

Global research collaboration in marine and ocean technologies

Senior ocean leaders from Canada, China, India, Brazil and Israel gathered in St John's, Newfoundland, earlier this year for a significant Multilateral Roundtable on collaborative research in marine and ocean technologies. Andrew Safer reports

Fifty-four senior oceans leaders from Canada, China, India, Brazil and Israel convened in St John's, Newfoundland, Canada, the City of Ocean Excellence, for three days in March 2011 for a Multilateral Roundtable on collaborative research in marine and ocean technologies. OceansAdvance, the organisation which represents the ocean technology cluster in St John's, and International Science and Technology Partnerships Canada (ISTPCanada) co-hosted the event, an important first step that could lead to the establishment of a Global Centre of Excellence in Marine and Ocean Technologies (GCEMOT).

"If you look at what's going on around the world, most recently with the tsunami and the concern about the fallout coming



Dr Arthur May, honorary chairperson, welcomes delegates at the opening ceremonies.
Photo: Kayla Hancock
Photography

out of Japan, it's challenging us to become more aware of how critical the oceans are to our life on Earth," said Mr Les O'Reilly, executive director of OceansAdvance. "This initiative directly supports our mandate to foster and promote the development and expansion of an internationally-connected industrial ocean technology cluster in Newfoundland and Labrador. Working together with counterparts from across Canada, we look forward to championing this collaborative R&D initiative and facilitating multilateral R&D projects among participating countries."

Mr O'Reilly noted this was the first time representatives from the four Canadian ocean technology research centres – Victoria, Rimouski, Halifax and St John's – presented a pan-Canadian report on R&D

capabilities in the sector. He emphasised that this cooperative effort could lead to the development of a pan-Canadian accord on the best approach to advancing the creation of a GCEMOT.

"All participating countries have made significant investments in innovation, and they all want to work more with Canada and with each other," said Dr Henri Rothschild, president and CEO of ISTPCanada. "This prompted us to consider the value of a global consortium that links emerging industrial needs, from resource development to transportation and aquaculture, and how it could break new ground in research collaboration."

As delegations presented overviews of their country's ocean technology initiatives and priorities, several areas of common interest emerged. These included low-cost/low-power sensors, ocean observing systems, aquaculture, freshwater production, marine renewable energy, robotics, and the

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development of medicines and food products from marine organisms.

SENSORS AND OCEAN OBSERVING SYSTEMS

Dr Belmiro Castro, a professor at the Oceanographic Institute in Sao Paulo and head of the Brazilian delegation, said Brazil needs better systems for monitoring the coastal zones where population density has a huge impact on the ecosystem. "These monitoring systems need to be intelligent, like the SmartBay system we saw at the Marine Institute yesterday," he said, referring to the ocean observing system that provides near-real time data from buoys and site-specific weather forecasts in Placentia Bay, Newfoundland and Labrador. Regarding deep-ocean monitoring, Dr Castro said Brazil needs a more robust system with more parameters and longer deployment.

Also in the area of ocean observation, Dr Ramasamy Venkatesan, project director of Ocean Observing Systems at the National Institute of Ocean Technology in Chennai, India, took an interest in Victoria, British Columbia-based Ocean Networks Canada's (ONC) underwater NEPTUNE Canada system – the world's first regional-scale underwater observatory network that plugs directly into the Internet. He told Dr Martin Taylor, president and CEO of ONC and leader of the Canadian delegation, that this system can be applied to the tsunami

warning system in the Indian Ocean. "We would like to learn from you about first erecting and operating such a system," Dr Venkatesan said. "We have already proposed such a tethered system to the government." Recalling his visit the previous day to the Visualization Centre at Memorial University, he added that another area for collaboration is 3D visualisation. "If we could process the data that is being collected in such a way as to display it in 3D visualisation, that would help both the policymakers and scientists understand."

FOOD PRODUCTS AND MEDICINES

In January 2011, the world's population surpassed seven billion, and food prices have increased 30% since 2007. Dr Rothschild pointed out that about 80% of the nutrients humans consume come from land-based sources. "The potential to introduce valuable new food sources is tremendous," he said. "For example, computational biology can play a key role in the development of sustainable food production from the oceans."

Dr Baruch Rinkevich, a professor at the National Institute of Oceanography in Haifa, Israel, pointed out that there are marine organisms that could serve as important sources of food products and bioactive compounds for medicine. He added: "There are many unknowns in the area of marine



Dr Charles Randell, C-CORE chief executive officer, delivers keynote address. Photo: Kayla Hancock Photography

biotechnology, reinforcing the need to invest in research." Having collaborated with scientists in more than 30 countries, Dr Rinkevich sees GCEMOT facilitating scientists from a variety of disciplines to engage in collaborative research.

FRESHWATER PRODUCTION, MARINE RENEWABLE ENERGY AND ROBOTICS

For India, China and Israel, the production of freshwater from the ocean is a high priority. Israel boasts the largest and most cost-effective desalination plant in the world, and China is the world's top



Left: Multilateral Roundtable attendees at closing Reception. Right: From left to right, Les O'Reilly, executive director, OceansAdvance, Dennis O'Keefe, Mayor, City of St John's, and Dr Henri Rothschild, president and chief executive officer, ISTPCanada. Photos: Kayla Hancock Photography

producer of both sea salt and aquatic products. A renewable energy system developed by China's National Ocean Technology Centre provides both freshwater and electricity for the residents of Dagan Island, making the island self-sufficient since facilities were constructed last year. The facilities include a 30-kilowatt pendulum-type wave power plant, 60-kilowatt wind turbines, and a ten-kilowatt solar power system. "I think for the more isolated communities in Canada," said Dr Taylor, "that's a very interesting model they've developed. That's an area where there could potentially be some collaboration."

Mr Ehud Gal, president of UGL Systems of Tel Aviv, Israel, proposed multilateral collaboration on the development of robotic vision systems for marine applications such as search and rescue, transportation and security. The other delegates agreed that the development of intelligent robotic systems presents an opportunity for research collaboration, as these systems would eliminate risk to human life.

In addition to ISTPCanada and OceansAdvance's leadership, essential support for the Roundtable was provided by the Government of Canada (including Foreign Affairs and International Trade Canada and the Atlantic Canada Opportunities Agency), the Canada-Israel Industrial R&D Foundation, the Government of Newfoundland and Labrador, the City of St John's and the National Research Council's Institute for Ocean Technology.

NEXT STEPS

Dr Castro, expressing the spirit of collaboration shared among the delegates, said: "Together, we are joining our strengths which gives us the ability to overcome our weaknesses. I am very optimistic."

Mr Zhi Gang Zhou, deputy chief, Department of Science and Technology, State Oceanic Administration of China, and head of the Chinese delegation, said: "These meetings are very successful. All the participating countries have introduced their work in ocean technology. This has enabled us to understand each other better. This will open future opportunities for collaboration."

As noted in the Record of the Roundtable, delegates committed to promote key recommendations and outcomes of this initial meeting to the stakeholder communities they serve. This includes engaging fellow authorities to discuss prospective platforms for multilateral collaboration such as multidisciplinary workshops, international centres of excellence and multilateral calls for proposals.

As Canadian co-hosts and leaders of this initiative, OceansAdvance and ISTPCanada aim to re-convene delegates over the next 12 months to discuss recommendations and develop an action plan that advances multilateral R&D cooperation, and to take steps towards the creation of a Global Centre of Excellence in Marine and Ocean Technologies. ■

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