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EDUCATION

1990 Master of Engineering (Civil), Czech Technical University, Prague, Czech Republic
1996 Master of Engineering (Civil), Carleton University, Ottawa, Canada

PROFILE

Ivana Kubat has been involved in ice engineering research since 1998. She led many major ice programs. They include the development of a research program on ice compression threat to shipping, which provided major advances to Arctic shipping. The outcome of that program is now in operational use by several agencies. Another major research area led by Ivana is the development of comprehensive environmental and engineering databases and integrated systems for ice-structure interaction (BSED) and Arctic shipping (CASRAS).

She led and contributed to numerous other projects including the development of an iceberg drift model, the development of ice load measurements on the Confederation Bridge, assessing the damage to vessels in ice-covered waters, evaluating the impact of climate change on Arctic shipping with regard to vessel damage and regulations, evaluation of historical ice conditions in Canadian Arctic shipping lanes, determining the class of vessels operating in the High Arctic complying with Transport Canada Regulations, and evaluation of the systems used for regulating shipping in the Arctic according to the Arctic Shipping Pollution Prevention Regulations.

She is a member of Canadian Standards Mirror Committee ISO/TC6/SC8 - Arctic Operations. Mrs. Kubat has chaired a number of sessions at numerous international conferences and workshops, invited to give several keynote presentations, and chaired the POAC'11 international conference. She has over 60 publications on ice engineering that appeared in refereed journals and conferences.

WORK EXPERIENCE

2017-Present	Director of Research and Development, OCRE, NRC
2013-2017	Team Leader, Ice Mechanics, OCRE, NRC
2012-2013	Project Engineer, Ocean, Coastal and River Engineering (OCRE), NRC
1998-2012	Project Engineer, Canadian Hydraulics Centre, NRC
1996-1998	Technical Officer, Institute for Research in Construction, NRC

PROFESSIONAL AFFILIATIONS

Professional Engineers of Ontario	Member
International Society of Offshore and Polar Engineers (ISOPE)	Member
Society of Naval Architects and Marine Engineers (SNAME)	Member

SCIENTIFIC AND COMMITTEE WORK

- Associate Editor – IJOPE (International Journal of Offshore and Polar Engineering) 2016 – present
- Chair – ISOPE Arctic Science and Technology Committee, 2017 - present
- Member - Canadian Standards Mirror Committee ISO/TC6/SC8 - Arctic Operations, 2012 - present
- Member – NEXTAW (Network of Expertise on Transportation in Arctic Waters), 2013 - present
- Member, Climate Change Working Group, 2011 - 2013
- President, Port and Ocean Engineering under Arctic Conditions (POAC), 2010-2012
- Chair, Port and Ocean Engineering under Arctic Conditions Conference 2011 (POAC'11)
- Session Chair for numerous international conferences and workshops including Arctic Sessions at ISOPE conference from Canada
- Secretary, Port and Ocean Engineering under Arctic Conditions Conference 2001 (POAC'01)

SELECTED PROJECT EXPERIENCE

Forecasting *high resolution scale* ice compression – Leader of a multi-year project with objective to provide ship owners and operators, offshore platform operators, and ship captains with technology that will enhance the safety and efficiency of navigation in severe ice. The research led to development of a model which forecasts build-up of pressured ice and ridging along navigation routes, evolution of ice thickness and concentration, and drift of pack ice. The model has been used operationally by multiple industry and government partners for forecasting ice dynamics, drift of pack ice, determining the effect of pressured ice on ship besetting, extreme pressured ice conditions along planned tankers corridors, and as a navigation and training tool. The model has been also used for assessing historical pressured ice conditions along the shipping routes and modeling ice drift trajectories with relevance to oil spill. The model is used by several companies and government agencies such as the CCG, CIS, the Marine Institute (CMS-MUN), Fednav, Husky Energy, and other major oil companies.

Canadian Arctic Shipping Risk Assessment System (CASRAS) - Leader of a multi-year project with objective to develop an integrated database that stores, queries and visualizes all key relevant environmental data with specific application to shipping, icebreaking and navigation in northern waters and Arctic marine corridors. The Database serves as a tool for assessing the risk associated with shipping in various northern regions.

Beaufort Sea Environmental Database (BSED) – Project leader of a multi-year joint industry/government project to design, develop, and implement an integrated database that serves as a framework for the storage, query and visualization of all key relevant environmental data for the Beaufort Sea with specific applications for the determination of design ice loads for fixed and floating offshore platforms and offshore marine operations. The Database presents a valuable reference source for Industry and Regulators.

Establishing requirements for exploratory drilling in ice-covered deep waters – Leader of a multi-year project with objective to develop tools supporting safe stationkeeping of Dynamic Positioning (DP) controlled drillships in ice. The research includes determining requirements for

safe ice management operations and station keeping of drillships in ice-covered deep waters. The project includes a literature survey of station keeping and ice management, determination of ice forces on drillships, establishing the required capabilities of the Dynamic Positioning systems, establishing ice management requirements. The results of the project provide direct decision-support for regulators and offshore operators, and are used in a number of sections of CSA ISO/TC67/SC 8 - Arctic Operations WG4.

Ship Safety and Performance in Pressured Ice Zones – Leader of a multi-year project with objective to provide real-time information to ships operating in the Arctic to minimize safety and operational problems due to pressured ice conditions. The project determines the performance and safety of various ship classes in pressured ice and quantifies ice pressure conditions and predicting the risk of ship besetting.

Iceberg Drift Forecasting – Leader of a multi-year project with aim to develop operational Iceberg drift and deterioration forecasting model. This model has been used operationally at the Canadian Ice Service, International Ice Patrol, and at Provincial Aerospace Ltd. for decision-making on iceberg towing. The model has been also implemented at the Norwegian Meteorological Institute and used operationally in Barents Sea.

Validation of Ice Conditions for Operations of New Polar Icebreaker - Leader of a multi-year project that supported the conceptual design work leading toward Effective Project Approval and the issuance of a Request for Proposal for a detailed Icebreaker design. Under this project a comprehensive validation of ice conditions in which the new Polar Icebreaker will operate was carried out. The examination of ice conditions provided input into required environmental assessment for the full life-cycle of the vessel as well as the development of an environmental guide book for the vessel.

Impact of Climate Change on Arctic Shipping: Vessel Damage and Regulations – Leader of a multi-year project which assessed the impact of climate change on likelihood and severity of damage to vessels and addressed the impact of climate change on the pollution prevention regulations governing ship traffic in the Arctic.

Arctic Shipping Pollution Prevention Regulations - Incorporation of International Standards and Scientific Verification – Led tasks of the project aimed at ensuring that Canada's Pollution Prevention Regulations for the Arctic are based on sound science. The project provided solid guidance on suitable scientific approaches to improve the basis for the Arctic Regulations and produced a Roadmap for implementing these changes into revised and updated Regulations.

Improved Ice Information Systems for High Arctic Transportation- Led a project which investigated the ability to navigate in the Canadian Arctic on a year-round basis. Detailed information on the ice conditions that would be encountered by a tanker operating year-round in the High Arctic was provided and the class of a vessel necessary to meet Transport Canada Regulations was determined.

SAFEICE - Increasing the Safety of Icebound Shipping – Participated in the project, which aimed to create a scientific basis for ice class rules (ship hull strength) and for placing requirements on ice classes. The main purposes in the SAFEICE project was to develop semi-empirical methods based on measurements to determine the ice loads on ship hull, to find relationship between operational conditions and ice load, to develop ship-ice interaction models to assess the design ice loads on ship hull, to develop methods to estimate ultimate strength of shell plating and frames and to develop methods to analyse ice damages.