# Geothermal Project

## Objective

The objective is to create computational models to study the feasibility and energy cost of using geothermal to supplement the cooling thermal management of buildings on campus (including ice rink)

## Framework:

* Your group will choose to use
  + Lake Champlain
  + Shallow digging near the ice rink
* Each group should:
  + Identify the cooling demand based on the heat transfer analysis of the ice rink or of your model building
  + Derive the necessary geothermal system to deliver the required cooling demand
  + Simulate how the solution handles the hottest days and their impact on the thermal comfort and the ice
  + The energy cost to move fluid within the geothermal loop
  + Perform a thermal analysis of a few days to compare chilling power with heat load from external sources.

## Assumptions:

* Ground is assumed to be at 10C at 2m deep
* Soil can be sand or clay
* For the heat exchange between soil and piping study two possibilities:
  + Option 1: The outside surface is at soil temperature in the heat exchanger
  + Option 2: Introduce a parametric distance at which the soil is at 10C from the surface of the pipe. Study the effect of that distance on the pipe length
* Recommended material for piping is HDPE
* The heat exchanger is assumed to require cool temperature of 12C and return temperature of 22C. Efficacy is estimated at 0.75
* When using the model building, use an indoor temperature of 20C

## Deliverable:

May 3: Cooling demand for a model building of your choice and Recommendation for geothermal heat exchanger dimensions

May 5: Refinement of model building heat load simulation

May 10: Final report due