

On-Campus research opportunities that could be used for honours thesis work

*For students interested in conducting **soil and water research** at the Trent Farm. Of particular interest to students majoring in SAFS, WASC, GEOG or ERSC:*

Ex Q1: How is tile drainage affecting the soil microclimate (i.e., soil temperature and moisture) in tiled vs. untiled sections of the farm? How do changes in soil microclimate affect nutrient turnover? Are soil microclimate differences between tiled and untiled areas large enough to affect snow cover/snow melt dynamics? (THEME: Microclimatology; Climate Change; Soil biogeochemistry)

Ex Q2: How much water and nutrients (N, P, C) are discharged each year from the two composite tiles? Is it possible to collect and store tile water and nutrients and use them to irrigate/fertilize the fields in times of need? Can wetlands at the outlets of tiles retain some of the nutrients discharged from tiles? What are the trade-offs? (THEMES: Agricultural best management practices; Ecological restoration)

Ex Q3: How does tile drainage affect rooting depth of crops? How do differences in rooting depth affect the field water balance? How do different types of crop cover affect soil moisture and tile water discharge? (THEMES: Ecohydrology; Agricultural best management practices)

*For students interested in **stormwater pond research** (utilizing the ESB parking lot pond; could be expanded to utilize other ponds off-campus). Of particular interest to students in WASC, ERSC, EGEO, ERJ:*

Ex Q1: What are the seasonal sodium and chloride (road salt) budgets (input vs. output) for the ESB stormwater pond?

Ex Q2: How are nutrients (nitrogen and phosphorus) affected by passage through the stormwater pond?

Ex Q3: Do benthic invertebrates in the pond reflect its chemical water quality?

*For students interested in conducting **groundwater research** utilizing the ESB groundwater monitoring well, or wells that are part of the PGMN. Of particular interest to students in GEOG, WASC, EGEO and ERSC:*

Ex Q1: Is there evidence of road salt entering groundwater? What are the ratios of Na to Cl in groundwater vs. surface water vs. soil water? Do these ratios help us to understand flowpaths?

Ex Q2: Do groundwater level and temperature reflect changes in precipitation inputs?

Ex Q3: What are local trends in groundwater quality and relationships with landcover (utilizing provincial groundwater monitoring network data PGMN)?

*For students interested in conducting **climate research** utilizing the Trent Climate Station (located at the Trent Research Farm). Of interest to GEOG, EGEO, WASC and ERSC majors.*

Ex Q1: How do climate trends at the Trent University site compare with the City of Peterborough (airport)? Is there any evidence of an urban heat island effect in Peterborough and can this be detected using the Trent station?

Ex Q2: How do soil moisture and temperature patterns compare with air temperature and precipitation patterns? Can we predict soil conditions using climate measurements?

Ex Q3: How has snow fall (% precipitation as snow; rain vs snow) and snow depth changed over time in the Peterborough region? Is there any evidence of winter warming?

Ex Q4: How do teleconnections like ENSO or the NAO affect seasonal climate in Peterborough?

These are just an example of possible questions that could be addressed through an honours thesis utilizing on-campus research facilities. Many other projects are available that are connected with on-going (funded) graduate research. Contact me for more information.