



**Session title:** Permafrost Engineering: risk assessment and adaptation challenges

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**Summary:**

Warming permafrost is projected to weaken foundation soils and create engineering risks. Geocryological processes such as thermokarst, frost heaving and fracturing, icing, thermal erosion, and Arctic coastal erosion are the source of immediate danger and cause of premature deterioration and failure for the engineering structures. For infrastructure built on thaw sensitive permafrost, sustainability relies heavily on sound assessment of risks and adaptation of design parameters. Recent advancements in the use of surface-based geophysics for geotechnical characterization are demonstrating that the heterogeneity of the permafrost ground-ice condition can often be exploited to reduce the risk of poor infrastructure performance and reduce construction and maintenance costs. Innovative adaptation and mitigation techniques have also been developed and tested, providing alternatives to increase resiliency to changing conditions. Additionally, thermal modeling techniques are becoming standard engineering tools for assessing long-term thermal stability of the permafrost foundation and determining performance of innovative designs, considering future warmed condition.

Presentations are invited that provide insight into the current methods for engineering on warming permafrost, and especially those that illustrate results of altered design parameters. We encourage demonstrations of innovation for maintaining or modifying founding soil conditions, innovation on the methods for characterizing the geotechnical condition both ground based and remotely collected, incorporation of permafrost cryostructure and geocryomorphology into the applied realm, assessments of risk and resiliency, and improved techniques for assessing, designing and constructing on warming permafrost.