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FROM SUSTAINABLE AND CONTINUOUS METAL NANOSTRUCTURE MANUFACTURING TOWARDS FUTURE NANOTHERAPY BIOMANUFACTURING

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Abstract: The research in our group centers on the continuous millifluidic green and sustainable synthesis of metal nanostructures, particularly targeting silver nanowires (AgNWs) and palladium nanorods (PdNRs). The novelty of the proposed millifluidic reactor extends beyond these materials, offering a versatile platform for synthesizing various nanomaterials. The focus of the presentation is to highlight the innovative millifluidic manufacturing platform, transitioning seamlessly from metal nanostructure manufacturing to a continuous biomanufacturing process for producing therapeutic nanoparticles (NPs). The envisioned process involves the encapsulation of proteins, plasmid DNA, or mRNA within polymer or lipid NPs, presenting a promising avenue for the continuous and efficient manufacturing of drug delivery vectors.

Bio: Dr. Shohreh Hemmati is an Assistant Professor of Chemical Engineering at Oklahoma State University (OSU). She joined OSU in 2018 after completing her Postdoctoral research at Purdue University. Dr. Hemmati earned her Ph.D. in Chemical Engineering in 2016 from the University of New Hampshire. Her academic journey also includes an M.S. in Energy Engineering from Sharif University of Technology in 2009, where she later worked as a Research Scientist from 2009 to 2012. She began her academic path with a B.S. in Chemical Engineering.

Dr. Hemmati's primary research interests center around green nanotechnology and nanomanufacturing. Specifically, her work is dedicated to the synthesis of metal nanostructures, emphasizing their green and sustainable production through millifluidic techniques. Her unique approach integrates machine learning to achieve precise control over the size and morphology of these structures. Dr. Hemmati's research is predominantly funded by the National Science Foundation (NSF).