Subject: Dissertation Defense - Hunter Mason, PHD Biosciences
Date: Thursday, June 26, 2025 at 10:25:10 AM Eastern Daylight Time
From: SSB Faculty List on behalf of Diane St. Germain
To: SSB-FACULTY-LIST-L@LISTSERV.GMU.EDU

Dissertation Defense Announcement
To: The George Mason University Community

Candidate: Hunter Mason

Program: PhD in Biosciences

Date: Tuesday July 8, 2025

Time: 12:00 PM Eastern Time (US and Canada)

Location:
In Person – IABR room 1004, Science & Tech campus
And
Virtual via Zoom
Join Zoom Meeting
https://gmu.zoom.us/j/94116721412?pwd=JX6QjOj7EydRGUwkEwnrxD6BnglLMb.1
Meeting ID: 941 1672 1412
Passcode: 189762
One tap mobile
+12678310333,,94116721412#,,,,*189762# US (Philadelphia)
+13017158592,,94116721412#,,,,*189762# US (Washington DC)

Dial by your location
+1 267 831 0333 US (Philadelphia)
+1 301 715 8592 US (Washington DC)
Meeting ID: 941 1672 1412
Passcode: 189762
Find your local number: https://gmu.zoom.us/u/aMpIRS4oz

Committee Chair: Dr. Ramin Hakami

Committee members: Dr. Remi Veneziano, Dr. Alessandra Luchini, Dr. Yuntao Wu

Title: Application of Novel Micro- and Nano-Technologies to Investigate the Immunological Roles of Extracellular Vesicles

Abstract:
Various human pathologies, including infectious diseases, can drastically influence cell-to-

cell communication processes, particularly by altering the properties and exchange of extracellular vesicles (EVs). Thus, the significant role of EVs in facilitating intercellular messaging during various disease states has been heavily investigated, leading to the potential of developing EV-based therapeutics, diagnostics, and vaccines in the future. However, due to their small size, heterogenous composition, and the complexity of the extracellular environment, functional investigation of EV exchange in physiologically relevant conditions is difficult and therefore the understanding of EV function for many diseases is still underdeveloped. To address these obstacles, we have engineered two distinct technologies to facilitate EV research: 1) A microfluidic chip enabling the observation of live EV exchange between co-cultured cell populations; and 2) A DNA origami-based scaffolding capable of coating and targeting EVs to specific cell types. Our microfluidic chip system has been designed to model bidirectional exchange of either EVs, smaller non-vesicular extracellular particles (NVEPs), or small soluble biomolecules. Optimizations were performed, in part using a 3D printing-based prototyping strategy, to further facilitate the capacity of the system for functional EV research. For the encapsulation of EVs by 2D DNA origami nanoparticles (DNA-NPs), we synthesized newly designed NPs and have developed binding and purification procedures. We have also evaluated the potential of functionalizing EV surfaces using modified DNA-NPs.

###