Monday, October 25, 2021			
Monday, October 25 10:00 to 11:00	Poster Presentations for Sessions 3 and 4		10:00 to 11:00
	Poster Presentations for Session 3		
	Posters: Taking a Look at the Overlooked: Microorganisms and their Processes in Permafrost	Chris Baker: Seasonal variation in microbial community depth profiles: implications for understanding nutrient movements	
		Robyn Barbato: Climate change effects on microbial activity in Arctic permafrost and considerations for modeling this system in transition	
		Stacey Doherty: The Transition From Stochastic to Deterministic Bacterial Community Assembly During Permafrost Thaw Succession	
		Joanne Heslop: Microbe-substrate interactions following simulated microbial inoculation to thawed yedoma permafrost in anaerobic environments	
		Adam Kirkwood: Mercury, methylmercury, and microbial communities in a degrading palsa of the Hudson Bay Lowlands, Far North Ontario	
		Mary-Cathrine Leewis: Life in the freeze: Microbial community growth and greenhouse gas production across a Holocene to Pleistocene permafrost chronosequence revealed by Stable Isotope Probing	
		Futing Liu: Altered microbial structure and function after thermokarst formation	
		Joy O'Brien: Investigating microbial dormancy within the permafrost microbiome	
		Sean Schaefer: Mycorrhizal species characterization of tundra plant roots	
		Alison Thurston: Changes in Permafrost Microbial Community Composition after Thaw	
		Nicole Wagner: Investigating the Preservation Process of DNA in the Cold and Arid Paleoshores of the Antarctic Untersee Oasis	
		Mark Waldrop: Permafrost microbial communities are structured by latitudinal and soil chemical gradients	

Monday, October 25	10:00 to 11:00	Poster Presentations for Session 4	
		Posters: Ground-ice Distribution and its Role in Permafrost Carbon Dynamics	Charles Abolt: Circumpolar observations of thermokarst pool expansion from high-resolution satellite imagery
			Kethra Campbell-Heaton: Ice wedges as a winter paleotemperature proxy: limitations and local noise in their ?18O record.
			Ariane Castagner: Vertical distribution of excess ice in icy sediments and its statistical estimation from geotechnical data (Tuktoyaktuk Coastlands and Anderson Plain, Northwest Territories)
			Alexandre Chiasson: Initial investigations of degrading peat plateaus in the central Mackenzie Valley, Northwest Territories
			Roxanne Frappier: Distribution, morphometry, and ice content of ice-wedge polygons, central Yukon, Canada
			Stephan Gruber: Relict basal ice from the Laurentide Ice Sheet near Lac de Gras, Slave Geological Province, N.W.T., Canada
			Miriam Jones: Holocene Carbon Dynamics from a Permafrost Peatland in the Sporadic Permafrost Zone, Kenai Peninsula, Alaska
			Kelcy Kent: Soil and plant community characteristics across successional stages of ice-wedge degradation and re-stabilization in the tundra of northern Alaska
			Frederieke Miesner: Submarine Permafrost as a Long-term Late Quaternary Carbon Sink
			Heidi Rodenhizer: The Thermokarst Detection Algorithm: A Case Study at Eight Mile Lake, AK
			Pascale Roy-Léveillée: Impacts of shrubification on ground temperatures and carbon cycling in a sub-arctic fen near Churchill, MB
			Christina Schaedel: Ground ice survey designed for data holders and data users to improve understanding of ground ice content in permafrost across the Arctic
			Deniz Vural: The Great Unknown: Thermokarst Lakes and Its Response to Permafrost Carbon Feedback Cycle
			Torben Windirsch: Impact of large herbivores on permafrost soil carbon storage
			Joseph Young: Slope failure at the base of permafrost increasing frequency and magnitude of thaw-driven mass-wasting across discontinuous permafrost terrain in the central Mackenzie Valley foothills, NWT

Monday, October 25

11:00 to 12:00

Opening Ceremony		11:00 to 11:55
Opening Ceremony	Cathy Wilson: Welcome from the United States Permafrost Association	11:00 to 11:05
	Chris Burn: Welcome from the International Permafrost Association	11:05 to 11:10
	Ed Yarmak: Welcome from the American Society of Civil Engineers	11:10 to 11:15
	Tom Douglas: Welcome from the Conference Organizers	11:15 to 11:20
	Kevin Schaefer: Welcome from the University of Colorado	11:20 to 11:25
	Tom Douglas: Welcome from Lisa Murkowski	11:25 to 11:30
	Cathy Wilson: Introduction for plenary Speaker Larry Hinzman	11:30 to 11:35
	Larry Hinzman: Plenary Presentation: Permafrost Science and Engineering: Critical Capacity and Research Needs for our Nation	11:35 to 11:55

12:00 to 12:55

Parallel Technical Sessions 1 & 2		12:00 to 12:55
Technical Session 1		
Geophysical and Remote Sensing Investigations of Changing Permafrost Landscapes	Stephanie James: Session Highlights	12:00 to 12:10
	Thomas Douglas: Recent widespread thaw degradation of Interior Alaska permafrost quantified from repeat surveys, remote sensing, and geophysics	12:10 to 12:20
	Sarah Cooley: Leveraging new satellite technologies to better understand permafrost-surface water feedbacks in the Arctic	12:20 to 12:30
	Highlights and Whole Group Discussion	12:40 to 12:55
Technical Session 2		
Infrastructure Engineering on Permafrost	Xiangbing Kong: Welcome	12:00 to 12:05
	Robert Ettema: A brief review of frigid-winter and ice effects on earth embankments: three case studies	12:05 to 12:15
	Dai Nakamura : Deformation Caused by Frost Heave on a Rock Slope of Mudstone	12:15 to 12:25
	Kevin Bjella: Synopsis: Permafrost Engineering in a Warming Climate – Current State and Future Strategy	12:25 to 12:35
	Breakout Groups and Discussion	12:35 to 12:55

Meet RCOP & ICCRE Sponsors in the Exhibit Hall! 13:00 to 14:00

Monday, October 25

14:00 to 14:55

Parallel Technical Sessions 3 & 4		14:00 to 14:55
Technical Session 3		
Taking a Look at the Overlooked: Microorganisms and their Processes in Permafrost	Robyn Barbato: Welcome	14:00 to 14:05
	Susanne Liebner: Microbial response to a long-term anoxic batch scenario of permafrost-affected soil	14:05 to 14:15
	Hannah Holland-Moritz: Assembly of microbial communities in thawing permafrost	14:15 to 14:25
	Whole Group Discussion & Breakout Groups	14:25 to 14:55
Technical Session 4		
Ground-ice Distribution and its Role in Permafrost Carbon Dynamics	Christina Schaedel: Welcome	14:00 to 14:05
	Catherine Dieleman: Shifts in plant-soil interactions following ice-rich permafrost thaw – implications for carbon storage	14:05 to 14:15
	Tabea Rettelbach: Quantifying Erosional Dynamics in Ice-Wedge Networks with Computer Vision and Graph Theory	14:15 to 14:25
	Claudia Czimczik: The transition to a permafrost-free Arctic - revelations from deep soil cores	14:25 to 14:35
	Whole Group Discussion	14:35 to 14:55

15:00 to 15:55

Parallel Technical Sessions 5 & 6		15:00 to 15:55
Technical Session 5		
New Remote Sensing Technology and Applications to Map Regional Permafrost Vulnerability	Yonghong Yi: Session Highlights	15:00 to 15:10
	Charles Miller: Advances in Airborne Remote Sensing of Permafrost During ABoVE	15:10 to 15:20
	Annett Bartsch: The potential of satellite data to identify and quantify permafrost presence and change	15:20 to 15:30
	Whole Group Discussion	15:30 to 15:55
Technical Session 6		
Geologic Terrain Analysis, Geomorphic Mapping in Support of Infrastructure Development	Michelle Gavel: Welcome	15:00 to 15:05
	Rada Khadjinova: Using Geo-data to adapt to a changing Arctic	15:05 to 15:15
	Johanna SCHEER: Multi-disciplinary hazard mapping framework for critical infrastructure on permafrost, Ilulissat, West-Greenland	15:15 to 15:25
	Whole Group Discussion	15:25 to 15:55

Monday, October 25	16:00 to 17:00	Poster Presentations for Sessions 1, 2, 5 and 6	16:00 to 17:00
		Poster Presentations for Session 1	
		Posters: Geophysical and Remote Sensing Investigations of Changing Permafrost Landscapes	Helena Bergstedt: Spatial variability of vegetation and surface cover within drained lake basins, North Slope Alaska
			Julian Dann: Using Landsat imagery to identify landscape change over the last 40 years from seismic exploration within the Arctic National Wildlife Refuge, Alaska.
			Venezia Follingstad: Quantifying the Surface Deformation of Pingos on the Alaskan North Slope using Interferometric Synthetic Aperture Radar (InSAR)
			Gerald Frost: Diminishing cryoturbation and shrubs on the march in the Siberian Arctic: detecting sorted circles and vegetation change using convolutional neural networks
			Guido Grosse: Airborne Surveys of Rapidly Changing Permafrost Landscapes in Western Alaska
			Teddi Herring: Developing a user-friendly forward modelling and inversion tool to inform electrical resistivity tomography studies of permafrost
			Teddi Herring: Standardized processing of geoelectrical data for permafrost applications: Initial findings from a new IPA action group
			Thomas Højland Lorentzen: Implementation of 3 component seismics on frozen ground
			Lara Hughes-Allen: Quantification of lake change through time and extrapolation of in situ greenhouse gas flux analysis using remote sensing
			Julius Kunz: Three-dimensional investigation of a broad-based closed-system pingo on the Tuktoyaktuk Peninsula, Northwest Canada
			Antoni Lewkowicz: Permafrost warming and thaw in the discontinuous zone tracked using electrical resistivity tomography, Alaska Highway corridor, Canada
			Adrian McCallum: Estimating sub-surface snow density using the surface reflection method
			Andy Parsekian: Geophysical Validation of Airborne SAR-Observed Permafrost Active Layer Estimates, Alaska USA
			Taylor Sullivan: Investigation of Permafrost and Soil Moisture Distribution using GPR, NMR, and ERT

Monday, October 25 16:00 to 17:00	**Posters: Geophysical and Remote Sensing Investigations of Changing Permafrost Landscapes (continued)**	Sebastian Uhlemann: Geophysical Monitoring Shows that Spatial Heterogeneity in Thermohydrological Dynamics Reshapes Transitional Permafrost Systems
		Jurjen van der Sluijs: Monthly UAV-based topographic surveys reveal timing and volume budgets of seasonal geomorphic processes within retrogressive thaw slumps
		Ming Xiao: In-Situ Monitoring of Permafrost's Geophysical and Geomechanical Characteristics Using Distributed Acoustic Sensing (DAS)
		Kazuki Yanagiya: High-resolution frost heave map at fire scars in Batagay, NE Siberia, derived by L-band InSAR and validation with field observation
	Poster Presentations for Session 2	
	Posters: Infrastructure Engineering on Permafrost	Kevin Bjella: Arctic Expeditionary Infrastructure Research
		Regula Frauenfelder: On the use of Electrical Resistivity Tomography measurements and Induced Polarization-surveying in arctic landfill assessments
		Scott Hamel: New Economical Ice Coring Method for Accreted Ice on Vertical Piles
		Lorene Lynn: Teamwork in the Trenches: an interdisciplinary effort to address utility-related tundra rehabilitation
		Kaitlin Mattos: Rethinking water and sanitation in challenging environments: lessons learned from installing portable, adaptable, mid-tech household systems
		Seyedeh Zakieh Mohammadi: Application of empirical correlations for predicting thaw settlement: A case study of Nunavik, Canada
		Dikshya Parajuli: Analysis of road salt use and its impact on groundwater within the context of changing winter weather conditions
		James Rooney: A Second Foundation Review of AHTNA Corporation Glennallen Facility, ALASKA, USA
		Hizb Ullah Sajid: Employing Polyols for Increasing Ice Melting Capacity and Decreasing Freezing Point of Salt Brine Deicer
		Alexander Stott: Laboratory testing of thermosyphon fin designs
		Yu Xia: Material properties of advanced high-strength cold-formed steel alloys subjected to subzero temperatures

Monday, October 25 16:00 to 17:00	Poster Presentations for Session 5	
	Posters: New Remote Sensing Technology and Applications to Map Regional Permafrost Vulnerability	Lingcao Huang: Automated quantification of the evolution of retrogressive thaw slumps from multi-temporal high-resolution satellite imagery
		Hui Jiang: High-Resolution Permafrost Mapping in the Source Region of the Yangtze River combining a process-based model with InSAR
		Benjamin Jones: High spatial and temporal resolution remote sensing of a collapsing pingo in northern Alaska
		Roger Michaelides: Quantifying Surface-Height Change over a Periglacial Environment with ICESat-2 Laser Altimetry
		Ingmar Nitze: Evaluating a deep-learning approach for mapping retrogressive thaw slumps across the Arctic
		Alexandra Runge: Permafrost Vulnerability Framework from multiple Essential Climate Variables
		Kevin Schaefer: Using Radar to Remotely Sensed Active Layer Thickness and Soil Moisture
		Melissa Ward Jones: Using ArcticDEM and shallow boreholes to quantify mass wasting sediment loss of retrogressive thaw slumps in the Eureka Sound Lowlands, Canadian high Arctic
		Zhuoxuan Xia: Detecting retrogressive thaw slumps over large permafrost areas: a case study along the Qinghai-Tibet Engineering Corridor
		Yonghong Yi: Investigating the sensitivity of L-band polarization ratio to surface organic soil properties in Arctic tundra area
		Simon Zwieback: Mapping ice-rich permafrost using InSAR observations of late-season subsidence

Monday, October 25	16:00 to 17:00	Poster Presentations for Session 6	
		Posters: Geologic Terrain Analysis, Geomorphic Mapping in Support of Infrastructure Development	Arianne B St-Amour: Permafrost Characterization Using Ground Penetrating Radar (GPR) in support of land use planning, Inukjuak, Nunavik
			Shunji Kanie: Mesoscopic-Model Simulation of Freeze and Thaw with Groundwater Flow for Terrain Change in Permafrost Regions
			Robin McKillop: Geomorphological Mapping in Permafrost Terrain to Inform the Routing and Planning of the Kivalliq Hydro-Fibre Link, Manitoba to Nunavut, Canada
			Albin Rosado: Investigating the relationship between permafrost, climate change, and the built environment in Arctic coastal and riverine environments

Tuesday, October 26, 2021

Tuesday, October 26
10:00 to 11:00

Poster Presentations for Sessions 7, 8, and 11		**10:00 to 11:00**
Poster Presentations for Session 7		
Posters: Global Terrestrial Network for Permafrost (GTN-P)	Sarah Chadburn: Standardized monitoring of permafrost thaw: a user-friendly, multi-parameter protocol	
	Anna Irrgang: Permafrost Measurements Best Practice: GCW's contribution to standardization of global observations	
	Ketil Isaksen: Climate-related operational permafrost monitoring in Svalbard and Norway	
	Huijun Jin: Permafrost Monitoring Network in the Northern Da and Xiao Xing'anling Mountains, Northeast China	
	Torre Jorgenson: A Thermokarst Monitoring Network for Alaska	
	Gleb Kraev: DEVELOPING REGIONAL PERMAFROST MONITORING SYSTEM IN YAMALO-NENETS AUTONOMOUS OKRUG, RUSSIA	
Poster Presentations for Session 8		
Posters: Transportation Engineering in Permafrost	Ryley Beddoe: Monitoring ground temperatures on portage sites along the Tibbitt-Contwoyto winter road to assess road resiliency	
	Munstair Billah: Performance of Bridges in Cold Regions with Sliding Seismic Isolation Bearings	
	Enoch Boekweg: Nondestructive Evaluation of a New Concrete Bridge Deck Subject to Excessive Rainfall during Construction: Implications for Durability in a Cold Region	
	Rui Chen: Simulating the thermal regime of railway embankment structure on the Tibetan Plateau under climate change	
	Anthony Fuentes: Quantification of Rut Detection and Height Mapping in Winter Terrains for Off-Road Mobility	
	Jennika Hammar: Drivers of permafrost degradation along the Inuvik to Tuktoyaktuk Highway	
	Balaussa Kameledenova: Numerical modeling of a new covered arch bridge and its future impact on the surrounding ground thermal regime in continuous permafrost	

Tuesday, October 26	10:00 to 11:00	**Posters: Transportation Engineering in Permafrost (continued)**	Amelia Menke: Use of a Portable Friction Tester on Snow and Ice Pavement
			James Rooney: Upper Silvis Lake Spillway and Powerhouse Failure
			Holly Trisch: Developing Pavement Performance Prediction Models Using Rutting Criteria for a Cold Region Environment
			Xiyin Zhang: Permafrost degradation effect on seismic response of bridge pile foundation along Qinghai-Tibet Railway
			Yue Zhao: Prediction of Climate Change Impact on a Highway in Warm Permafrost
		Poster Presentations for Session 11	
		Posters: Planetary Permafrost	Ali Bramson: A sublimation-based framework for generating protrusion of marker beds within the icy Martian Polar Layered Deposits
			Shannon Hibbard: Implications for the distribution of brain terrain in Arcadia Planitia, Mars
			Joseph Levy: Boulder halo rock distributions on ice-rich latitude dependent mantle indicate large role for cold-permafrost cryoturbation processes at some sites on Mars
			Norbert Schorghofer: Subsurface-Atmosphere Exchange of Water Vapor in Sublimation Environments
	11:00 to 11:55	**Day 2 - Keynote Speakers**	**11:00 to 11:55**
		Keynote Speakers Day 2	Joel Ulring: Welcome to day 2 — 11:00 to 11:05
			Joel Ulring: ASCE CanAm and Hal Peyton Awards and Introduction of Plenary Speaker — 11:05 to 11:10
			Margaret Darrow: Plenary Presentation and Eb Rice Lecture: Tears of a Rapper: The Science and History behind the Art of Frozen Debris Lobe Rap Videos — 11:10 to 11:50
	12:00 to 12:55	**Parallel Technical Sessions 7 & 8**	**12:00 to 12:55**
		Technical Session 7	
		Global Terrestrial Network for Permafrost (GTN-P)	Alexey Maslakov: Session Highlights — 12:00 to 12:10
			Kelsey Nyland: Global Long-Term Active Layer Thickness Trends — 12:10 to 12:20
			Cécile Pellet: Permafrost warming in the Swiss Alps: current state and long-term trends — 12:20 to 12:30
			Highlights & Whole Group Discussion — 12:30 to 12:55

Tuesday, October 26

12:00 to 12:55

Technical Session 8		
Transportation Engineering in Permafrost	Joey Yang: Session Highlights	12:00 to 12:10
	Thomas Schneider von Deimling: Modelling consequences of permafrost degradation for Arctic infrastructure – a case study of the Dalton highway	12:10 to 12:20
	Edward Yarmak: Recent Experiences with Existing Passively Cooled At-Grade Foundations	12:20 to 12:30
	Hao Zheng: Spontaneous Corrugation on Snowy and Icy Road Surface Produced by Moving Vehicles in Cold Regions	12:30 to 12:40
	Whole Group Discussion	12:40 to 12:55

Meet RCOP & ICCRE Sponsors in the Exhibit Hall! **13:00 to 14:00**

14:00 to 14:55

Parallel Technical Sessions 9 & 10		14:00 to 14:55
Technical Session 9 [WORKSHOP]		
Permafrost Data Systems WORKSHOP*	Nick Brown: Welcome	14:00 to 14:05
	Ashley Rudy: Developing an NWT Permafrost Database	14:05 to 14:15
	Jeannette Noetzli: Processing and management of mountain permafrost data	14:15 to 14:25
	Extended Break-out Discussions	14:25 to 14:55
Technical Session 10		
Snow, vegetation, and permafrost interactions and advancements in sensing/monitoring technologies	Katrina Bennet: Session Highlights	14:00 to 14:10
	Alexander Kholodov: Affect of the slope topography on the ground temperature, hydrology and soil formation: a case study at the Seward Peninsula.	14:10 to 14:20
	Jessie Young-Robertson: Boreal shrub water use in permafrost and permafrost-free systems	14:20 to 14:30
	Whole Group Discussion	14:30 to 14:55

Tuesday, October 26	15:00 to 15:55	Parallel Technical Sessions 11 & 12		15:00 to 15:55
		Technical Session 11		
		Planetary Permafrost	Joseph Levy: Session Highlights	15:00 to 15:10
			Hanna Sizemore: Ground Ice on Terrestrial Worlds: The importance of laboratory data	15:10 to 15:20
			Eric Petersen: A review of terrestrial analogs for Martian glacial, periglacial, and permafrost studies	15:20 to 15:30
			Whole Group Discussion	15:30 to 15:55
		Technical Session 11		
		Engineering Properties of Frozen Soils	Amy Steiner: Welcome	15:00 to 15:05
			tugce baser: An Experimental Investigation of Coupled Thermo-Dielectric Properties of Icy Porous Media	15:05 to 15:15
			Simon Dumais: Thaw consolidation model for permafrost based on the residual stress	15:15 to 15:25
			Whole Group Discussion	15:25 to 15:55

Tuesday, October 26	16:00 to 17:00	Poster Presentations for Sessions 9, 10, and 12		16:00 to 17:00
		Poster Presentations for Session 9		
		Posters: Permafrost Data Systems WORKSHOP	Coline Mollaret: International database of geoelectrical surveys on permafrost: a new IPA Action group	
		Poster Presentations for Session 10		
		Posters: Snow, vegetation, and permafrost interactions and advancements in sensing/monitoring technologies	Martha Apple: The Distribution of Dwarf Shrubs and Drought Resistant Plants Varies With Soil Temperature and Position on Periglacial Patterned Ground at the Goat Flat Alpine Tundra, Montana, USA	
			Katrina Bennett: Spatial Patterns of Snow Distribution for Improved Earth System Modelling in the Arctic	
			Nathan Blais: Quantifying Permafrost Soil Micro-Structure with Micro X-ray Computed Tomography	
			Leah Clayton: Active Layer Thickness as a Function of Soil Water Content in Alaska and Canada	
			Thomas Douglas: Machine learning analyses of remote sensing measurements establish strong relationships between vegetation and snow depth in the boreal forest of Interior Alaska	
			Madeleine Garibaldi: TTOP model sensitivity and comparison to random forest permafrost temperature modelling across Western Canada	
			Bradley Gay: Field Validation of Simulated Permafrost Thaw Depth Across the Vegetation Gradient in Alaska from SIBBORK-TTE Modeling Infrastructure	
			Jean Holloway: Cumulative impacts of fire and climate on permafrost at local and regional scales, southern Northwest Territories, Canada	
			Emma Lathrop: Extrapolating snowpack properties from small temperature sensors in two watersheds on the Seward Peninsula, Alaska, USA	
			Noah Smith: Explicitly modelling microtopography in permafrost landscapes in the JULES land-surface model	

Tuesday, October 26	16:00 to 17:00	**Posters: Snow, vegetation, and permafrost interactions and advancements in sensing/monitoring technologies (continued)**	Mary Szatkowski: Comparison of Satellite-Derived Snow Data Benchmarks with Historic Snow Survey Data from the North Slope of Alaska using ILAMB Software.
			Rosamond Tutton: Modelled Soil Temperature Sensitivity to Variable Snow and Vegetation Conditions in Low-Relief Coastal Mountains, Nunatsiavut and NunatuKavut, Labrador
			Anna Wagner: Snow and canopy interception influence on soil thermal regimes
			Yifeng Wang: Thermal Modelling of Post-Fire Permafrost Change Under a Warming Coastal Subarctic Climate, Eastern Canada
			Stijn Wielandt: Distributed Temperature Profiling Networks for Quantifying Soil Thermal Regimes and their Controls across Discontinuous Permafrost Environments
		Poster Presentations for Session 12	
		Posters: Engineering Properties of Frozen Soils	Rosa Affleck: Geotechnical Properties of Frozen Ground at McMurdo Station, Antarctica
			Jean-Pascal Bilodeau: Creep of marginally frozen soils
			Élise Devoie: Measurement Techniques for Soil Freezing Characteristic Curves
			Duane Froese: Permafrost core characterization using gamma ray attenuation and industrial computed tomography scanning
			Melanie Kern: Fine-scale heterogeneity vs. large-scale models: Effects of soil heterogeneity on simulated physical properties - Does it matter?
			Min Liew: Synthesis of Geophysical and Geomechanical Properties of Permafrost-Affected Soils Highlights Complex Processes of Permafrost Degradation in a Geotechnical Context

Wednesday, October 27, 2021		
Wednesday, October 27 10:00 to 11:00	Poster Presentations for Sessions 9, 10, and 12	10:00 to 11:00
	Poster Presentations for Session 13	
	Posters: Permafrost Discovery Gateway: Big imagery Permafrost Science Today and Tomorrow (WORKSHOP)	Amit Hasan: Understanding the effect of image augmentation on deep learning convolutional neural net algorithms
		Matthew Jones: Interactive, geospatial visualization of high-resolution, pan-Arctic permafrost features in the Permafrost Discovery Gateway
		Elias Manos: Automated recognition of ice-wedge polygon troughs and human-built infrastructure in the Arctic permafrost landscapes using commercial satellite imagery
		Todd Nicholson: Developing Hybrid Machine Learning Pipelines Using Cloud and HPC Resources for the Permafrost Discovery Gateway
		Mahendra Rajitha Udawalpola: High performance image analysis workflow designs for automated mapping of ice-wedge polygons from high-resolution satellite imagery
	Poster Presentations for Session 15	
	Posters: Dynamics of Permafrost Rivers, Deltas, and Coastlines	Elena Debolskaya: The Influence of Thermal Erosion at River Bed Deformation in Permafrost Areas
		Catherine Deslauriers: Ground temperature responses to climatic trends in a range of surficial deposits near Kangiqsualujjuaq, Nunavik
		Wayana Dolan: Functional Delta Connectivity and Impacts on Lake Ice in the Colville Delta, Alaska
		Louise Farquharson: Permafrost thaw and coastal erosion between 1950 and 2100 at three coastal communities in Arctic Alaska, past observations and future projections
		Jennifer Frederick: Demonstration of the ACE (Arctic Coastal Erosion) model at Drew Point, AK during a permafrost bluff block collapse event in summer 2018
		Paul Overduin: Floating Ice and Riverbed Permafrost in the Lena River Delta

Wednesday, October 27 10:00 to 11:00	**Posters: Dynamics of Permafrost Rivers, Deltas, and Coastlines**	Joel Rowland: Spatial variability in the relative influence of permafrost on river bank erosion rates.
		Lawrence Vulis: Characterizing lake spatial distribution to understand permafrost processes on arctic river deltas
		Robert Way: Permafrost Investigations Below the Marine Limit at Nain, Nunatsiavut, Canada

Poster Presentations for Session 16	
Posters: Permafrost Dialogue: New Avenues of Communication for Permafrost Science, Outreach, and Education	Salvatore Curasi: Enhancing STEM education and soil monitoring with a durable DIY low-cost soil temperature data logger
	Stacey Fritz: Engage the Public in Science and Embrace Future Change with Human-Centric Stories, Art, and Imaginings
	Nicolas Jelinski: Towards a Standardization of Soil Cryogenic Structure and Cryostructure Terminology for the Field Description of Permafrost-Affected Soils
	Kristina Levine: The Permafrost Monthly Alert (PMA) Program: Informing Engineers, Scientists, Educators, and the Public of Current Permafrost Literature
	Antoni Lewkowicz: Towards a revised version of the Glossary of Permafrost and Related Ground-Ice Terms
	Erin MacDonald: An interactive website to visualize and communicate how the Arctic is changing

Wednesday, October 27	10:00 to 11:00	Poster Presentations for Session 17	
		Posters: Water in Permafrost Systems – An Interdisciplinary Consideration	Mohamed Abdelhamed: Hydrologic-land surface modelling of the Canadian sporadic-discontinuous permafrost: initialization and uncertainty quantification
			Trevor Andersen: Long-term (2000-2017) response of lake-bottom temperatures and talik configuration to changes in climate at two adjacent tundra lakes, western Arctic coast, Canada
			Lesleigh Anderson: Holocene thermokarst lake dynamics in northern Interior Alaska: the interplay of climate, fire, and subsurface hydrology
			Jason Clark: Modeling Arctic Lakes with the LAKE2.0 Model
			Ronald Daanen: Simulating Arctic hydrology with WaSiM
			Philippe Fortier: Hydrogeology and permafrost dynamics of a degrading lithalsa near Umiujaq (Nunavik, Canada): insights from long-term monitoring
			Michael Gooseff: Seasonal Freeze-Thaw Dynamics Under and Around Streams in the McMurdo Dry Valleys, Antarctica
			Alexandra Hamm: Impact of lateral groundwater flow on hydrothermal conditions of the active layer in a high arctic hillslope setting
			Cassandra Koenig: Modelling Water Release from Degrading Permafrost in Arid Mountain Environments
			Liudmila Lebedeva: Spatial distribution and temporal dynamics of the suprapermafrost subarial taliks in Eastern Siberia
			Mara Nutt: Are Concentration-Discharge Relations in Arctic Rivers Different from Temperate Rivers?
			Brianna Rick: The Lake Agnes rock glacier as a climate resilient cold-water reservoir within the Colorado Front Range
			Elizabeth Wig: Fine-Resolution Measurement of Soil Moisture from InSAR Phase Closure
			Yue Wu: The uncertainty in InSAR-based active layer soil water storage estimates over the Arctic Foothills
			Yu Zhang: The thermal response of permafrost to coastal flooding

Wednesday, October 27

11:00 to 11:55	**Day 3 - Keynote Speakers**		**11:00 to 11:55**
	Keynote Speakers Day 3	Anna Liljedahl: Welcome to Day 3	11:00 to 11:05
		Michael Brubaker: Introduction for Plenary Speaker Darcy Peter	11:05 to 11:10
		Darcy Peter: Plenary Presentation: Perspectives on Climate Change: On-the-Ground Impacts of Climate Change in Arctic Communities	11:10 to 11:50

12:00 to 12:55	**Parallel Technical Sessions 13 & 14**		**12:00 to 12:55**
	Technical Session 13 [WORKSHOP]		
	Permafrost Discovery Gateway: Big imagery Permafrost Science Today and Tomorrow WORKSHOP*	Anna Liljedahl: Welcome	12:00 to 12:05
		Anna Liljedahl: Permafrost Discovery Gateway: A project overview	12:05 to 12:15
		Extended Breakout Discussions	12:15 to 12:55
	Technical Session 14		
	General session: Permafrost and cold regions engineering	John Thornley: Welcome	12:00 to 12:05
		Annett Bartsch: A spatially consistent account of infrastructure across the entire Arctic	12:05 to 12:15
		Astrid Schetselaar: Performance of climate projections used for engineering design in Yukon and adjacent Northwest Territories, 1991-2020	12:15 to 12:25
		Dmitry Streletskiy: Developing a Framework for Assessing the Vulnerability of Infrastructure on Permafrost to Climate Change	12:25 to 12:35
		Whole Group Discussion	12:35 to 12:55

Meet RCOP & ICCRE Sponsors in the Exhibit Hall! **13:00 to 14:00**

Wednesday, October 27

14:00 to 14:55

Parallel Technical Sessions 15 & 16		14:00 to 14:55
Technical Session 15		
Dynamics of Permafrost Rivers, Deltas, and Coastlines	Jennifer Frederick: Welcome	14:00 to 14:05
	Eva Stephani: Permafrost dynamics related to channel migration in the Colville River Delta, Alaska	14:05 to 14:15
	Go Iwahana: Intra-ice and intra-sediment cryopeg brine occurrence in permafrost near Utqia?vik (Barrow)	14:15 to 14:25
	Danika Ouellette: Process-based thermal-mechanical numerical modeling of coastal erosion on Tuktoyaktuk Island, NT	14:25 to 14:35
	Whole Group Discussion	14:35 to 14:55
Technical Session 16		
Permafrost Dialogue New Avenues of Communication for Permafrost Science, Outreach, & Education	Brendan Rogers: Session Highlights	14:00 to 14:10
	Jessie Young-Robertson: Alaska Voices: Building Bridges of Knowledge Through Shared Conversations	14:10 to 14:20
	Deborah Huntzinger: Polar Explorer - An Immersive Virtual Learning Environment that Teaches Students about the Impacts of Thawing Permafrost on Society	14:20 to 14:30
	Whole Group Discussion	14:30 to 14:55

15:00 to 15:55

Parallel Technical Sessions 17 & 18		15:00 to 15:55
Technical Session 17		
Water in Permafrost Systems – An Interdisciplinary Consideration	Eva Stephani: Session Highlights	15:00 to 15:10
	Michelle A. Walvoord: Hydrologic implications of supra-permafrost taliks in disturbed landscapes of boreal Alaska, USA	15:10 to 15:20
	David Rey: Measurement and Modeling of Wildfire-Initiated Talik Development in Boreal Alaska	15:20 to 15:30
	Whole Group Discussion	15:30 to 15:55
Technical Session 18 [WORKSHOP]		
Arctic Environmental and Engineering Data and Design Support System	Sveta Stuefer: Welcome	15:00 to 15:05
	Whole Group Discussion	15:05 to 15:55

Wednesday, October 27 16:00 to 17:00	Poster Presentations for Session 14	16:00 to 17:00
	Poster Presentations for Session 14	
	Posters: General session permafrost and cold regions engineering	Irina Chesnokova: Infrastructure’s Adaptation to Climate Change at the Russian Cold Region’s Territories
		Rob Clark: Early Warning Frost Detection System
		Howard Epstein: Understanding the Changing Natural-Built Landscape in an Arctic Community: An Integrated Sensor Study in Utqia?vik, Alaska
		Amro Faki: Regional-scale investigation of pile bearing capacity for Canadian permafrost regions in a warmer climate
		Regula Frauenfelder: On the influence of complex and changing Arctic conditions on historic and future waste disposal sites - a multi-criteria risk assessment
		Erin Trochim: Alaska's Transportation Infrastructure in a Changing Environment

Thursday, October 28, 2021			
Thursday, October 28	10:00 to 11:00	Poster Presentations for Session 19, 20, 21, and 22	10:00 to 11:00
		Poster Presentations for Session 19	
		Posters: Unique Challenges of Permafrost in Mountain Areas	Lukas Arenson: A Continental Permafrost Distribution Model for the South American Andes
			Daniel Draebing: An increase of rockfall activity due to elevation dependent paraglacial and periglacial processes
			Ayon Garcia: Mountain permafrost in the “Ojos del Salado” Volcano, Chile, advances and challenges
			Lara Hughes-Allen: First evidence of rock wall permafrost in the Pyrenees (Vignemale peak, 3298 m a.s.l, 42°46'16" N / 0°08'33'' W)
			Kaytan Kelkar: Identifying Slope Instability in Mountain Permafrost Terrain: A Case Study in Colorado and Alaska
			Hairo León: Mountain permafrost in the Tropical Andes of Peru: the 0°C isotherm as a potential indicator
			Till Mayer: Topographic and geologic controls on frost weathering in Alpine rockwalls
			Raven Mitchell: Sedimentological Investigations at the Hickory Run Boulder Field, Carbon County, Pennsylvania
			Sarah Morard: 20-year long permafrost evolution at the long-term monitoring site Stockhorn, Swiss Alps by combining borehole temperature, electrical and seismic monitoring data
			Frederick Nelson: Early North American investigations in cryoplanated uplands
			Nick Noad: Surface-Based Temperature Inversion Characteristics in Dissimilar Valleys, Yukon
			Clayton Queen: Characteristic Periglacial Terrain: Multi-Scale Hypsometric Analysis of Cryoplanated Uplands in Eastern Beringia

Thursday, October 28 10:00 to 11:00	**Posters: Unique Challenges of Permafrost in Mountain Areas**	Riccardo Scandroglio: Quantification of permafrost degradation using calibrated 4D-ERT and consequent deformations in alpine bedrock.
		Juditha Undine Schmidt: Surface temperatures and their influence on the permafrost thermal regime in steep high Arctic rock walls on Svalbard
		Jaimy Schwarber: Preliminary Interpretations from a Landslide Inventory in Interior Alaska
		Vasily Tolmanov: Development of Early Soviet Ideas About Cryoplanation Terrace Genesis
	Poster Presentations for Session 20	
	Posters: Pipelines, Construction, Mining, and Oil and Gas in Cold Regions	Nina Blahut: Linking climate change and human systems: a case study of Arctic pipelines
		chris clarkson: Centrifuge Modelling of Steel Piles in Frozen and Thawing Ground
		Peppi Croft: Slope Stabilization Along a Buried Crude-Oil Pipeline in Ice-Rich Permafrost
		Peppi Croft: Embankment Fill Slope Movement on Thaw Sensitive Permafrost: Movement Mechanisms and Thermal Conditions at Lost Creek along the Trans Alaska Pipeline System (Lost Creek – Part 1)
		Andrew Daggett: Effects of Foundation Performance on TAPS from Changing Thermal Conditions
		Oliver Hoopes: Embankment Fill Slope Movement on Thaw Sensitive Permafrost: Combining Creep Testing and Thermal Simulations to Develop Mitigation Options at Lost Creek along the Trans Alaska Pipeline System (Lost Creek – Part 2)
		Danielle Kennedy: Concrete Construction in Cold Regions – Quantifying the Impact of Daily Temperature Variations on Required Frost-Protection Measures
		Karl Kyzer: Using Airborne LIDAR to Assess Elevation Trends on the Alaska North Slope
		Jeff Miller: Cruz Construction 2021 Regional Permafrost Conference Abstract

Thursday, October 28	10:00 to 11:00	**Posters: Pipelines, Construction, Mining, and Oil and Gas in Cold Regions**	James Rooney: Permafrost Test Sites: A Summary of Alaskan Pipeline Industry Efforts in Addressing Frozen Ground and Related Technical Issues
			Doug Simon: Improving Construction and Performance of a Runway in Nuiqsut, Alaska
			Christopher Stevens: Initial Performance of Sloped Thermosyphons for Stabilization of Massive Ground Ice Beneath the Alaska Highway, Yukon Territory
			John Thornley: Design and Construction of an At-Grade LNG Storage Tank on Warm Permafrost in Fairbanks, Alaska
			Liam Zsolt: Climate Change Adaptation - Saving our Critical Infrastructure
		Poster Presentations for Session 21	
		Posters: Rock Glacier Inventories and Kinematics	Dominik Amschwand: Novel subsurface measurement setup to investigate heat transfer processes within the debris mantle of rock glacier Murtèl (Engadine, eastern Swiss Alps)
			Lukas Arenson: Strengths and Limitations of Rock Glacier Inventories
			Edwin Badillo-Rivera: An estimation of past and present air temperature conditions, water equivalent, and surface velocity of rock glaciers in Cordillera Volcanica, Peru
			Xavier Bodin: Rock glaciers throughout the French Alps accelerated and destabilised since 1990 as air temperatures increased
			Denny Capps: Accelerating rock glacier threatens critical infrastructure
			ELISABETTA DRIGO: Review of the inventory and kinematic analysis of Aosta Valley (Italy) rock glaciers
			Alexander Handwerger: Tracking active rock glaciers in Utah with satellite-based InSAR
			Harald Wathne Hestad: Statistical prediction modelling of rock glacier distribution in Norway
			Jason Janke: Rock glaciers and contributing area parameters in the Front Range of Colorado
			Viktor Kaufmann: Repeated annual UAV-based measurement of the surface creep velocity of Leibnitzkopf rock glacier (Austrian Alps) without the use of geodetically measured ground control points (GCPs)
			Christophe Lambiel: Distribution and kinematics of rock glaciers in the Southern Alps of New Zealand

Thursday, October 28	10:00 to 11:00	**Posters: Rock Glacier Inventories and Kinematics**	Benjamin Lehmann: Reconstruction of rock glaciers dynamics in alpine environment, from modern to holocene timescales
			diana agostina ortiz: INTERNAL STRUCTURE, DYNAMIC BEHAVIOR AND HYDROLOGICAL CHARACTERISTICS OF A ROCK GLACIER IN THE SEMIARID ANDES OF ARGENTINA
			jaakko putkonen: Remote Detection of Buried Ice Masses; Transantarctic Mountains, Antarctica
			Tazio Strozzi: Systematic monitoring of rock glacier kinematics from satellite SAR interferometry: insights from case studies in the European Alps and Disko Island
			Mishélle Wehbe: Multi-method approach to inventorying rock glaciers and features of interest in Banff and Jasper National Parks, Alberta, Canada
		Poster Presentations for Session 22	
		Posters: Changing Biogeochemistry of Permafrost Regions	Erin Berns: Representing pH buffering in Arctic soils: The roles of water, organic carbon, and proton binding
			Maren Jenrich: Estimating greenhouse gas production in thermokarst lagoons of Bykovsky Peninsula, Siberia
			Jing Tao: Snow-to-Rain Shifts Regulate Carbon Emissions From pan-Arctic Permafrost Regions
			Anna-Maria Virkkala: Understanding the drivers, dynamics, and regional patterns of terrestrial ecosystem CO2 fluxes across the Arctic-Boreal Zone
			Yuanhe Yang: Temperature sensitivity of permafrost carbon release mediated by mineral and microbial properties
	11:00 to 11:55	**Day 4 - Keynote Speakers**	**11:00 to 11:55**
		Keynote Speakers Day 4	Chris Burn: Welcome to Day 4 — 11:00 to 11:05
			Colin Williams: Tribute to Arthur Lachenbruch (1925- 2021) — 11:05 to 11:15
			Chris Burn: Introduction for Plenary Speaker and IPA Lifetime Achievement Award. — 11:15 to 11:20
			Fritz Nelson: Plenary Presentation: A Life in Permafrost: Jerry Brown and the Internationalization of Frozen Ground Science and Engineering — 11:20 to 11:55

Thursday, October 28				
12:00 to 12:55	**Parallel Technical Sessions 19 & 20**			**12:00 to 12:55**
	Technical Session 19			
	Unique Challenges of Permafrost in Mountain Areas	Alexandre Bevington: Welcome		12:05 to 12:10
		Christian Hauck: Ground ice content loss in different mountain permafrost environments inferred from repeated and re-processed geophysical measurements data		12:05 to 12:15
		Margaret Darrow: Accelerated Motion Rates of Frozen Debris Slopes in the Brooks Range, Alaska, USA		12:15 to 12:25
		Thomas Ingeman-Nielsen: First experiences from a high Arctic, off-grid, solar powered time-lapse ERT system		12:25 to 12:35
		Break-out Sessions		12:35 to 12:55
	Technical Session 20			
	Pipelines, Construction, Mining, and Oil and Gas in Cold Regions	Jessica Worthington: Session Highlights		12:00 to 12:10
		Emily Asenath-Smith: Construction and Structural Analysis of an Arched, Cellulose-Reinforced Ice Bridge for Gap Crossing by (Military) Vehicles		12:10 to 12:20
		Larry Mosley: Alyeska's 40-plus Years of Experience with Heat Pipes on the Trans Alaska Pipeline		12:20 to 12:30
		Whole Group Discussion		12:30 to 12:55
Meet RCOP & ICCRE Sponsors in the Exhibit Hall!				**13:00 to 14:00**
14:00 to 14:55	**Parallel Technical Sessions 21 & 22**			**14:00 to 14:55**
	Technical Session 21			
	Rock Glacier Inventories and Kinematics	Alessandro Cicoira: Welcome		14:00 to 14:05
		Robert Way: Consensus-based rock glacier inventorying in the Torngat Mountains, northern Labrador		14:05 to 14:15
		Cécile Pellet: Operational monitoring of rock glacier kinematics: insights from the PERMOS network		14:15 to 14:25
		Breakout Groups		14:25 to 14:55

Thursday, October 28				
14:00 to 14:55	**Technical Session 22**			
	Changing Biogeochemistry of Permafrost Regions	Kevin Schaefer: Welcome		14:00 to 14:05
		Edward Schuur: The Vulnerability of Permafrost Carbon to Climate Change: Key Findings from a Decade of Synthesis		14:05 to 14:15
		Amanda J. Barker: Iron speciation at the permafrost-active layer boundary		14:15 to 14:25
		Claire Griffin: Landscape connectivity and dissolved organic matter in a degrading permafrost polygonal landscape		14:25 to 14:35
		Breakout Groups		14:35 to 14:55
16:00 to 17:15	**Closing Ceremony**			**16:00 to 17:15**
	Closing Ceremony	Tom Douglas: RCOP-ICCRE Wrapup and Acknowledgements		16:05 to 16:15
		Anna Wagner: Permafrost Engineering Education Program Awards		16:15 to 16:25
		Amy Thorson: ASCE Awards		16:25 to 16:35
		Marco Oliva: Announcement of 2023 European Conference on Permafrost (EUCOP)		16:35 to 16:45
		Lukas Arenson: Announcement of 2024 International Conference on Permafrost (ICOP)		16:45 to 16:55
		David Prusak: ASCE Closing Remarks		16:55 to 17:00
		Chris Burn: IPA Closing Remarks		17:00 to 17:05
		Cathy Wilson: USPA Closing Remarks		17:05 to 17:10