



Dr. Stephanie MacQuarrie

**Associate Professor of Chemistry, Associate Dean of Science and
Technology**

Cape Breton University

Wednesday, September 27th 2023

11:00 a.m. to 11:50 a.m. in ENW 115

**Crabbing for Carbon: Unearthing the Potential of Biochar from Crustacean
Shells and Wood Waste**

ABSTRACT

S.L. MacQuarrie, K.A. Hawboldt, JL Vidal, VP Andrea, FM Kerton, S. Cheema, H. Oliver
Cape Breton University & Memorial University of NFLD and Labrador

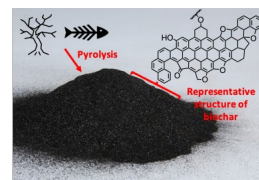


Figure 1. Forestry and aquaculture waste to biochar

From rotting wood to stinky crab bodies, converting waste streams to valuable resources is the focus of research within the MacQuarrie Group. This talk is a hodgepodge of stories exploring the production and characterization of several value-added products from abundant and local, renewable sources, previously considered worthless and costly waste. Low energy pyrolysis generates a solid product called biochar (often < 40% yield). Most commonly biochar is used as a low value soil amendment, however the MacQuarrie group recognizes increased potential for this interesting solid material, but first we must understand the molecular and physical properties of the chars we are creating. The process of fully characterizing biochar is tricky, as it is in-soluble, heterogeneous black solid. We've used several complementary techniques to gain a clear understanding of the properties inherent in the virgin biochar produced under slow pyrolysis from fisheries and forestry wastes. Unsurprisingly these chars consist of mostly stable, fixed carbon, but the material also retains residual organics and minerals characteristic of the feedstock. We've explored the potential for these virgin biochars and tailored biochars in various applications, adsorption, catalysis, remediation, and cosmetics.

BIOGRAPHY

Stephanie MacQuarrie

Dr. MacQuarrie is a Professor of Organic Chemistry at CBU and Associate Dean of the School of Technology and Science. She obtained her BSc from Mount Allison University in 1996. She continued to pursue chemistry in graduate school at Virginia Polytechnic Institute and State University where she earned her PhD in organic chemistry in 2005. In 2005, she accepted a post-doctoral position in Dr. Crudden's group at Queen's University. Stephanie's research includes finding high value applications for waste products, reducing the total carbon footprint of advanced materials and the development of functional materials for electronics, catalysis and absorption. Her research program is funded through NSERC DG as well as industry partnerships (Engage grants, Pnl vouchers). Stephanie has Adjunct status at Memorial University where she supervises graduate students in both Chemistry and Engineering. Over the last 13 years, Stephanie has developed a comprehensive and far-reaching set of initiatives aimed at encouraging and promoting interest and public awareness in EDI across Chemistry and STEM.