.D. in Physics from Cambridge University. He returned to Canada in the early fifties and became one of the first Canadian oceanographers. He had a distinguished and rewarding career as a research scientist and research manager for 40 years and was still interested in his field in his retirement; until a year ago he could be seen almost daily at UVic having lunch at the University Club and attending physics seminars. He participated in and led many international experiments and committees, travelling widely. Bob received many Canadian and international awards, but was most gratified by his "F.R.S.". At the end of his life he was content to be treated as one of the grandfathers of oceanography and was called upon to lecture on the "early days". He was a proud Canadian, choosing to dedicate his long career to Canada. He had an inquiring mind, was fierce in his search for knowledge, yet kind and loving in his family life, where he was considered affectionately as an "absent-minded professor".

## **C-SOLAS host of the first International SOLAS Science Conference**

Report by: Caroline-Renae Alexander, [Caroline.Alexander@dal.ca](mailto:Caroline.Alexander@dal.ca) and Sylvie Roy, [sylvie.roy@dal.ca](mailto:sylvie.roy@dal.ca)

In 2001, the Canadian SOLAS (Surface Ocean Lower Atmosphere Study) Research Network was jointly funded by the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Canadian Foundation for Climate and Atmospheric Science (CFCAS), with a strong financial support from the Department of Fisheries and Oceans Canada and Environment Canada. The C-SOLAS Research Network was awarded \$9 million Canadian dollars for a five-year program and was the first SOLAS national program to both receive funding and initiate field programs. C-SOLAS is a unique opportunity for Canadian atmospheric and ocean scientists to cooperatively develop and implement a coordinated research plan. This collaboration was remarkably successful with four major research expeditions (one in the subarctic Pacific and three in the western North Atlantic), and, to date, one special session at the Joint American Society of Oceanography (The Oceanography Society Ocean Sciences Meeting in Honolulu HI), a multi-authors paper in Nature and several other peer-reviewed publications and many presentations at national and international scientific meetings. Because of this success, the C-SOLAS community has positioned itself as leader in the International SOLAS program. SOLAS is one of the core programs of the IGBP II with the main objective to achieve quantitative understanding of the key biogeochemical-physical interactions and feedbacks between the ocean and the atmosphere, and how this coupled system affects and is affected by climate and environmental change. ([www.csolas.dal.ca](http://www.csolas.dal.ca))

The leading role of C-SOLAS provided the scientific centerpiece for the first SOLAS International Open Science Conference held from October 13 to 16, 2004 in Halifax, Nova Scotia, Canada. This event was partly funded by SCOR. This conference fitted well within the SCOR mandate to promote interdisciplinary cooperation and early awareness of scientific knowledge. The conference clearly provided a unique opportunity for both atmospheric and ocean scientists to share their results and plan future international collaborations.

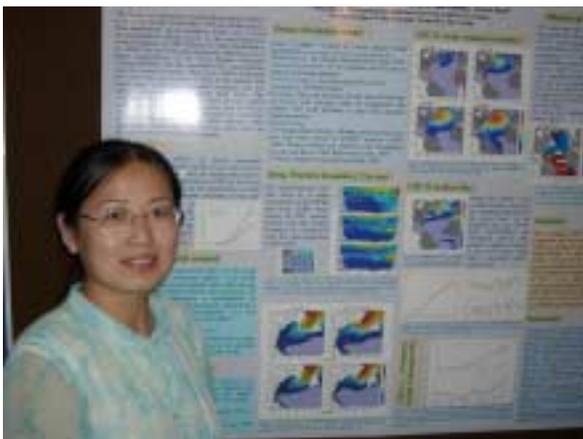
Two hundred and thirty five delegates from 24 countries attended the conference. The morning sessions were devoted to plenary talks from world leaders in research fields including influence of iron on trace biogeochemical cycling of climate relevant gases, impact of iron and nitrogen fixation, occurrence and emission of DMS in the ocean, ocean-atmosphere-sea ice –snow interactions, surface processes controlling air-sea gas fluxes, aerosols in the marine boundary layer, and aerosols and climate. Poster sessions took place during the afternoon, followed by a suite of discussion groups on SOLAS related topics.

Education and training at the conference was supported through several avenues. In addition to financial backing provided from SCOR, two other agencies facilitated the support of students from developing countries or countries in economic transition. The Inter-American Institute for Global change Research (IAI) supported the participation of young scientists from the Americas, and the Asia-Pacific Network for Global Change Research (APN) supported young scientists from the Asia-Pacific region to attend the conference.

Networking on International ocean sciences groups was evident through several meetings held in conjunction to the SOLAS International Conference. WGSF, SOLAS IMP Focus I and II, C-SOLAS and US-SOLAS met separately during or prior to the conference.

This conference was an opportunity for Canadian researchers to promote their scientific progress within the larger SOLAS community and to retain recognition as international leaders in this important and expanding research field. It also provided an overview of SOLAS science globally, and the exciting directions being taken both now and as a catalyst for future work.

For more information on C-SOLAS and PDF copies of the C-SOLAS Network overview poster and Newsletters, go to <http://www.csolas.dal.ca>



*“More than 180 posters were presented at the International SOLAS Conference hosted in Halifax...”*

Masters student Jun Zhao presents her poster “Simulations of the uptake and spreading of CFCs in the North Atlantic Ocean”.



C-SOLAS Executive Director Dr. Daniela Turk provides information on the C-SOLAS Network and an overview of C-SOLAS research.

## **IAG/IAPSP/IABO 2005 Joint Assembly Call for Papers**

Contribution by Lawrence A. Mysak, [lawrence.mysak@mcgill.ca](mailto:lawrence.mysak@mcgill.ca), IAPSO Vice President

The International Association for the Physical Sciences of the Oceans (IAPSO) will hold a Joint Assembly in cooperation with the International Association of Biological Oceanography (IABO) and the International Association of Geodesy (IAG), 22 - 26 August 2005, Cairns, Queensland, Australia <http://www.dynamicplanet2005.com> The scientific program is organised under the theme of "Monitoring and Understanding a Dynamic Planet with Geodetic and Oceanographic Tools". The Organising Committee invites YOU to now to take advantage of the Early Bird Registration Fee – the cut off date being May 30, 2005.

[https://ei.im.com.au/ei/getdemo.ei?id=223&s=\\_19U0MQFQP](https://ei.im.com.au/ei/getdemo.ei?id=223&s=_19U0MQFQP)

### **CALL FOR PAPERS - CLOSING DATE 29 APRIL 2005**

The Scientific Program Committee is calling for abstracts for oral and poster at the conference - all information on themes can be found on the conference website

<http://www.dynamicplanet2005.com/Call-Papers.htm> You are encouraged to book your accommodation through the Conference Secretariat to ensure that you receive very competitive rates. The Accommodation Page of the website contains information on hotels and rates and all bookings can be taken on-line.

## **Canadian Census of Marine Life: Three Oceans of Biodiversity**

Executive Summary of the Ottawa Workshop, the full report may be viewed at:

<http://www.coreocean.org/Dev2Go.web?id=247906&rnd=8001>

Canada has a particularly critical role to play in the global Census of Marine Life (CoML) given that the country has the longest coastline in the world and also abuts three different oceans, each with unique characteristics and habitats. A workshop of 55 participants that included many highly-regarded Canadian marine ecologists was held in Ottawa (29-31 October 2004) to plan a coordinated program for Canada in the international initiative CoML. The agenda included a historical context of marine biodiversity initiatives in Canada, presentations on current CoML-related projects in Canada, and group discussions to identify research priorities for a major new initiative. Significant results of the meeting include the identification of research priorities for a new Canadian CoML proposal and the election of a steering committee to help direct a national research agenda on marine biodiversity.

Canada has multiple commitments to maintain marine biodiversity, as evident in the signing of the Convention of Biological Diversity (1992), the FAO Code of Conduct for Responsible Fishing (1995), Canada's Oceans Act (1997), the Species at Risk Act (2004), and ratification of the Law of the Sea (2004). These efforts will require better knowledge of biodiversity for issues such as designing marine protected areas (MPAs) and other conservation initiatives. In 2000, the

Department of Fisheries and Oceans (DFO) established the Centre for Marine Biodiversity (CMB), which organized a workshop in 2002 to identify broad objectives for Canadian research in marine biodiversity and then drafted "Three Oceans of Biodiversity: A Canadian National Plan 2004-2009". The goal of the Ottawa workshop was to build on and refine the broad ideas developed at the 2002 meeting.

Although there has not yet been a concerted effort to coordinate Canadian CoML research, there are current CoML initiatives that have Canadian involvement, including the Future of Marine Animal Populations (Ransom Myers), the Pacific Ocean and Shelf Tracking (POST) Project (David Welch), The Gulf of Maine Biodiversity Discovery Corridor (Peter Lawton), and the Arctic Ocean CoML (Russ Hopcroft).

Information on several emerging technologies particularly relevant to CoML research was presented, including New Technologies for Observing Marine Life (David Farmer), DNA Barcoding (Paul Hebert), the Gulf of Maine Biogeographic Information System (Bob Branton), Ocean Telemetry (Ron O'Dor), and Cabled Observatories in Canada (Verena Tunnicliffe).

A proposed framework (Paul Snelgrove) for a coordinated Canadian CoML initiative was based on developing scientific criteria for the conservation of marine biodiversity. There was general support for organizing a major initiative around this approach, assuming that the potential for management applications and the importance of taking inventory of biodiversity resources were acknowledged as priorities. In order to stimulate discussion, a summary was presented of key ecological issues on biodiversity processes at the three biological organizational levels: seascape (John Roff), multi-species (Ken Frank), and population/genetic (Paul Bentzen) diversity.

The first discussion session identified important issues within each level of biological organization. The second session discussed how these issues linked across the three levels. The third session revolved around four research themes (described below) that were identified as high priority in the previous sessions.

Research theme I: What are the relationships between biodiversity and ecosystem functioning? Three major types of interactions between ecosystem functioning and marine biodiversity were identified: the relationship between metrics of productivity and metrics of biodiversity, the relationship between large-scale physical processes and functional diversity, and the relationship between physical structure in habitats and biodiversity. Technologies can provide synoptic maps of physical structure in marine ecosystems that, combined with theory allowing prediction of how marine biodiversity should vary with those structural factors, can be used to develop testable hypotheses.

Research theme II: What is the nature of cryptic diversity, the spatial distribution of biodiversity, and temporal changes in biodiversity? A proposal was made to undertake 'The Great Canadian Ocean Exploration' to sample all the kingdoms in a geographically broad-based study to form a baseline on biodiversity using DNA barcoding and taxonomy, and thus address issues such as climate change. Important aspects of this project would be standardization of procedures, support and development of museum capacity for voucher specimens, and identification of taxonomic expertise both within Canada and internationally.

Research theme III: How can we utilize studies of spatial and temporal variability within and between habitats to model and predict broader biodiversity patterns for other geographical areas, habitats, and times? Relationships between biodiversity and driving processes, such as disturbance or environmental stress, could be examined through spatial analysis on a range of scales in order to generate predictive models. In order to determine how the main processes that structure biodiversity vary with spatial scale, there is a pressing need for a unified and interdisciplinary approach to study scaling in physical and biological processes that encompasses specific, testable hypotheses. More theoretical research is required to design novel models, which will subsequently require additional field research for validation.

Research theme IV: How are disturbances related to biodiversity? A community-based approach is needed to evaluate the effects of broadly defined disturbances, such as physical, chemical, or trophic disruptions, on marine biodiversity. An important sampling approach is the comparison between natural and human-impacted areas and between disturbed and undisturbed areas. Five possible areas of major interest are: trawling effects, climate change, acoustic pollution, eutrophication, and overexploitation.

There was strong consensus among the workshop participants that a major multi-disciplinary proposal should be initiated and would receive substantial support from the marine scientific community. There was enthusiasm for biodiversity research in all three of Canada's oceans, but there was recognition that addressing these issues in Arctic ecosystems is particularly crucial. This proposal would interface with ongoing CoML projects but generate a significant new effort that would build on these efforts. Funding strategies for this initiative were discussed and representatives from some of the key funding agencies provided input on relevant programs. An important organizational result of this workshop was the election of a national steering committee to help organize and direct Canada's research efforts on Census of Marine Life issues, including a chair to represent Canada at the International Census of Marine Life meeting in December. The steering committee was charged with developing a proposal strategy over the coming months in consultation with other members of the scientific community.

### **Call for SCOR Working Group Proposals for 2005**

The 37th SCOR Executive Committee Meeting will take place in Cairns, Australia on 29 August - 1 September 2005. For consideration at that meeting, the SCOR Secretariat will accept proposals for new SCOR working groups from now until 15 April 2005. A model proposal and other information about working groups can be found at [www.jhu.edu/scor/wkgrpinfo.htm](http://www.jhu.edu/scor/wkgrpinfo.htm). In order to achieve a disciplinary balance among working groups and other activities sponsored by SCOR, we would particularly like to encourage working group proposals in the areas of physical and chemical oceanography, and marine geology. SCOR has sufficient funding for two new working groups to start in 2006. National SCOR committees are an important aspect of SCOR's operation and can play a key role in reviewing working group proposals. Proponents should consider submitting their proposals through their national SCOR committees, although SCOR will also accept proposals from individuals and other organizations. Details on the call for proposals may be found at: <http://www.jhu.edu/~scor/2005WGProposals.pdf>

## CNC/SCOR Lecture Tour on the East Coast in 2005

To promote communications and interactions among Canadian scientists, CNC/SCOR initiated a once-per-year lecture tour from one coast to provide lectures at CMOS centers on the other coast over a one week period. For more information, please browse the website at <http://www.cmos.ca/scor/newsletters.htm> issue #8.

Dr. Philippe Tortell in the Department of Earth and Ocean Sciences (EOS), University of British Columbia was chosen to give a CNC/SCOR lecture on the east coast in 2005. Dr. Marlon Lewis at Dalhousie University was chosen to give a tour lecture on the west coast.

Dr. Tortell graduated with a B. Sc degree from McGill University in 1994 and a Ph. D degree from Princeton University in 2001. Dr. Tortell was appointed as an assistant professor in the Department of Earth and Ocean Sciences at UBC in 2003. Dr. Tortell's research interests are very broad, which include biological oceanography, physiology, ecology, evolution of marine phytoplankton and bacteria, CO<sub>2</sub> effect on oceanic productivity, trace metal nutrition and toxicity in the sea, and biological isotope fractionation. Dr. Tortell will take a CNC/SCOR lecture tour from February 27 to March 12, 2005. The title of his lecture talk is "**Real-Time Measurement of Dissolved Gases in Seawater: New Insights into Ocean Biogeochemical and Physical Dynamics**". Following is the schedule and local contact persons for Dr. Tortell's CNC/SCOR lecture tour on the east coast in 2005.

Duration	Local CMOS to be visited	Contact Person
Feb. 27 - Feb. 28	St. Johns, Newfoundland	Dr. Brad de Young Email: <a href="mailto:bdeyoung@physics.mun.ca">bdeyoung@physics.mun.ca</a> Phone: 709-737-8839
Feb. 29 - Mar. 2	Halifax, Nova Scotia	Dr. Teresa Canavan /Dr. Jinyu Sheng Email: <a href="mailto:Teresa.Canavan@ec.gc.ca">Teresa.Canavan@ec.gc.ca</a> / <a href="mailto:Jinyu.Sheng@Dal.Ca">Jinyu.Sheng@Dal.Ca</a> Phone: 902-426-9135/902-494-2718
Mar. 2 - Mar. 4	Rimouski, Quebec	Dr. Michael Scarratt Email: <a href="mailto:Scarrattm@dfo-mpo.gc.ca">Scarrattm@dfo-mpo.gc.ca</a> Phone: 418-775-0508
Mar. 4 - Mar. 7	Montreal, Quebec	Dr. Pierre Dubreuil Email: <a href="mailto:Pierre.Dubreuil@ec.gc.ca">Pierre.Dubreuil@ec.gc.ca</a> Phone: 514-421-4601
Mar. 7 - Mar. 8	Ottawa, Ontario	Rita Beregszazy Email: <a href="mailto:BeregszaszyR@dfo-mpo.gc.ca">BeregszaszyR@dfo-mpo.gc.ca</a> Phone: 613-990-5203
Mar. 9 - Mar. 13	Toronto, Ontario	Dr. Sarah Wong Email: <a href="mailto:Sarah.Wong@ec.gc.ca">Sarah.Wong@ec.gc.ca</a> Phone: 416-848-0888

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Previous newsletters may be found on the CNC/SCOR web site.  
Les bulletins antérieurs se retrouvent sur le site web du CNC/SCOR.

Newsletter #14 will be distributed on March 31, 2005. Please send contributions to [dick.stoddart@sympatico.ca](mailto:dick.stoddart@sympatico.ca)  
Bulletin #14 sera distribué le 31 mars 2005. Veuillez faire parvenir vos contributions à [dick.stoddart@sympatico.ca](mailto:dick.stoddart@sympatico.ca)

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