

2018 Fall Chem 501/Haines Morris Seminar



Dr. Dana Spence

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Graduate Studies

Department of Biomedical Engineering Institute for Quantitative
Health Science & Engineering -Michigan State University

Thursday – November 1, 2018

Refreshments 3:25pm, Buehler 513

Lecture at 3:45pm, Buehler 555

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MICHIGAN STATE UNIVERSITY

Hosted by: Graduate TA, Laura Casto

*“Advanced Diagnostics and Therapeutics through Enabling Technologies and
Forgotten Biology”*

The Spence group, housed in the Institute for Quantitative Health Science & Engineering (IQ), currently has 4 core projects under investigation. Broadly defined, these projects are in the fields of (1) diabetes, (2) multiple sclerosis (MS), (3) blood banking, and (4) drug discovery. Admittedly, when listing these areas of interests, one may presume that the Spence group lacks focus as it is not common to find groups interested in, say, diabetes and MS, or diabetes and blood banking. However, in reality, our group's efforts are very focused as each project involves the erythrocyte, or red blood cell (RBC). Most scientists know that the RBC is the most prominent cell type in the bloodstream and even many non-scientists remember from middle school biology that the RBC's main job in vivo is to carry oxygen to demanding tissues and organs. Unfortunately, in this construct, most people view the RBC as a simple, non-nucleated bag of hemoglobin that carries oxygen. In this presentation, I will try to convince those in attendance that the RBC is a key determinant in diabetic complications, especially its role with C-peptide, the 31 amino acid peptide that is co-secreted with insulin from pancreatic β -cells. Interestingly, binding of C-peptide to the RBC is the basis for a new diagnostic for MS currently under investigation in our labs. While a number of measurement schemes (classic scintillation counting, microscopy, mass spec) and methods (ELISA, cell culture, separation science) are used to investigate these problems, it has been our ability to fabricate 3D-printed devices that has advanced our understanding of the molecular level events important to each project. Various enabling technologies from the 3D-printer will be shown throughout the talk, with an emphasis on 3D-printed devices with integrated membranes.

Dr. Spence is a Professor in the Department of Biomedical Engineering in the Institute for Quantitative Health Science & Engineering at Michigan State University. He received his Ph.D. in Analytical Chemistry under the guidance of Dr. Stan Crouch in 1997 and has been a faculty member at Saint Louis University and Wayne State University.