Analytical Chemistry Seminar

Tuesday, January 30, 2024
3:30 p.m. ~ WTHR 320

"Taking Advantage of Multiphase Systems: Biphasic Electrodeposition"

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Abstract:

Gold has many exciting properties that justify its use in a wide range of applications. While gold nanoparticles are frequently used, nanoring's offer an interesting new geometry. Unfortunately, few technologies exist to fabricate nanorings, which are often created by multistep lithographic methods. Furthermore, nanoring arrays are even more difficult to achieve. Herein, a one-step, one-pot electrodeposition method to realize arrays of gold nanorings with tunable parameters is demonstrated. It is shown that the electrodeposition of gold nanoring arrays can be easily achieved when one submerges a water droplet containing HAuCl4 into an oil-phase containing a quaternary ammonium salt. These conditions allow for spontaneous emulsification at the water|oil interface. The nanorings can be deposited at the edges of the emulsion droplets that become adsorbed to the electrode. Changing the concentrations of species, submersion time, and electrodeposition parameters allows us to tune relevant parameters of the array of nanorings, including the thickness and size of the rings.

Bio: Guillermo S. Colón Quintana is a 4th-year graduate student in Dr. Jeffrey Dick's lab. He graduated from the University of Puerto Rico - Rio Piedras Campus in 2020, where he obtained a bachelor's degree in chemistry. At the University of Puerto Rico, he worked in Dr. Cabrera's lab, focusing on the development of interdigital electrodes for telomerase sensing and cancer detection, with secondary projects focusing on the electrodeposition of novel catalysts for fuel cell use. Finally, He spent two years at UNC Chapel Hill under Dr. Jeffrey Dick before moving to Purdue to continue his research in fundamental electrochemistry and electrodeposition behavior, obtaining a master's degree in the process

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