

Department of Chemistry & Biomolecular Science
Clarkson University
PhD Defense

Abraham Samuel Finny

will speak on

Development of an Additive Manufacturing Platform and Formulation of 3D Printable Hydrogel-based Inks for Sensing and Environmental Applications

Abstract: The shortage of suitable high-performance bioink compositions that can be printed and retain functionality during 3D printing remains a significant challenge in the advanced manufacturing of 3D printing constructs for applications in various fields. Choosing appropriate biopolymers and developing a selection guide of suitable hydrogel formulations with rationally designed characteristics for printing is crucial for manufacturing complex and functional 3D-printed objects. This presentation will discuss fundamental and practical studies addressing design characteristics and formulation criteria concerning the printing and the performance of functional and responsive 3D printed constructs. Specifically, the effect of the rheological properties and hydrogel composition in multicomponent systems on the mechanical, chemical, and degradation properties of printed biopolymer hydrogels, will be discussed in relation to the functional properties and the behavior of active components incorporated into bioinks. Several strategies and a general platform technology have been developed to print functional hydrogel candidates into 3D-printed all-in-one sensors to monitor physical and biological parameters for sensing and environmental remediation. The developed strategies have led to the fabrication of wearable 3D printed sensors for monitoring UV exposure and, finally, 3D printable adsorbents for heavy metal ion remediation. The results of this work can be used as a universal tool for the processing and utilization of hydrogel-based materials for targeted applications such as tissue engineering, sensing, food industry, or consumer products applications

Friday, July 29, 2022

1:00 PM

Meeting Link:

<https://clarkson.zoom.us/j/98835082508>

Meeting ID: 988 3508 2508

Passcode: 747803