Earth & Environmental Sciences 250/251: Environmental Geochemistry and Laboratory Service-Learning Class

A Geochemistry Study of Middle and Lower Bolton Lakes
December 7, 2017

After a brief introduction by Professor Tim Ku, there will be five 12-15-minute student presentations.

1) Phosphorus is a key nutrient for algal growth and the internal loading or flux of phosphorus released from the bottom lake sediments can be an important source of phosphorus to the water column. The **Internal Loading Group** of *Owen Rego, Paula Tartell, and Jason Yoo* will present their results on the benthic flux and cycling of phosphorus (P) from sediment grab samples. They used diffusive-gradient in thin-film (DGT) devices to quantify the flux of bioavailable P within the sediment and will compare this flux to the concentration of readily available P.

2) The nutrient status of water bodies can be evaluated by analyzing the carbon, nitrogen, and phosphorus concentrations of submerged aquatic plants. The **Aquatic Macrophyte Team** of *Matt Butrim and Hannah Sonnenberg* measured the %C, %N, %P, and nitrogen isotopic ratio ($^{15}N/^{14}N$) of aquatic plants in Middle and Lower Bolton Lakes. These data will be used to access the limiting nutrient(s) for these plants and to compare and contrast the nutrient status between the two lakes.

3) Sediment or mud cores record the history of environmental changes within a lake just like tree rings track a tree's growth. The **Physical Sedimentology Group** of *Jordyn-Marie Dudley, Natasha Nurjadin, Emma Powell, and Shuo Wang* will explain how to collect sediment cores and how to use mercury concentration measurements to determine sediment ages and deposition rates. These ages will allow us to document the history of Middle and Lower Bolton Lakes over the last few hundreds of years.

4) Changes in lake productivity or plant growth due to changing nutrient inputs can be recognized in sediment cores. The **Nutrient History Group** of *Min Jang, Melissa McKee, Celeste Smith, and Molly Wagner* measured the %C, %N, %P, and $^{15}N/^{14}N$ of sediments from three cores. These measurements reveal how the lake environment has changed from pre-human settlement times to the modern day.

5) Diatoms are a common phytoplankton that produce shells or frustules composed of silica. Since diatom species are sensitive to changes in pH and phosphorus, shifts in diatom species indicate changing water conditions. **Team Diatom** of *Eliza Carter and Eduardo Centeno* examined the diatoms contained in sediment cores to see how plankton communities have changed over the last few hundreds of years. They also took beautiful microphotographs of the diatoms living in Middle and Lower Bolton Lakes.