Faculty of Engineering and Applied Science
Chemical Engineering Seminar Series

Is Black the New Green?
- Monolithic Biochar as Functional Material for Sustainability

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Thursday, January 27, 2022, 2:30pm
Dupuis Hall Room 215

Climate change mitigation requires reductions in carbon dioxide emissions and the withdrawal of carbon dioxide from the atmosphere. Half of the dry biomass is carbon removed from the atmosphere via photosynthesis while utilizing solar energy. Biochar is carbon extracted from biomass by pyrolysis and is chemically stable, making pyrolysis a negative emission technology (NET). Globally, biochar systems could deliver 3.4-6.3 Pg CO_2e emissions reduction per year, primarily through forest and agriculture applications, such as soil amendment. In the Green Technology Lab at the University of Toronto, we explore a new dimension in climate change mitigation with biochar - the potential of monolithic biochar as functional materials for applications that enhance sustainability. This talk reports the current progress in our lab and consists of four parts – starting with a background on the Global Carbon Cycle and biomass pyrolysis, followed by:

1. Biochar characteristics with a focus on electrical conductivity.
2. Monolithic biochar as electrodes in high energy density in supercapacitors for renewable energy storage.
3. Monolithic biochar as a photothermal material for solar water purification.