ICCRE 2024

20TH INTERNATIONAL CONFERENCE ON COLD REGIONS ENGINEERING

Anchorage, Alaska

May 13-17, 2024

Welcome

Dear Attendees,

The 20th International Conference on Cold Regions Engineering is prepared under the guidance of the Cold Regions Engineering Division of the American Society of Civil Engineers and hosted by the College of Engineering, the University of Alaska Anchorage. This event aims to bring together engineers, academics, and experts from various disciplines to share their knowledge and experience and help our communities find **Sustainable and Resilient Engineering Solutions for Changing Cold Regions**.

This conference offers exciting programs, including six keynotes and an Eb Rice Lecture from our distinguished speakers, 115 oral presentations in 31 technical or special sessions, ten posters, and various field trips. The conference proceedings are published by the American Society of Civil Engineers, including 59 peer-reviewed papers. The post-conference field trip offers a great opportunity for our attendees to visit the Permafrost Tunnel and Permafrost Experiment Stations of CRREL and the Trans-Alaska Pipeline System in Fairbanks. I am pleased to report that the conference generated strong interest, with 250 attendees and more than 40 students.

I want to express my sincere thanks to all the members of the Local Organizing Committee for their hard work since October 2022! I am grateful to the 22 sponsors. With their generous support, we were able to offer deeply discounted registrations for so many students to join us.

Last but not least, the support from the University of Alaska Anchorage, including financial and staff support, is essential for the success of this conference. In particular, I want to thank our event planner, Ms. Heather Paulsen, her team, our graduate students Ms.Yue Zhao and Mr. Yong Tao, and other student volunteers for making this event a reality.

I appreciate you all for being part of this conference!

Zhaohui (Joey) Yang, Ph.D.
Chair, 20th International Conference on Cold Regions Engineering
Professor, University of Alaska Anchorage

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Keynote Speakers

Dr. Peter Bieniek

Research Associate Professor
International Arctic Research Center, UAF

Dr. Peter Bieniek is a Research Associate Professor at the International Arctic Research Center at the University of Alaska Fairbanks. He is an atmospheric scientist and his research focuses on Alaska regional climate variability and change. Recent projects have included evaluating seasonal forecasts of Alaska wildfires and producing high-resolution dynamically downscaled projections of climate for Alaska. His work has contributed to the National Climate Assessment and NOAA climate monitoring in Alaska and his downscaled Alaska climate data sets are in wide use. Peter graduated with a B.S. in Meteorology from Valparaiso University in 2005 and an M.S. and Ph.D. in Atmospheric Science from the University of Alaska Fairbanks in 2007 and 2012 respectively.

Topic: Data and tools that can support engineering solutions in the changing climate of Alaska.

Dr. Joseph L. Corriveau

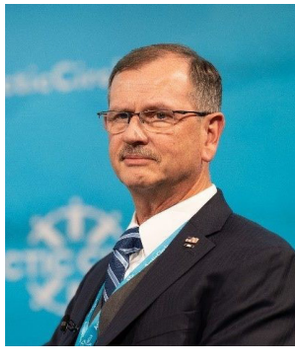
Senior Advisor for Cold Regions Research & Development
Cold Regions Research and Engineering Laboratory (CRREL)

Dr. Joseph L. Corriveau serves as the Senior Advisor for Cold Regions Research & Development at the Cold Regions Research and Engineering Laboratory (CRREL) located in Hanover, New Hampshire and Fairbanks, Alaska. The mission of CRREL is to advance and apply science and research engineering approaches to solve interdisciplinary and strategically important challenges related to the Earth's cold regions. CRREL conducts research across a range of fundamental and applied sciences and engineering in polar regions and in temperate and mountain regions. Dr. Joseph L. Corriveau just completed serving six years as the Director of CRREL.

Topic: U.S. Army needs in the Arctic, and CRREL capabilities and recent achievements.

Randy "Church" Kee, Maj Gen, USAF (Ret)

Director, Ted Stevens Center for Arctic Security Studies



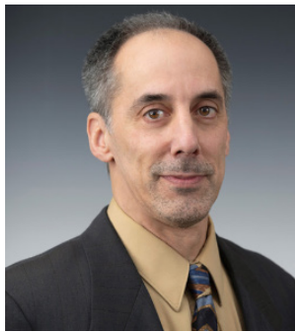
Maj Gen Randy "Church" Kee (Ret) is the inaugural Director of the Ted Stevens Center. Since September 2021, Maj Gen Kee has served as the Senior Advisor for Arctic Security Affairs for the Ted Stevens Center. Prior to his appointment with the Ted Stevens Center, he served as a Commissioner to the U.S. Arctic Research Commission and as the Executive Director of the Arctic Domain Awareness Center after his 30-year military career.

Topic: Geopolitics, Climate and Russia: Security in a Changing Arctic

Keynote Speakers

Tom Marchesani, P.E.

Vice President of Engineering, Risk, and System Integrity
Alyeska Pipeline Service Company



Tom Marchesani is a licensed professional engineer who has been actively involved in engineering management, design engineering, project engineering, with a specialization in corrosion engineering. He serves as Vice President of Engineering, Risk, and System Integrity for Alyeska Pipeline Service Company. In this capacity, he is responsible for all technical aspects of TAPS.

Tom joined Alyeska in 2013 as a project engineer, but his work on TAPS dates to 1992, when he moved from South Jersey to Valdez to oversee coating of the marine terminal loading berths. He's held many technical roles since, from field engineer and Flow Assurance Engineer to Operations Engineering Manager and Engineering Director, before becoming Vice President of Engineering. Prior to joining Alyeska, he founded and led a firm providing corrosion and project engineering services to owners of industrial infrastructure in the marine, petroleum, and bioremediation industries. He holds a Bachelor of Science in Mechanical Engineering from Villanova University and is licensed in Alaska and Washington. He lives in Anchorage with his wife, Courtney, and their two sons and daughter. He is an artist, alpinist, writer, and musician who still enjoys a good game of basketball.

Topic: Trans-Alaska Pipeline System: Past, Present and Future

Dr. Michael Sfraga

Chair, U.S. Arctic Research Commission
Chair & Distinguished Fellow, Polar Institute, Wilson Center

Dr. Sfraga was the founding director of the Polar Institute and served as the director of the Global Risk and Resilience Program at the Woodrow Wilson International Center for Scholars in Washington, D.C. He currently serves as chair and distinguished fellow in the Polar Institute, where his scholarship and public speaking focus on Arctic policy. An Alaskan and a geographer by training, his work focuses on the changing geography of the Arctic and Antarctic landscapes, Arctic policy, and the impacts and implications of a changing climate on political, social, economic, environmental, and security regimes in the Arctic.

Sfraga served as distinguished co-lead scholar for the U.S. Department of State's inaugural Fulbright Arctic Initiative from 2015 to 2017, a complementary program to the U.S. Chairmanship of the Arctic Council; he held the same position from 2017 to 2019. He served as chair of the 2020 Committee of Visitors Review of the Section for Arctic Science (ARC), Office of Polar Programs, National Science Foundation, and currently serves on the Scientific Advisory Council of the Finnish Institute for International Affairs. Sfraga previously served in several academic, administrative, and executive positions at the University of Alaska, including vice chancellor, associate vice president, faculty member, department chair, and associate dean. Sfraga earned the first Ph.D. in geography and northern studies from the University of Alaska Fairbanks.

Topic: Current activities and international collaboration to address the challenges of a changing Arctic.

Keynote Speakers

Dr. Hannele Zubeck

The 17th Recipient of the Elbert F. Rice Memorial Lecture Award
Professor Emerita of Civil Engineering, University of Alaska Anchorage

Dr. Hannele Zubeck is a Professor Emerita of Civil Engineering at the University of Alaska Anchorage. Her field of expertise is in Geotechnical Engineering, more specifically frozen ground engineering and pavement engineering in cold regions. She serves on several international committees, including the ASCE's Cold Regions Engineering Division, and is a member of the editorial board of the Elsevier Journal for Cold Regions Science and Technology. She and Dr. Guy Doré co-authored the Cold Regions Pavement Engineering book published by ASCEPress/McGrawHill.

Topic: Cold Regions Engineering Education, following in the steps of Dr. Eb Rice.

Wiley W Wilhelm, P.E.

Civil Engineer and General Manager
UMIAQ Design, LLC

Wiley W Wilhelm, P.E., is a registered professional Civil Engineer and the General Manager of UMIAQ Design, LLC, an architecture, engineering and survey firm owned by UIC Commercial Services, a subsidiary of Ukpeaġvik Iñupiat Corporation, the ANCSA corporation for Utqiaġvik, Alaska. He has a B.S. in Civil Engineering from Washington State University and an MBA from the University of Washington.

For the past 35 years, Wiley has worked on infrastructure projects throughout Alaska. He designed more than 150 bulk fuel facility upgrades in rural and urban Alaska. Many of these projects were located in the Yukon-Kuskokwim delta and posed significant design challenges due to marginal permafrost conditions. He has also worked extensively on projects located on the North Slope, including water & wastewater repairs and replacement, coastal erosion control, roads and pads, and landfills. He also, at one point, managed the Operation, Maintenance and Training contract for the water & wastewater systems in the seven outlying village of the North Slope Borough.

Wiley is a lifelong Alaskan who raised two sons in Anchorage with his wife Kelly. He enjoys spending time with them and his new granddaughter, as well as travel, and working on old cars and motorcycles.

Topic: Changes observed over a career in Utqiaġvik and future challenges for the northmost community in Alaska.

Conference Overview

All events at the Egan Center (555 W. 5th Ave.) unless otherwise marked

Monday, May 13

Time	Title	Location
8:30 a.m. - 4 p.m.	CRED Comm Meetings	UAA Engineering and Industry Building (2900 Spirit Dr.)
1 - 5:30 p.m.	Registration	Egan Center (555 W. 5th Ave.)
6 - 8 p.m.	Ice Breaker	Orso (737 W. 5th Ave.)

Tuesday, May 14

Time	Title	Location
7:30 - 8:30 a.m.	Registration	Lobby
7:30 - 8:30 a.m.	Continental Breakfast	LaPerouse room
8:45 - 10:15 a.m.	Welcome and Keynote	LaPerouse room
10:15 - 10:30 a.m.	Coffee Break and Poster Session	Room E
10:30 a.m. - 12 p.m.	Parallel Technical Sessions	*See page 10*
12 - 1:30 p.m.	Lunch & Speaker	LaPerouse room
1:30 - 3 p.m.	Parallel Technical Sessions	*See page 11*
3 - 3:30 p.m.	Coffee Break and Poster Session	Room E
3:30 - 5 p.m.	Parallel Technical Sessions	*See page 12*

Wednesday, May 15

Time	Title	Location
7:30 - 8:30 a.m.	Continental Breakfast	LaPerouse room
8:45 - 10:15 a.m.	Welcome and Keynote	LaPerouse room
10:15 - 10:30 a.m.	Coffee Break and Poster Session	Room E
10:30 a.m. - 12 p.m.	Parallel Technical Sessions	*See page 14*
12 - 1:45 p.m.	Award Lunch	LaPerouse room
1:45 - 3:15 p.m.	Parallel Technical Sessions	*See page 15*
3 - 3:30 p.m.	Coffee Break and Poster Session	Room E
3:30 - 5 p.m.	Parallel Technical Sessions	*See page 16*
6 - 8:30 p.m.	Banquet and Student Awards	49th State Brewing (717 W. 3rd Ave.)

Thursday, May 16

7:30 - 8:30 a.m.	Continental Breakfast	LaPerouse room
8:45 - 10:15 a.m.	Welcome and Keynote	LaPerouse room
10:15 - 10:30 a.m.	Coffee Break and Poster Session	Room E
10:30 a.m. - 12 p.m.	Parallel Technical Sessions	*See page 18*
12 - 1:30 p.m.	Lunch with Exhibitors	Room E
1:30 - 2:45 p.m.	Parallel Technical Sessions	*See page 19*
2:45 - 3:30 p.m.	Coffee Break	Room E
12:45 - 5:30 p.m.	**Field Trip:** Whittier Tunnel	*See page 20*
3 - 5 p.m.	**Field Trips:** Salmon Hatchery, UAA, and Anchorage Museum	*See page 20*

Friday, May 17

8:15 a.m. - 2:30 p.m.	**Field Trip:** Permafrost Tunnel, Trans-Alaska Pipeline System Viewpoint, and Permafrost Experiment Station in Fairbanks	*See page 20*

Tuesday Schedule

Room	Session #	Session Name	Chairs	Presenters
10:30 a.m. - 12 p.m.				**Page 10**
A	1	**Aerospace Engineering**	O. Bannova, N. Zhou	Olga Bannova, Nick Zhou, Pooneh Maghoul, Nima Farzadnia
B	2	**Pavement Design 1**	Joel Ulring, Steve Kari,	Robert Halcomb, Manik Barman, Leo Liu, Ayyaz Fareed
C	3	**Communities in Cold Regions**	D. Nichols, V. Groeschel	Olaf Kuhlke, Matthew Joyner, Rosa Affleck, Michelle Michaels
D	4	**Cold Regions Structures**	S. Hamel, I.-S. Ahn	Christopher Oreskovic, Scott E. Hamel, Maha Dabas, Il Sang Ahn, David Kulikovskiy
1:30 - 3 p.m.				**Page 11**
A	5	**Ethics 1**	D. Prusak	Wade Ellis, Ryan Anderson Rebecca Bowman
B	6	**Laboratory, Geophysical, Remote Sensing**	J. Thornley, E. Babcock	Joseph Vantassel, Molly Tedesche, Chuang Lin, Gennady Gienko
C	7	**Frozen Ground and Permafrost 1**	H. Brooks, Z. Wang	James Frye, James Rooney, Connie Fortin, Xiangbing Kong
D	8	**Sustainable Infrastructure in Cold Regions 1**	F. Zhang, L. Wang	Micheal Uduebor, Yue Zhao, Di Wang, Annika Goozen
3:30 - 5 p.m.				**Page 12**
A	9	**Pavement Design 2**	H. Zubeck, D. Wang	Aritra Banerjee, Ali Raza Khan, Micheal Uduebor, Chuang Lin
B	10	**Cold Regions Construction 1**	J. Holland, J. Vantassel	Brian Gastrock, Barbara Frigo, Chengjun Liu, Md. Fyaz Sadiq
C	11	**Cold Regions Transportation**	V. Vasudevan, Jie Zhou,	V. Vasudevan, James Arthurs, Feng Zhang
D	12	**Cold Regions Utilities**	J. Drage, B. Barber-Wiltse,	Bridget Eckhardt, Kenneth Johnson, Boualem Ouazia, Xin Wang

Tuesday Overview

10:30 a.m. - 12 p.m.

Aerospace Engineering — Room A

- **Planning and Design in Space and Extreme Environments on Earth,** *Olga Bannova*
- **Autonomous Construction (3D printing): From Ex-terrestrial to Terrestrial Applications,** *Nick Zhou*
- **Seismic Geophysics for Permafrost Characterization in Space and on Earth,** *Pooneh Maghoul*
- **Alkali Activation of Locally Sourced Alaskan Fly Ash for Arctic Construction,** *Nima Farzadnia*

Pavement Design 1 — Room B

- **Alaskan Pavement Resilience: Navigating Climate Change in Cold Regions,** *Robert Halcomb*
- **Effective Mitigation Strategies for Tenting of Transverse Cracks in Asphalt Pavement,** *Manik Barman*
- **Model and Tool for Location-Specific Seasonal Load Restriction,** *Leo Liu*
- **Evaluating the Impact of Using Microencapsulated Phase Change Materials on Low Temperature Cracking Resistance of Asphalt Binder,** *Ayyaz Fareed (S)*

Communities in Cold Regions — Room C

- **Assessing the Use, Utility, and Spatial Accuracy of 3D Camera Tools for the Measurement and Visualization of Permafrost Thaw Impact on Road and Bridge Infrastructure in Rural Alaskan Communities,** *Olaf Kuhlke*
- **Accounting for Permafrost Degradation in Site-Specific Ground Motion Procedures for Building Design,** *Matthew Joyner*
- **Analytical Methodologies for Cold Regions Installations and Community Resilience,** *Rosa Affleck*
- **Analysis for Arctic Climatic Typing (ACT),** *Michelle Michaels*

Cold Regions Structures — Room D

- **Quantifying Structural Snow Loads Using the Finite Area Element Method: A Comparison between Physical Wind Tunnel and Computational Fluid Dynamics Input Data,** *Christopher Oreskovic*
- **Creep Performance of High R-value Structural Insulated Panels (SIPs),** *Scott E. Hamel*
- **Evaluation of the Impact of Weather Shocks on Roofing Materials Properties,** *Maha Dabas*
- **Concrete Creep and Shrinkage at Cold Temperatures and Their Implications to PC Girder Design,** *Il Sang Ahn, David Kulikovskiy*

Tuesday Overview

1:30 - 3 p.m.

Ethics 1 — Room A

This is a panel discussion. Distinguished panelists include:

- **Wade Ellis, P.E.**
  Design Services Director, Alaska Native Tribal Health Consortium
- **Ryan Anderson, P.E.**
  Commissioner, Alaska Department of Transportation & Public Facilities
- **Rebecca A. Bowman, Esq., P.E.**
  Senior Director of Ethics and Professional Practice, National Society of Professional Engineers

Laboratory, Geophysical, Remote Sensing — Room B

- **Measuring Depth to Ice-Bonded Permafrost Using Surface Waves: Challenges and Recommendations from Field Measurements in Eagle Summit, Alaska**, *Joseph Vantassel*
- **Snowpack Strength and Micromechanics on Grand Mesa, Colorado via the 2017 NASA SnowEx SnowMicroPen Dataset**, *Molly Tedesche*
- **3D Coordinates Determination for the Featured Points Based on Close-up Photogrammetric Method**, *Chuang Lin*
- **Mapping Coastal Bluff Erosion: Case Study at Pt. Woronzof, Alaska**, *Gennady Gienko*

Frozen Ground and Permafrost 1 — Room C

- **Climate Change Impacts on Arctic Airfields**, *James Frye (S)*
- **Encounters with Relict Permafrost in the Anchorage, Alaska Area**, *James Rooney*
- **Designing a Lower Salt Future**, *Connie Fortin*
- **Case Study of the Thermal Regime of Permafrost underneath the Airstrips in Nunavik, Quebec, Canada**, *Xiangbing Kong*

Sustainable Infrastructure in Cold Regions 1 — Room D

- **Impact of Engineered Water Repellency on Mechanical Properties of Frost-Susceptible Soils under Repeated Freeze-Thaw Cycles**, *Micheal Uduebor (S)*
- **Pile Pinning Effects in Ground Lateral Spreading: A Case Study of the Slana River Bridge, Alaska**, *Yue Zhao (S)*
- **Fabrication and Characterization of Multiphase Bituminous Materials for Cold Region Pavements**, *Di Wang*
- **Vibration Characteristics of Degrading Warm Permafrost from the Analysis of Ambient Noise Data: A Case Study from Bethel, Alaska**, *Annika Goozen (S)*

Tuesday Overview

3:30 - 5 p.m.

Pavement Design 2 — Room A

- **Uncovering the Impact of Freeze-Thaw Cycles on Resilient Modulus of Cement-Stabilized Sulfate-rich Subgrade Soil,** *Aritra Banerjee*
- **Thermal and Fatigue Cracking Performance of Fiber-Reinforced Asphalt Mixtures (FRAM),** *Ali Raza Khan (S)*
- **Impact of Engineered Water Repellency on Mechanical Properties of Frost-Susceptible Soils under Repeated Freeze-Thaw Cycles,** *Micheal Uduebor (S)*
- **Wicking Geotextile Application for Mudstone Solid Waste Utilization in Cold Regions,** *Chuang Lin*

Cold Regions Construction 1 — Room B

- **Sliplining a Failing 54-inch Stormwater with 42-inch FRP in Anchorage, Alaska,** *Brian Gastrock*
- **Forensic Engineering in Snow Avalanche Science,** *Barbara Frigo*
- **Permeability Coefficient of Soft Clay After Artificial Freeze-Thaw Based on CPTU During Centrifuge Model Test,** *Chengjun Liu (S)*
- **Effect of Salt Concentrations on the Freeze-Thaw Susceptibility of Soils,** *Md. Fyaz Sadiq*

Cold Regions Transportation — Room C

- **Life-Cycle Analysis of LED Traffic Lights in Alaska,** *V. Vasudevan*
- **Development of a Smart-Light System for Remote Rural Areas,** *V. Vasudevan*
- **Geotechnical Design of Permafrost and Wetland Mitigation for Colorado State Highway 5 (Mt. Evans Road),** *James Arthurs*
- **Identification Method of Permafrost Table Based on Ground-Penetrating Radar,** *Feng Zhang*

Cold Regions Utilities — Room D

- **History and Update of the Cold Regions Utilities Monograph: A Time-Honored Reference Manual,** *Bridget Eckhardt*
- **Emergency Water Reservoir Refill for Northern Village of Kangiqsualujjuaq, Nunavik Region, Northern Quebec, Canada,** *Kenneth Johnson*
- **Performance Assessment of a CO_2-Based Demand-Controlled Frost Resilient Dual Core Energy Recovery Ventilation System for Northern Housing,** *Boualem Ouazia*
- **Thermal-Stress Response Analysis and Applicability Study of Energy Shaft in Winter,** *Xin Wang (S)*

Wednesday Schedule

Room	Session #	Session Name	Chairs	Presenters
10:30 a.m. - 12 p.m.				**Page 14**
A	13	**ASCE/NOAA Partnership**	Dan Walker, Jaci Overbeck	
B	14	**Cold Regions Oil and Gas**	J. Rooney, H. Brooks	Gregory Kinney, John Thornley, Alexandre Lai
C	15	**Coastal and Maritime Topics**	B. Conner, T. Ravens	Virginia Groeschel, Nina Stark, Tom Ravens, Jasmine Langmann
D	16	**Pavement Design 3**	S. Kari J. Ulring	Md. Hasibul Hasan Rahat, Mohamed Saleh, Nader Ghafoori, D. Loaiza Monsalve
1:45 - 3 p.m.				**Page 15**
A	17	**Natural and NBS in Alaska and the Arctic 1**	J. Overbeck, T. Douglas	Taber Midgley, Kamil Biedka, Phil Osborne, KC Kent, Sean Ferguson
B	18	**Cold Regions Construction 2**	A. Steiner, W. Presler	Yong Tao, Zakary Picard, Huade Zhou, Chao Ban
C	19	**Frozen Ground and Permafrost 2**	H. Zubeck, X. Kong	Nicholas Murray, Margaret Darrow, Steve Saboundjian, Ziyi Wang
D	20	**Sustainable Infrastructure in Cold Regions 2**	G. Kinney, D. Wang	Heather Brooks, Mulugeta Amare, Natalie Wagner, William Fraser
3:30 - 5 p.m.				**Page 16**
A	21	**Natural and NBS in Alaska and the Arctic 2**	J. Overbeck T. Douglas	Jaci Overbeck, Lauren Bosche, Ellen Jessup, Aaron Poe
B	22	**Cold Regions Hydrology and Hydraulics**	J. Zufelt, M. Harrison	Ed Zapel, Trung Le, Svetlana Stuefer, Zoe Li
C	23	**Performance of Materials**	S. Saboundjian, Ch. Lin	Hao Wang, Barbara Frigo, Shijun Wei, Subhabrata Dev
D	24	**Frozen Ground and Permafrost 3**	M. Darrow, N. Stark	Yue Zhao, Xiangbing Kong, Ziyi Wang, James Rooney

Weds. Overview

10:30 a.m. - 12 p.m.

ASCE/NOAA Partnership — Room A

This session will focus on the opportunities for Advancing Civil Engineering Practice in Cold Regions. Co-conveners include:

- **Dan Walker, Ph.D., A.M.ASCE**, *past chair of ASCE Committee on Adaptation to a Changing Climate and co-chair of ASCE NOAA Task Force on Climate Resilience in Civil Engineering Design*
- **Jaci Overbeck, CFM,** *Alaska Regional Geospatial Coordinator for NOAA Office for Coastal Management*

Cold Regions Oil and Gas — Room B

- **Shallow Buried Fuel Gas Line: Stability Maintenance in the Arctic,** *Gregory Kinney*
- **Foundation Performance Evaluation of an At-Grade LNG Storage Tank on Warm Permafrost in Fairbanks, Alaska,** *John Thornley*
- **Slipstream Heat Addition on the Trans-Alaska Pipeline: Thermal Risk Mitigation Strategies and Lessons Learned,** *Gregory Kinney*
- **Impact of Glacier Outburst Floods on Stream Stability at the Tazlina River Trans-Alaska Pipeline Crossing,** *Alexandre Lai*

Coastal and Maritime Topics — Room C

- **Navigating the New Arctic: Advancing Research in Ice-Structure Interactions for Safer Marine Operations,** *Virginia Groeschel (S)*
- **Variability of Geotechnical Properties in Arctic Coastal and Shelf Regions with Regards to Sediment Dynamics,** *Nina Stark*
- **Controlling Arctic Coastal Erosion with Thermal and Mechanical Measures,** *Tom Ravens*
- **Preliminary Finite-Element Modeling of Floating Sea Ice Impacting Vertical Piles with Accreted Ice,** *Jasmine Langmann (S)*

Pavement Design 3 — Room D

- **Investigating the Impact of Freeze-Thaw Damage on Chloride Ingress in Concrete,** *Md. Hasibul Hasan Rahat (S)*
- **Development of a High-performance Asphalt Concrete with Enhanced Low-Temperature Performance,** *Mohamed Saleh*
- **Role of Aggregate Type on De-Icing Salt Resistance of Ultra-High-Performance Concrete,** *Nader Ghafoori*
- **Quantification of Influence Factors in the Studded Tire Wear Using the Prall Device,** *D. Loaiza Monsalve (S)*

Weds. Overview

1:45 - 3:15 p.m.

Natural and NBS in Alaska and the Arctic 1 — Room A

- **Improving Coastal Resilience with Nature-Based Solutions in Point Hope,** *Taber Midgley*
- **Erosion Mitigation Design in the Arctic Considering Climate Change Impacts,** *Kamil Biedka*
- **Spit Recycling: The Default Nature-based Solution at Shaktoolik, Alaska,** *Phil Osborne*
- **Rock Solid: Engineering Coastal Structures in Ice-Prone Zones,** *KC Kent*
- **Towards Development of Guidelines for Nature-Based Solutions Using Findings from Several Pilot Projects in Canadian River Systems,** *Sean Ferguson*

Cold Regions Construction 2 — Room B

- **Modeling a Composite Pore Model for Chlorinated Silty Clay under Load Influence during Freeze-Thaw Cycles Based on NMR Fractal Theory,** *Yong Tao (S)*
- **Preliminary Numerical Analysis of the Impact of Heterogeneity on Seepage in Frozen Soils,** *Zakary Picard (S)*
- **Quantitative Analysis of Unfrozen Water Content of Muddy Clay under Extremely Low Temperature Freezing Conditions,** *Huade Zhou (S)*
- **Shear Characteristics and Microstructure of Cemented Soil-Concrete Interface after Artificial Freeze-Thaw under Vibration Loading,** *Chao Ban (S)*

Frozen Ground and Permafrost 2 — Room C

- **How Climate Change is Changing Bridge Design in Alaska,** *Nicholas Murray*
- **Can't Stop This: Documenting the Collision of Frozen Debris Lobe-A with the Dalton Highway, Alaska,** *Margaret Darrow*
- **Long-Term Performance of Permafrost Passive Cooling Systems in Interior Alaska,** *Steve Saboundjian*
- **Cryostructure and Uniaxial Compressive Strength of Ice-rich Permafrost in Northern Alaska,** *Ziyi Wang (S)*

Sustainable Infrastructure in Cold Regions 2 — Room D

- **Conceptual Design of Quantitative Risk Algorithms for a Geohazard and Geo-asset Management System for Roadway Networks in Permafrost Regions,** *Heather Brooks*
- **Assessing Traffic Safety in Cold Regions for Sustainable and Resilient Infrastructure: A Hybrid Approach of Association Rule Mining and Spatial Analysis,** *Amare Mulugeta*
- **Funding for Sustainable Infrastructure Efforts in Alaska and Related Challenges,** *Natalie Wagner*
- **Temperature Effects on CT in Un-Baffled Water Storage Tanks,** *William Fraser*

Weds. Overview

3:30 - 5 p.m.

Natural and NBS in Alaska and the Arctic 2 — Room A

- **A Brief History of Federal Policy, Programs, and Guidance for Natural and Nature-Based Solutions Engineering with Applications to Alaska and the Arctic,** *Jaci Overbeck*
- **Engineering With Nature® and Progressing Natural and Nature-Based Solutions in Alaska and the Arctic,** *Lauren Bosche*
- **Nature-based Solution Design: The Value of a Process-Based Definition to Identify NBS in Any Environment, as Demonstrated by a Case Study to Enhance Coastal Resilience in Point Hope, Alaska,** *Ellen Jessup*
- **Building Connections and Capacity for Community-Led Coastal Resilience in Alaska,** *Aaron Poe*

Cold Regions Hydrology and Hydraulics — Room B

- **Small Scale Hydropower in Alaska - From Construction to Operations; Challenges in Harsh Conditions,** *Ed Zapel*
- **Estimation of Bed Shear Stress Distribution Using ADCP Data in Ice-Covered Streams,** *Trung Le*
- **Overview of NASA SnowEx Alaska Field Campaign in 2022-2023,** *Svetlana Stuefer*
- **Prediction of Mid-Winter Breakup of Ice Cover on Canadian Rivers,** *Zoe Li*

Performance of Materials — Room C

- **A Simple Technique for Measuring Soil Pore Structure in Frozen Soils Using the Nuclear Magnetic Resonance Method,** *Hao Wang (S)*
- **Temperature Effect on the Relationship between Flexural Strength and Compressive Strength of Ice,** *Barbara Frigo*
- **Freezing Mechanism of Water in Clay Nanopores Using Molecular Dynamics,** *Shijun Wei (S)*
- **Development of Biofiltration Process for the Treatment of Acid Mine Drainage in Cold Regions,** *Subhabrata Dev*

Frozen Ground and Permafrost 3 — Room D

- **Seasonal Frost and Permafrost Impact in Liquefaction-Induced Lateral Spreading,** *Zhao Yue (S)*
- **Study on the Thermal Regime of Permafrost underneath the Tasiujaq Airstrip near Ungava Bay Coast, Northern Quebec,** *Xiangbing Kong*
- **Experimental Investigation of Thermal and Hydraulic Properties of Ice-rich Permafrost near Point Barrow, Alaska,** *Ziyi Wang (S)*
- **Personal Career Experiences with Permafrost,** *James Rooney*

Thursday Schedule

Room	Session #	Session Name	Chairs	Presenters
10:30 a.m. - 12 p.m.				**Page 18**
A	25	**Arctic EDS**	S. Rupp	Margret Darrow, Svetlana Stuefer, Charles Parr
B	26	**UFC Manuals of Practice**	R. Affleck, K. Bjella	R. Affleck, K. Bjella, M. Mark
C	27	**AI in Cold Regions**	J. Thornley, L. Liu	Scott Slone, Leo Liu, Md. Shohel Rana
D	28	**Cold Regions Construction 3**	E. Yarmak, Jr., X. Xiao	Austen Whitney, Kiera Towell, Alexandre Lai, Suguang Xiao
1:30 - 2:45 p.m.				**Page 19**
A	29	**Community Engineering (Silver Jacket)**	K. Bjella	B. Conner, P. R. Martinez, T. Holmes, M. Musial
B	30	**Ethics 2**	D. Prusak	Rebecca Bowman
C	31	**Cold Regions Construction 4**	Ch. Lin, L. Wang	Lei Wang, Jie Zhou Hanli Wu

Thursday Overview

10:30 a.m. - 12 p.m.

Special Session on Arctic EDS — Room A

Arctic EDS, Arctic Environmental and Engineering Data and Design Support System, is a new online hub for up-to-date data, interactive tools, and flexible modules that provide a modern alternative to the antiquated Environmental Atlas of Alaska (last revised in 1984). System elements are designed to aid in engineering decisions related to Alaska and other cold regions. These include web-based models of historical and projected climate variables; vetted downloadable datasets; and modules and notebooks offering users the opportunity to undertake specialized site-specific or region-specific engineering calculations by creating and sharing code in web applications. Speakers include:

- *Scott Rupp*
- *Margret Darrow*
- *Sveta Stuefer*
- *Charles Parr*

UFC Manuals for DoD Construction in Cold Regions — Room B

The UFC specifically discusses Arctic and Sub-Arctic Engineering for Vertical and Horizontal Infrastructure. Kevin Bjella is the CRREL POC. Speakers include:

- *Rosa Affleck*
- *Wade Lein*
- *Wendy Wieder*
- *Mark Musial*
- *John Thornley*

AI in Cold Regions — Room C

- **Improved Prediction of Frost Depth Penetration Using Recurrent Neural Networks,** *Scott Slone*
- **Data-Driven AI-Powered Snow and Ice Removal for Winter Road Maintenance,** *Leo Liu*
- **Advancing Cold Region Engineering through Machine Learning for Robust Infrastructure Resilience Based on Historical Weather Data Analysis,** *Md. Shohel Rana*

Cold Regions Construction 3 — Room D

- **Retrofitting a Passively Cooled At-Grade Foundation at Nunam Iqua, Alaska, USA,** *Austen Whitney*
- **3D Printing Ice Composites for Construction in Cold Regions,** *Kiera Towell*
- **Low-Impact Sustainable Gravel Mining on the Sagavanirktok River Floodplain,** *Alexandre Lai*
- **Laboratory Investigation on Load Transfer of Pile Foundations in Frozen Sandy Soils,** *Suguang Xiao*

Thursday Overview

1:30 p.m. - 2:45 p.m.

Community Engineering (Silver Jacket) — Room A

This special session aims to bring together the collective Arctic Engineering community to:

1. Identify pathways to create a means for gathering expertise and providing information to the villages.
2. Determine immediate solutions which have low risk and high probability for success.
3. Determine how the Engineering Working Group can interlace with existing entities (identified above) without overstepping or doubling efforts.
4. Determine longer term, perhaps novel solutions which have ability to provide robust Arctic community climate resilience.

Speakers include:

- *Kevin Bjella*
- *B. Conner*
- *P. R. Martinez*
- *T. Holmes*
- *M. Musial*

Ethics 2 — Room B

- **The Ethics of Competence: A Moving Target,** *Rebecca Bowman*

Cold Regions Construction 4 — Room C

- **Discrete Element Modeling of Bio-Inspired Drilling for Optimal Design of New Drilling Tools into Lunar Regolith,** *Lei Wang*

Field Trips

Thursday, May 16

All Thursday trips depart from the Egan Center street-level lobby

University of Alaska Anchorage Campus — 3 - 5 p.m.

Coordinators: Scott Hamel and Vinod Vasudevan

William Jack Hernandez Sport Fish Hatchery — 3 - 5 p.m.

Coordinator: Daniel Nichols

The Anchorage Museum — 3 - 5 p.m.

Coordinator: Virginia Groeschel

The Whittier Access Tunnel — 12:45 - 5 p.m.

Coordinator: Jeremiah Holland

12:45 pm	Stage and board coach/safety speech
1 p.m.	Depart Egan Center for Anton Anderson Memorial Tunnel
2:15 p.m.	Arrive at Anton Anderson Tunnel for tour
2:30 - 2:45 p.m.	Scheduled traffic to Whittier, Transit tunnel with tour guide(s)
2:45 - 3 p.m.	Arrive in Whittier, turn around for return queue
3 - 3:15 p.m.	Scheduled transit from Whittier to Bear Valley, depart Anton Anderson Tunnel
3:30 - 4 p.m.	Stop at Begich Boggs Visitor Center
4 p.m.	Depart Begich Boggs for Egan Center; arrive around 5:15 pm

Friday, May 17

Friday's trip departs from the Bridgewater Hotel lobby

Post-conference field trip in Fairbanks — 8:15 a.m. - 2 p.m.

Coordinator: Greg Kinney

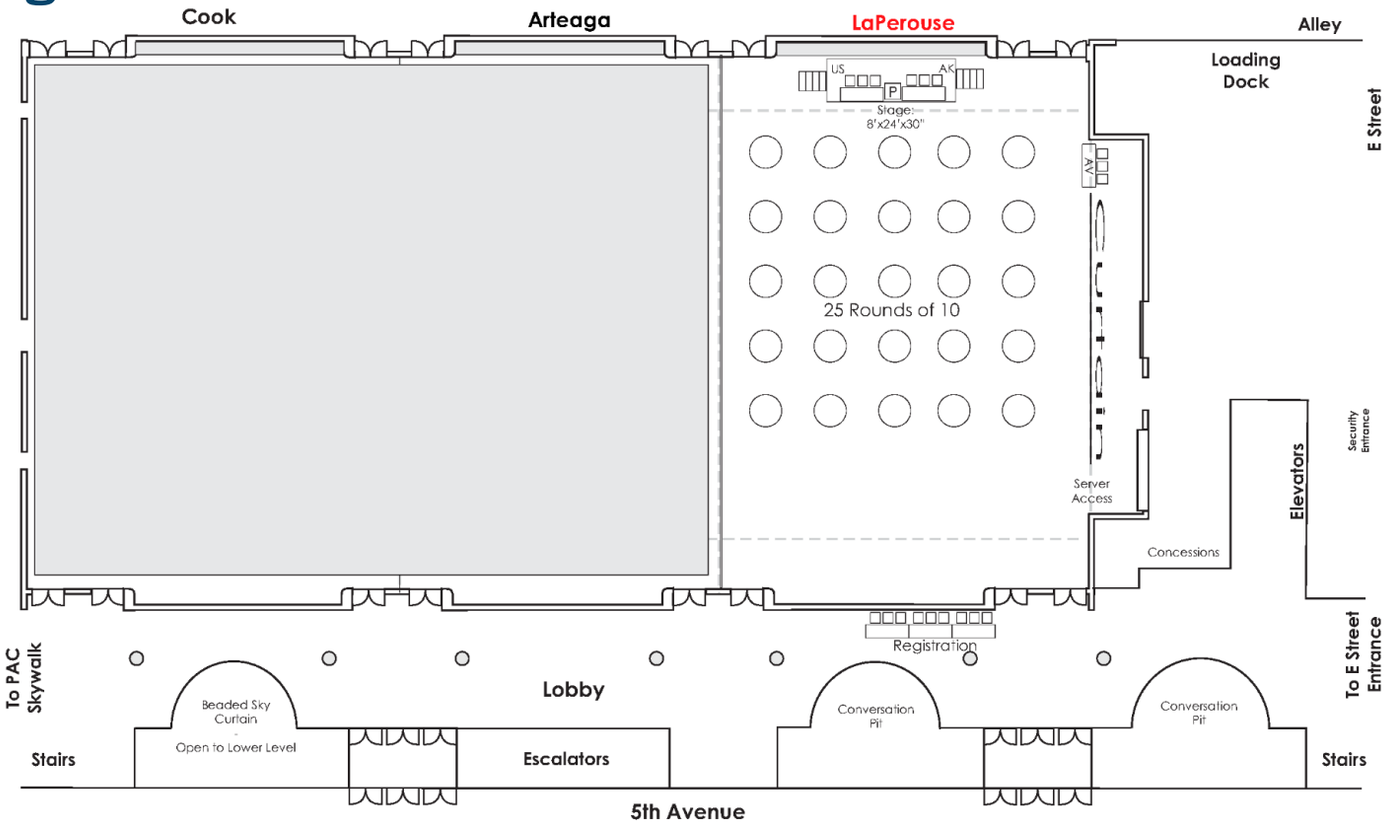
8:15 a.m.	Board coach at Bridgewater Hotel, safety speech
1 p.m.	Depart Bridgewater for Trans-Alaska Pipeline Viewpoint/Permafrost Tunnel and Permafrost Experiment
2:15 p.m.	Pick up at Permafrost Experiment Station and take directly to Fairbanks Airport

Poster Session

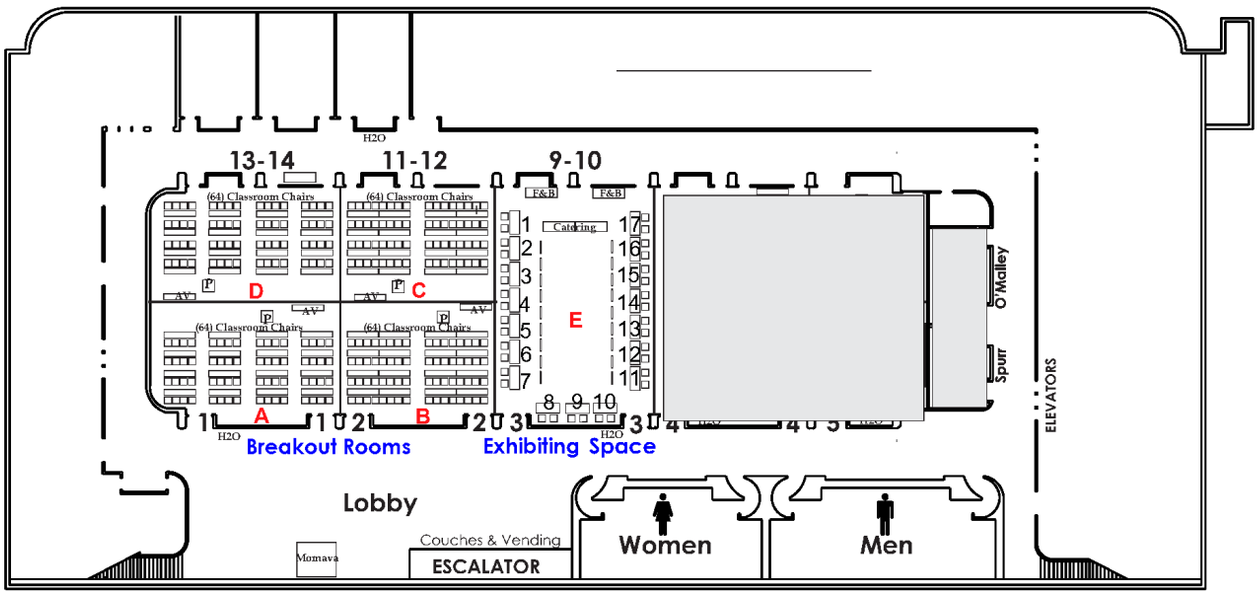
#	Author	Title
1	Padinhare Purakkal	Design of Electrically Conductive Asphalt Pavement for Self-Deicing Applications in Cold Regions
2	Matt Bray	Frost Susceptibility and Strength of Cement-Treated Fine-Grained Soils
3	Jianmin Ma	Multiscale Characterization of Cracking Resistance in Asphalt: Link between Binder and Mixture Tests
4	Jianmin Ma	Comparative Analysis of Tension-Compression and Shear Oscillatory Loading on the Rheological Response of Asphalt Binders from a Northern Ontario Pavement Trial
5	Cooper Knarr	The Lone Peak Tram: A Heat Transfer Analysis
6	Zihao Shang	Volumetric Behavior of Unsaturated Silty Soil Subject to Freezing-Thawing Cycles
7	Joseph Sopko	Ground Freezing for Deep Shaft Excavation in New York City
8	George Payne	Arctic Flume for Natured-Based Coastal Protection Experiments
9	Md. Fyaz Sadiq	Feasibility of SAA to Monitor Freeze-Thaw Performance of Pavement Foundations in Cold Regions

Maps

Egan Center - Street Level



Egan Center - Lower Level



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