

**7th Annual LLNL/LPC Science and Engineering Seminar Series
Theory to Practice: How Science Gets Done**

Building Biologically Inspired Nano-Bots

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Tuesday, March 7th 2017

6:00-7:15pm

Building 2400, Room 2420

Free and Open to the Public

Abstract: This seminar will discuss the use of both synthetic and molecular biology approaches to produce small nano-machines, termed nano-bots, with defined and measurable functionalities. The main building block for these nano-bots is based on nano-lipo-protein particles (NLPs). These NLP particles are made up of a lipid raft surrounded by protein that naturally exists in the human body to transport cholesterol. Dr. Matthew Coleman and Dr. Amy Rasley's team has developed a unique process to make engineered particles that represent the basic building blocks of their nano-robots. Functionality is imparted through modifying the surface of the particle or by embedding or attaching additional biomolecules with specific activity. The process of making the NLPs is simple and is easily adapted to building higher complex machines to meet multiple health and biosecurity challenges. These NLP based nano-bots represent a unique solution for new approaches to vaccines, drug delivery and energy needs. Nano-machines can also facilitate biochemical studies to characterize the function and structure of biomolecules that have been, to date, difficult to obtain.



Dr. Coleman is a Senior Biomedical Staff Scientist at Lawrence Livermore National Laboratory and an Adjunct Professor in the Department of Radiation Oncology at University of California Davis School of Medicine. He received his Ph.D. in Molecular Biochemistry and Cellular Biology from Boston University. Dr. Coleman has authored over 100 publications in peer-reviewed journals, published proceedings and book chapters covering a diverse breadth of molecular biology and biochemistry. Dr. Coleman is active in the development of advanced biochemical techniques using nanoparticles.



Dr. Rasley is a Senior Staff Scientist working in the Host-Pathogen Biology Group within the Biosciences and Biotechnology Division at LLNL. Dr. Rasley received her B. S. in Zoology from Weber State University in Utah and Ph. D. in Immunology from the University of North Carolina at Charlotte. Her past research efforts during her Ph.D. and postdoctoral tenures focused on understanding the initiation of innate immune responses within the central nervous system during bacterial and viral infections. Currently, Dr. Rasley's work has been largely focused on the use of a nanoparticle platform for immune modulation strategies aimed at mitigating or preventing infection, including vaccines and adjuvant systems.