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Friday, November 13 | **ZOOM** | 10:00-11:15 AM

Title | Nanomaterials Chemistry Approaches to Address Health and Energy Challenges

Abstract | Our planet is populated by an estimated 7.3 billion, highly interacting individuals, who are, at least in the first world countries, enjoying longer, hyperconnected, and comfortable lives. These facts bring substantial strain to the healthcare systems, as people are more exposed to both communicable and non-communicable diseases. In stark contrast, communities in developing and low-income countries have limited access to healthcare and are often exposed to communicable diseases, sometimes of zoonotic origin, in addition to being unable to rely on sufficient screening for other non-communicable diseases, such as cancer. Similarly, while people in high income countries are putting substantial strain on energy resources, villages in low income countries are completely off the grid. Therefore, there is the need to address healthcare and energy issues for both the rich and the developing countries, taking into account how approaches that could be effective for the rich world have to be made substantially cheaper, rugged, and portable to address the needs of low-income countries. In my talk, I will discuss how my group has been addressing these needs by leveraging lessons from nanomaterials chemistry, intertwined with inputs from physics, biology, and medicine. I will present our holistic computational and experimental approach to rationally design novel gold nanoparticles and describe how these particles can be employed to solve medical and energy problems. For instance, I will show how they can be used to quantify cancer cell phenotype at the single cell level and in tissue microarrays by means of surface enhanced Raman spectroscopy (SERS), to understand influenza A virus mutations in single intact cells, and to increase the rates of hydrogen evolution via photocatalytic spitting of water through near infrared light absorption. Taken together, these initial successes promise to bring a nanomaterials chemistry contribution to solving current and future healthcare and energy needs.

Bio | Dr. Laura Fabris is an Associate Professor of Materials Science and Engineering at Rutgers University. Prior to joining Rutgers in 2009, she was a post doc in the Department of Chemistry and Biochemistry at the University of California Santa Barbara. Dr. Fabris earned both her B.S./M.S. and Doctorate Degrees in Chemistry from the University of Padova, Italy. Her research aims at rationally designing plasmonic nanomaterials, employing both experimental and computational approaches, to address biologically- and medically-relevant questions and, most recently, to design efficient nanostructured photocatalysts.

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