UCSD Jacobs School of Engineering | NANOENGINEERING

Diana Dehaini Dissertation Defense
NanoEngineering Ph.D. Candidate
Zhang Nanomedicine Lab

"Biomimetic Nanoparticles for Targeted Delivery and Removal"

PI: Dr. Liangfang Zhang

Thursday, February 28, 2019
12:00p.m.
ASML Conference Center (SME 248)

Abstract: Nanoparticle drug delivery has revolutionized disease treatment over the last decade. Nanoparticles can be tailored to specific applications through their size, shape, and surface design. Recently, significant efforts have been put into creating new cell membrane coatings for nanoparticles. Cell membrane can be used as a biomaterial to "cloak" particles, endowing them with the surface properties of the parent cell. Each cell type in the body has a distinct surface structure with lipids, proteins, and receptors perfectly tailored to its purpose and location. Some of these surface structures have well known purposes such as immune evasion or specific receptor targeting, while some are yet uncharacterized but potentially important. The properties of these surface structures can be retained by using the entire cell membrane as a biomaterial. The biomimetic techniques developed during this PhD range from novel formulations of classical small molecule receptor targeting for cancer therapy, to new methods of utilizing a fusion of two different cell membranes to create custom-tailored targeting. Firstly, we will discuss how biomimetic techniques were used to target nanoparticles loaded with chemotherapeutics to cancer. Secondly, we will discuss targeted delivery of antibiotics to infectious diseases, and the ability of cell membranes to sequester and remove toxins produced by bacteria. Thirdly, we will discuss a novel cell membrane fusion technique developed to combine properties from multiple cell types.

Bio: Diana Dehaini is a San Diego native born at UCSD medical center, and earned a BS (2014) and MS (2016) in Nanoengineering at UCSD. She has over seven years of experience in the Zhang Nanomedicine Lab designing targeted drug delivery platforms using cell membrane cloaking technology.