



Dr. Rajarshi Chattaraj

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11:30am - 1:00pm

CKB 303

Self-Assembled Colloids and Nanostructures for Treatment of Traumatic Brain Injury and Infectious Disease

Abstract:

Traumatic Brain Injury (TBI) causes tens of thousands of children to be hospitalized per year in the US; it leads to impairment of brain development, speech, and cognitive expression. Treatments involve either therapy (mild injury) or surgery (severe). There is a critical need for in-between treatments to stop secondary injury/edema. In recent years, the 5th noble gas, xenon, has emerged as a unique therapeutic for acute brain injuries. Xenon is postulated to inhibit certain glutamate receptors, thus interrupting excitotoxic cascades that cause cell death. However, systemic xenon inhalation can be prohibitively expensive and exceedingly wasteful of a rare gas. This talk will largely focus on xenon encapsulating microbubbles for image-guided local gas delivery to the brain via clinical ultrasound. Challenges of xenon bubble production using phospholipids and their therapeutic effect on TBI in a pig model will be discussed, demonstrating the feasibility of neuroprotection using a side-effect free colloidal system controllable by a non-invasive ultrasound technique. Additionally, this talk will briefly delve into a separate topic involving a distinctive class of recombinant protein, called Oleosin, that can spontaneously self-assemble like free-chain surfactants into structures like microbubbles, droplets, micelles, and vesicles.

About the Speaker

Rajarshi Chattaraj is a Postdoctoral Research Fellow in Chemical and Biomolecular Engineering at the University of Pennsylvania. He received his Ph.D. from University of Colorado, Boulder in 2018 in the lab of Andrew Goodwin. Dr. Chattaraj's work has been featured in reputed journals; he has given invited talks in academic conferences and is currently an AIChE Future Faculty Mentee. In his current position in the labs of Daniel Hammer and Daeyeon Lee, Dr. Chattaraj works on the interfacial and genetic design of colloids and nanostructures for healthcare applications.