

SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS

# ICETECH2010

SHIPS AND STRUCTURES IN ICE

INSTITUTE OF THE NORTH



September 20-23  
Hotel Captain Cook  
Anchorage, Alaska  
[www.icetech10.org](http://www.icetech10.org)



# ICETECH 10

INTERNATIONAL CONFERENCE AND EXHIBITION on  
PERFORMANCE OF SHIPS AND STRUCTURES IN ICE

September 20-23, 2010 \* Anchorage, Alaska, USA

Organized by the Arctic Section of the Society of Naval Architects and Marine Engineers (SNAME)

ICETECH 2010

PO Box 63090

Stadium RPO

Calgary, Alberta, Canada, T2N 4S5

URL: [www.icetech10.org](http://www.icetech10.org)

## TO THE PARTICIPANTS OF THE 9<sup>TH</sup> INTERNATIONAL CONFERENCE ICETECH 2010

Dear Friends, Colleagues, and Associates,

We are pleased to welcome you to ICETECH 10, the 9<sup>th</sup> International Conference and Exhibition on Ships and Structures in Ice, organized by the Arctic Section of the Society of Naval Architects and Marine Engineers and Alaska's Institute of the North, and held at the Hotel Captain Cook in scenic Anchorage, Alaska. We gratefully acknowledge the support and dedication of both SNAME and ION in the realization of this exciting and successful event.

The theme and subject areas of the conference complement the growing interest in Arctic shipping and in oil, gas and mineral exploration and production in Arctic offshore regions. As you can see from the program that follows, we have over 50 technical and plenary presentations – covering a wide range of specialty topics within our theme of performance in ice, with emphasis on icebreaking ships, ice resistant structures, and operations in ice. These will be presented during the conference by authors from around the globe. Additionally, we have two panel sessions, both at an international level, with one focusing on Arctic Escape, Evacuation, and Rescue (EER), and one focusing on Arctic shipping led by Arctic Marine Shipping Assessment (AMSA) and Transport Canada members. There is also an exhibition portion of the conference at the same venue to facilitate networking with leading offshore commercial organizations.

ICETECH 10 is grateful for the support of our many generous sponsors, who are crucial contributors to the success of this conference by providing funding to enhance events and facilities. Finally, we hope you enjoy the social event program and find opportunity to join some of the tours that showcase the beauty and majesty of Alaska.

Once again, we thank you for being part of ICETECH 10 by taking part in the technical presentations and sessions, visiting the ICETECH exhibition, recognizing our sponsors, and enjoying the social functions, tours, and other opportunities that are a part of the conference. The ICETECH 10 organizing and support team is honored to have you here with us in Anchorage.

Many thanks!



Nils Andreassen



Frank Bercha



Lawson Brigham

Co-Chairs, ICETECH 10

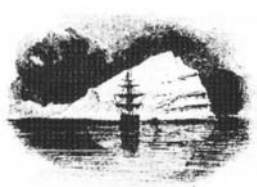
### ICETECH 10 ORGANIZING COMMITTEE

#### Alaska Members

**Nils Andreassen** (Co-Chair and Sponsors)  
**Lawson Brigham** (Co-Chair and Program)  
**Nancy Hemsath** (Venues and Social Program)  
**Orson Smith** (Papers)  
**Dick Prentki** (Papers)  
**Leo Blas** (Treasurer)  
**John Cologgi** (Sponsors)

#### Calgary Members

**Frank Bercha** (Co-Chair and Papers)  
**Merv Edgecombe** (Technical Program)  
**Dave McGonigal** (Treasurer)  
**Ben Seligman** (Sponsors)  
**Alex Brovkin** (Papers)  
**Susan Bercha** (Secretariat)



# ICETECH 2010

September 20-23, 2010  
Anchorage, Alaska, USA



## Program and Conference Guide

Monday 1830-2200

Icebreaker Reception  
and Exhibition Opening

Entertainment: Hobo Jim  
Discovery Ballroom

Tuesday 1900-2200

Opening Banquet

Entertainment: Pamyua  
Discovery Ballroom



*Gold Sponsor*

Wednesday 1930-2230

Alaska Qiyana

Salmon bake at Alaska Native Heritage Centre  
Entertainment: Carhartt Brothers  
Buses depart 1830, return 2130-2200

**ConocoPhillips**

*Gold Sponsor*

Thursday 1220-1310

Closing Luncheon

Discovery Ballroom



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### Silver Sponsors



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### Honorary Sponsors



Government  
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du Canada

Thursday 1400-1600

Port of Anchorage Tour

Technical guided motorcoach tour of Port of  
Anchorage expansion project  
Buses depart 1400



*Honorary Sponsors*



# Welcome from SNAME



Dear ICETECH participants,

The Arctic Section of the Society of Naval Architects and Marine Engineers (SNAME) welcomes you to ICETECH 10 in Anchorage, Alaska! We hope you will all have a great experience here, technically and socially, and we hope you will consider further participation in SNAME. The opportunity is here! Right at the SNAME exhibition booth or through any of the many SNAME members attending.

You may know that ICETECH 10 is the 9<sup>th</sup> ICETECH conference organized by the Arctic Section, this time in conjunction with the Institute of the North. We have had ICETECHs in Montreal, Calgary and Banff, Canada, and St. Petersburg, Russia – and plan to continue the tradition in 2012.

Now, in joining SNAME, you will get many member benefits, including those outlined below.

## SNAME Members

SNAME members have designed and overseen the building of thousands upon thousands of boats, ships, submarines and other naval craft of all sizes and descriptions and published millions of pages of original research defining the state of the art and best practices in marine architecture and engineering. SNAME members have done all this while enjoying the collegiality of the Society. Joining SNAME means joining nearly 10,000 colleagues from around the world: naval architects and marine engineers whose combined knowledge comprises expertise of every aspect of the ship-building arts.

Membership is open to all qualified applicants in or associated with the maritime, offshore, and small craft industries. As a member you will have immediate access to this rich community. All members are empowered with access to SNAME's robust online tools that make connecting with any other SNAME member and working together as simple as sending an email. Beyond work, SNAME members enjoy the unique fellowship that comes with membership in an international organization respected around the world.



SNAME Past President  
Bruce Rosenblatt and  
current President Keith  
Michel

## Knowledge Resources

SNAME captures its extensive history in its vast and expanding library of peer-reviewed research papers, journals, books, and other content. Members enjoy unsurpassed access and discounts to this priceless resource, literally consisting of thousands of unique documents. The entire library can be searched online with 5,000+ papers spanning SNAME's history available for download directly to your computer. Members receive a substantial discount on all items for sale and students receive special discounts.

## Author and Leadership Opportunities

SNAME members have the opportunity to make their mark on the industry. The Society encourages and sponsors maritime research into areas of the ocean sciences, with particular emphasis on marine vehicles and offshore structures. Members can join dozens of committees and panels dedicated to the fields of their expertise. Papers authored by these panels and individual authors are subject to presentation, with a handful selected for publication in the annual Transactions.

## SNAME Sections

The Society's 17 Sections exist within 5 regions across the world, and membership in SNAME includes membership in a SNAME Section. These regionally based subgroups offer regular, well-attended meetings and substantial networking opportunities. Many SNAME Sections also run research symposia and publish peer-reviewed research material semi-independently of the larger Society. ICETECH is the work of the Arctic Section. An Alaska Section could be formed if members so wish.



Peter Noble, Chair of the  
SD-9 Commercial Ship  
Design Panel

## Student Benefits

SNAME student membership includes many benefits to help you advance in your academic and professional career and better afford your education. Important student member benefits include:

- *Textbook discounts* – up to 50%
- *Scholarships* for undergraduate and graduate study
- *Online research tools* through the SNAME website
- *Career Center* – post your resume for free; create a job search; look for internships
- *Technical Paper Awards* – an opportunity to have your papers presented at the SNAME Annual Meeting

## Insurance Plans and Discounts

SNAME members in the USA now have access to numerous types of business and personal lines insurance products through Arthur J. Gallagher Risk Management Inc.(AJG), which provides Professional Liability Insurance, Medical Insurance, and other types of commercial insurance.

## Partner Discounts

SNAME members enjoy discounts with some useful commercial service organizations including Avis Car Rental, Budget Car Rental, Dell Computer, or UPS

So, why not visit the SNAME ICETECH 10 Exhibition booth and check it out? You can apply for membership right here today!

See you there!

Frank Bercha, PhD, PEng  
SNAME Regional VP and ICETECH 10 Co-Chair

## Registration and General Notes

### **Notes to All Registrants:**

- Registration includes Monday night Icebreaker Reception, all breakfasts and lunches during the conference, the Tuesday evening Banquet and the Wednesday evening Alaska Quiana dinner. In addition, there will be bus transportation and tour of the Port of Anchorage expansion for up to 100 participants on Thursday afternoon. Please note that the accompanying person package does not include coffee breaks, but includes all breakfasts and the evening events.
- If you plan to go on any of the special package tours and have not yet booked these online, there will be a SalmonBerry tour company desk near the registration area Monday through Wednesday.
- The dress for Icetech for all sessions and events is informal.
- The main evening events included in full and accompanying registrations are as follows:
  - Icebreaker Reception and Buffet sponsored by DNV and Stena Drilling. Monday evening in the Discovery ballroom.
  - Banquet sponsored by BP. Tuesday evening in the Discovery ballroom.
  - Alaska Quiana sponsored by ConocoPhillips. Wednesday evening at the Alaska Native Heritage Center.
  - Port of Anchorage expansion technical tour by motorcoach on Thursday afternoon. Sponsored by the Port of Anchorage and ICRC, but limited to 100 people.
- If you require additional event tickets, also please purchase these at the Conference Registration Desk.
- If you have any questions or concerns please contact one of our ICETECH Organizing Committee or Team members via the Conference Registration Desk.
- Please note that if you wish any accompanying children to attend the evening events, tickets should be purchased when you register. Children under 5 are free, children 5 to 12 are half price and children over 12 are full price.

### **Notes on Presentations**

- All presenters (Plenary and Technical) should contact their session chairs prior to the session in an ad hoc manner.
- All presenters should go to their presentation room 15 minutes before their session starts or at breakfast or lunch to download their presentations to the session laptop, unless you emailed the presentation prior to the conference. An AV professional will also be on hand at registration to download your presentation materials.
- The following are strict schedules for presentations:
  - Technical presentations maximum 15 minutes and 5 minutes for discussion
  - Plenary presentations maximum 20 minutes and 10 minutes for discussion
- Audio visual helpers will be available to make sure all equipment functions, presentations are loaded, etc. An LCD projector will be used with one of our AV professionals assisting, and session chair coordinating.
- There is a Practice Room (the Whitby Room on the hotel's lower level) equipped with a laptop computer for use of presenters to review their presentations.
- There will be three prizes for the best presentations based on chair and Team evaluations considering content and relevance, communication ability, and timeliness. These will be awarded at the closing ceremony.
- No flash photo or videography is allowed during presentations or discussion.

## Conference Program: Monday, September 20 (*evening*)

### **Conference Registration – Monday, September 20, 1500-1800**

The ICETECH Registration Desk will be open from 3:00 to 6:00pm on Monday, September 20th, in the Alcove across from the Discovery Ballroom.

### **ICEBREAKER RECEPTION AND EXHIBITION OPENING – Monday, September 20, 1830-2200**

#### ***Sponsored by DNV and Stena Drilling***

Open to all registered delegates and accompanying persons  
Lasting from 6:30 to 10:00pm, a tasty buffet and entertainer Hobo Jim are featured  
MC: Nancy Hemsath      Location: Discovery Ballroom



# Conference Program: Tuesday, September 21 (*morning*)

Discovery Ballroom		Endeavor Room (lower level)	
<b>Breakfast</b> (Discovery Ballroom) Addresses from American Bureau of Shipping and Lloyd's Register MC: Dave McGonigal		700-815	
<b>OPENING CEREMONIES AND WELCOME</b> ICETECH 2010 Conference Co-Chairs: Nils Andreassen, Frank Bercha, Lawson Brigham		815-900	
<b>Tu-PL-1 PLENARY SESSION</b> Chair: Frank Bercha		900-1000	 <b>Companion Program</b> Motorcoach Tour of Turnagain Arm Depart: meet at 5 <sup>th</sup> Ave hotel entrance 9:00am Return: bus returns to hotel 11:00am Sponsored by Lloyd's Register
#112 <i>Ice Risk Management for Stationary Vessel Operations in Moving pack Ice in Ice Offshore Experience and State of Art</i> , A. Keinonen, E. Martin		900-930	
#183 <i>Arctic Challenges - A Treatise of Past and Recent Developments</i> , A. Ghoneim, A. Cammaert, M. Mejlaender-Larsen		930-1000	
<b>Coffee Break</b> (Exhibition Deck) Sponsored by BOEMRE		1000-1020	
<b>Tu-SH-1 Ships in Ice 1 – Navigation</b> Chair: Arno Keinonen		1020-1120	<b>Tu-ST-1 Structures in Ice 1 – Moored Structures 1</b> Chair: Alexander Brovkin
#170 <i>Differences in the Characteristic Shapes of First-Year and Multi-Year Pressure Ridges</i> , P. Wadhams, J. Rodrigues, N. Toberg		1020-1040	#104 <i>Fast Ice Drilling System - FIDS - An Improved System for Shallow Water Arctic Drilling</i> , R. Shafer, P. Noble, A. Iyerusalimskiy
#121 <i>Ice Navigation Curriculum Using the AVTEC Ship Simulator, Seward, Alaska</i> , O. Smith, J. Schibel, S. Hamilton, R. Thomas		1040-1100	#115 <i>Arctic Deepwater Development Drilling System Design Considerations</i> , T. Kokkinis, C. Brinkmann, J. Ding, D. Fenz
#179 <i>Ice Hazard Radar</i> , B. O'Connell		1100-1120	#159 <i>Pack Ice Forces on Floating Offshore Oil and Gas Exploration and Production Systems</i> , L. Liu, D. Zhan, D. Spencer, D. Molyneux
<b>Tu-SH-2 Ships in Ice 2 - Propulsion</b> Chair: Goran Liljestrom		1120-1220	<b>Tu-IC-1 Ice 1 – Mapping and Dynamics</b> Chair: Ivana Kubat
#182 <i>Nuclear Energy - Foundation for the Arctic Icebreakers Fleet</i> , N. Khlopkin, V. Kuznetsov, V. Makarov		1120-1140	#163 <i>Mapping Sea Ice Overflood Along the Alaskan North Coast</i> , D. Dickens, G. Hearon, K. Morris
#133 <i>Propulsion in Ice - Big Ships</i> , G. Dahler, J. Stubbs, L. Norhamo		1140-1200	#166 <i>On the Spatial and Temporal Characterization of Motion Induced Sea Ice Internal Stress</i> , J. Hutchings, C. Geiger, A. Roberts, J. Richter-Menge, B. Elder
#184 <i>Converting an Icebreaker from an Oil Lubricated Stern Tube Bearing System to a Seawater Lubricated Stern Tube Bearing Considering Environmental and Operating Costs</i> , K. Ogle, C. Carter		1200-1220	#139 <i>Use of Beacons for Studying Arctic Ice Movement</i> , S. Tiffin, R. Pilkington, M. Edgecombe, D. McGonigal
<b>Lunch</b> (at selected restaurants) Sponsored by American Bureau of Shipping		1220-1350	

## Conference Program: Tuesday, September 21 (afternoon)

Discovery Ballroom	Endeavor Room (lower level)
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### Tu-ST-2 Structures in Ice 2 – Moored Structures 2 1350-1450

Chair: Aleksandr Iyerusalimskiy

- #160 *Turret Mooring of a Moderately Sized Production Unit in Heavy Ice Conditions*, A. Bonnaud, E. Hovland, O. Gudmestad 1350-1410
- #174 *Construction and Monitoring of an Ice Platform in Siberia*, V. Neth 1410-1430
- #149 *Research Vessel SIKULIAQ: Wartsila Ice Capable Run Quiet Propulsion*, J. Hatley 1430-1450

### Tu-SH-3 Ships in Ice 3 – Ice Loads on Ships

Chair: Rubin Sheinberg

- #110 *Effect of Moving Ice Loads on the Plastic Capacity of a Ship's Structure*, B. Quinton, C. Daley, R. Gagnon
- #138 *Modeling of Pressured Ice Interaction with Ships*, I. Kubat, M. Sayed, A. Collins
- #141 *Assessment of Ship Ice Loads in Pack Ice*, C. Daley, J. Liu

**Coffee Break** (Exhibition Deck)  
Sponsored by Arctia Offshore Ltd

1450-1510



### Tu-ST-3 Structures in Ice 3 – Fixed Structures 1510-1650

Chair: Abdel Ghoneim

- #102 *Parametric Trends of Arctic Gravity Based Structures*, P. Spencer, A. Bound 1510-1530
- #164 *The Challenges and Synergy of the Winterisation for Ships and Offshore Installations*, R. Bridges, H. Battye, D. Upcraft, T. Butler 1530-1550
- #158 *Testing of Northstar Artificial Island in Ice Model Basin*, G. Wilkman, G. Li, S. Saarinen 1550-1610
- #172 *Bond Enhancement for Sandwich Shell Ice Wall*, P. Marshall, A. Palmer, R. Liew, T. Wang, M. Khine Wa Thein 1610-1630

**Social Hour Bar** (Discovery Ballroom)

Sponsored by Port MacKenzie / Matanuska-Susitna Borough  
MC: Nils Andreassen

1800-1900



**Opening Banquet** (Discovery Ballroom)




Sponsored by BP Exploration (Alaska)

Entertainment: Pamyua  
MC: Nils Andreassen

1900-2200



# Conference Program: Wednesday, September 22 (morning)

Discovery Ballroom		Endeavor Room (lower level)	
<b>Breakfast</b> (Discovery Ballroom) Address from Chevron MC: Karen Muggeridge		800-845	
<b>ANNOUNCEMENTS</b>		8:45-900	
W-PL-2 <b>PLENARY SESSION</b>		900-1000	
Chair: Peter Noble			
#188	<i>What's Happening with Ice in the Arctic</i> , D. Jackson	900-920	<div>Companion Program Walking Tour of Anchorage Start at Federal Archive Building (1000-1100)</div> 
#157	<i>The Arctic Council's Arctic Marine Shipping Assessment and Beyond</i> , L. Brigham	920-940	
#106	<i>Arctic EER Today</i> , F. Bercha	940-1000	
<b>Coffee Break</b> (Exhibition Deck) Sponsored by Crowley Marine Services		1000-1020	
			
W-AMSA <b>AMSA Panel</b>		1020-1120	W-IC-2 <b>Ice 2 - Monitoring</b>
Chair: Lawson Brigham			Chair: Marie-France Gauthier
Panel Members: David Jackson, Ross MacDonald, Victor Santos Pedro, Robert Tustin, Goran Wilkman, Anders Backman		1020-1040	#126 <i>Supporting Arctic Operations with Real-time Ice Information from Satellite Images</i> , R. Hall
		1040-1100	#150 <i>Automated Detection of Hazardous Sea Ice Features from Upward Looking Sonar Data</i> , D. Fissel, A. Kanwar, K. Borg, T. Mudge, J. Marko, A. Bard
		1100-1120	#185 <i>Training Courses for Ice Experts as Ice Observers and for Interpretation of Satellite Images to Support Arctic Shipping Operations</i> , G. Thomas, Y. Mironov, V. Smirnov, V. Stepanov
W-EER-1 <b>EER Procedures</b>		1120-1220	W-ST-4 <b>Structures in Ice 4 – Ice Loads 1</b>
Chair: Ernst Radloff			Chair: Karen Muggeridge
#167	<i>Traffic and Casualty Trends in Canadian Arctic Shipping</i> , B. Judson (Presenter: G. Igloliorte)	1120-1140	#116 <i>Multi-Year Ice Interaction with Downward Breaking Cone Structures</i> , J. Ding, D. Fenz, T. Kokkinis, C. Brinkmann
#108	<i>Arctic Escape, Evacuation, and Rescue Standards and Guidelines</i> , J. Poplin, F. Bercha	1140-1200	#117 <i>Critical Roles of Constitutive Laws and Numerical Models in the Design and Development of Arctic Offshore Installations</i> , A. Derradji-Aouat
		1200-1220	#122 <i>A Closer Examination of the May 12, 1986 Ice Floe Impact with the Molikpaq</i> , D. Sudom, R. Frederking
<b>Lunch</b> (at selected restaurants) <b>Sponsored by Chevron</b>		1220-1350	
			

**Companion Program**  
SalmonBerry Shuttle to Eagle River Nature Centre  
Depart: meet at the 5<sup>th</sup> Avenue hotel entrance 12:00pm  
Return: bus leaves Nature Centre at 4:00pm




**Sponsored by United States Arctic Research Commission (USARC)**



# Conference Program: Wednesday, September 22 (afternoon)

Discovery Ballroom		Endeavor Room (lower level)	
<b>W-EER-2 EER Crafts 1</b> Chair: Jim Poplin #103 <i>Operational Limitations of Conventional Lifeboats Operating in Sea Ice</i> , A. Kennedy, A. Simões Ré, B. Veitch #154 <i>Thermal Requirements for Surviving a Mass Rescue Incident in the Arctic: Project Update</i> , R. Boileau, M. DuCharme, L. Mak (Presenter: A. Simões Ré) #180 <i>Lifeboat Habitability and Effects on Human Subjects</i> , J. Power, A. Simões Ré	<b>1350-1450</b> 1350-1410 1410-1430 1430-1450	<b>W-SH-4 Ships in Ice 4 – Performance</b> Chair: Merv Edgecombe #111 <i>The Effect of Ice-Breaking Bow on the Open Water Performance of a Large Arctic Ore Carrier</i> , H. Yu, S. Kim, R. Yook, D. Lee, H. Jung, J. Seo #120 <i>Global Ice Loads on Arctic Drillships</i> , B. Wang, C. Daley, M. Sayed, J. Liu	
	<b>1450-1510</b>		
	<b>W-EER-3 EER Crafts 2</b> Chair: Ian Denness #171 <i>ARKTOS Evacuation Craft for Beaufort Sea Shear Zone Operation</i> , T. Hall, B. Seligman #143 <i>Effect of Simulator Training on Novice Operators' Abilities to Navigate in Ice</i> , S. Power, J. Power, S. MacKinnon, A. Simões Ré	<b>1510-1550</b> 1510-1530 1530-1550	<b>W-SR-1 Shipping and Shipping Rules</b> Chair: Robert Tustin #101 <i>Canadian Arctic Shipping and Emission Assessment</i> , E. Radloff, D. Hrebenyk #148 <i>Future Possibilities for Trans-Arctic Shipping through the Central Arctic Ocean</i> , R. Tustin, M. Niini
	<b>W-EER EER Panel</b> Chair: Frank Bercha Panel Members: Ian Denness, David Jackson, James Poplin, Ernst Radloff, Bruce Seligman	<b>1550-1650</b> 1550-1610 1610-1630 1630-1650	<b>W-ST-5 Structures in Ice 5 – Ice Loads 2</b> Chair: Orson Smith #136 <i>Understanding Combined Influences of Aspect-Ratio, Dimensionless Velocity, and Material Properties on Dimensionless Ice-Induced Pressure on Structures</i> , A. Arunachalam #129 <i>Seabed and Iceberg Scour Conditions Affecting a Potential Pipeline Landfall Offshore Labrador</i> , T. King, G. Sonnichsen
 Bus to Alaska Native Heritage Centre (ANHC) for evening activities - Departing Hotel Captain Cook (5th Ave.) Busing sponsored by Transport Canada		<b>1800</b>	
<b>Social Hour Bar (ANHC)</b> Sponsored by Arctic Slope Regional Corporation (ASRC) MC: John Cologgi		<b>1830-1930</b>	
<b>Alaska Quayana (ANHC)</b> Sponsored by ConocoPhillips Entertainment: Carhartt Brothers MC: John Cologgi		<b>1930-2200</b>	
 Return buses to Hotel Captain Cook begin at 2130 Final bus departs ANHC at 2200.		<b>2130-2200</b>	

# Conference Program: Thursday, September 23

Discovery Ballroom	Endeavor Room (lower level)
<b>Breakfast</b> (Discovery Ballroom) Sponsored by Shell Exploration and Production Alaska MC: Alexander Brovkin	800-845 

## ANNOUNCEMENTS 845-900

### Th-PL-3 PLENARY SESSION 900-1000

Chair: John Cologgi

- |      |                                                                                                                                   |          |
|------|-----------------------------------------------------------------------------------------------------------------------------------|----------|
| #153 | <i>Past Experience from Arctic Commercial Expeditions</i> , O. Gudmestad, J. Alme (Presenter: A. Bonnaud)                         | 900-930  |
| #186 | <i>What's Going on in the Russian Arctic</i> , E. Velikhov, V. Kuznetsov, V. Makarov, V. Mikhailichenko, S. Lavkovskiy, I. Glumov | 930-1000 |

### Th-SH-5 Ships in Ice 5 – Icebreakers

Chair: Chris Cleary

- |      |                                                                                                                                   |           |
|------|-----------------------------------------------------------------------------------------------------------------------------------|-----------|
| #147 | <i>MOERI's Ice Model Test for Korean Icebreaking Research Vessel</i> , C. Lee, S. Cho, S. Jeong, E. Chun                          | 1000-1020 |
| #123 | <i>AURORA BOREALIS - A New European Combined Research Icebreaker and Drilling Vessel</i> , W. Doelling, A. Delius, L. Lembke-Jene | 1020-1040 |
| #155 | <i>North Slope Trends in Sea Level, Storm Frequency, Duration and Intensity</i> , N. Sultan, K. Braun, D. Thieman, A. Sampath     | 1040-1100 |

1000-1100

### Th-SH-6 Ships in Ice 6 – Transit Analysis

Chair: Roger Pilkington

- |      |                                                                                                                                                                    |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #151 | <i>An Analysis of Sea Ice Conditions to Determine Ship Transits through the Northwest Passage</i> , T. Mudge, D. Fissel, M. Martinez de Saavedra Alvarez, J. Marko |
| #173 | <i>Arctic Sea Route Transit Analysis for Large Cargo Vessels</i> , K. Choi, J. Nam, S. Jeong                                                                       |
| #177 | <i>The Transportation of Large Modules through the Northwest Passage</i> , G. Igloliorte, A. Kendrick                                                              |

## Coffee Break (Exhibition Deck) 1100-1120

Sponsored by Alaska Frontier Constructors, Inc



### Th-SH-7 Ships in Ice 7 – Arctic Tankers

Chair: Peter Noble

- |      |                                                                                                                                             |           |
|------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| #119 | <i>Structural Integrity Assessment for a Polar Class Arctic Tanker under Ice Loads</i> , J. Dolny, S. Liu, D. Won, J. Lee, J. Choi, M. Kwak | 1120-1140 |
| #131 | <i>Fatigue Damage Estimation of Hull Structure of Large Arctic LNG Carrier Due to Ice Loads</i> , H. Ito, Y. Suh, K. Jang, S. Park          | 1140-1200 |
| #135 | <i>Arctic Tankers: Current and Future Structural Design Practice</i> , R. Tustlin, M. Niini, E. Ranki                                       | 1200-1220 |

1120-1220

### Th-VA-1 Various

Chair: David Dickens

- |      |                                                                                                         |
|------|---------------------------------------------------------------------------------------------------------|
| #175 | <i>ARKTOS Amphibious Oil Spill Response Craft for Mixed Ice/Water Conditions</i> , B. Seligman, T. Hall |
| #152 | <i>Assessment of Lifeboat Laminate Strength</i> , P. Gifford, A. Kennedy                                |
| #187 | <i>Arctic and Northern Offshore Oil Spill Probabilities</i> , F. Bercha                                 |

## Lunch (Discovery Ballroom) 1220-1310

Sponsored by TransAtlantic Ice Council  
MC: Nils Andreassen



## CLOSING CEREMONIES (Discovery Ballroom) 1310-1350

Acknowledgements, awards, and closing remarks. MC: Co-Chairs



### Port of Anchorage Expansion Project Technical Tour

(1400-1600)

Sponsored by the Port of Anchorage and Integrated Concepts & Research Corporation (ICRC)

Busen meet at 5th Ave entrance at 2:00pm (100 participant limit). This tour is part of the Companion Program.



## Sponsors

Thank you to all of our sponsors; your support has contributed to the success of ICETECH 10.

### Honorary Sponsors

- Government of Canada
- Institute of the North (ION)
- Integrated Concepts and Research Corporation (ICRC)
- Port of Anchorage
- Society of Naval Architects and Marine Engineers (SNAME), Arctic Section, Canada

### Gold Sponsors

- BP Exploration (Alaska)
- ConocoPhillips
- TransAtlantic Ice Council

### Silver Sponsors

- American Bureau of Shipping (ABS)
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- Stena Drilling
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### Bronze Sponsors

- Alaska Frontier Constructors
- Arctia Offshore Ltd.
- Crowley Marine Services
- PND Engineers Inc.
- United States Arctic Research Commission (USARC)
- United States Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE)



## Exhibitors

The ICETECH Exhibition will be open throughout the conference in the Aft Deck of the Discovery Ballroom, adjacent to the plenary and reception area. Be sure to visit our exhibitors.

- AKAC Inc.
- Alaska Satellite Facility
- Alaska Ship & Drydock
- Arctia Offshore Ltd.
- ARKTOS Developments Ltd.
- ASL Environmental Sciences, Inc.
- CANATEC Associates International Ltd.
- Fugro GeoServices, Inc.
- Government of Canada
- Informa Maritime & Energy
- Institute of the North
- Oceanic Consulting Corp.
- PND Engineers, Inc.
- Society of Naval Architects and Marine Engineers
- TransAtlantic Ice Council
- U.S. Army Corps of Engineers
- Wärtsilä North America, Inc.





**ICETECH 10 – Secretariat**

SNAME Arctic Section  
PO Box 63090  
Stadium RPO  
Calgary, Alberta, Canada T2N 4S5



**ICETECH 10 – Alaska**

The Institute of the North  
509 W. Third Ave. Suite 107  
Anchorage, Alaska, USA 99501

[www.icetech10.org](http://www.icetech10.org)