Dielectrophoretic Trapping of Nanoparticles with Carbon Nanofiber Mats

Hannah Stanley[1], Tonoy Kumar Mondal[2], Hunter J. West[2], Stuart J. Williams[2]
[1]Georgia Institute of Technology, College of Engineering
[2]University of Louisville, Mechanical Engineering Department

Abstract (in 12 Pt Arial Font)

Trapping nanoparticles smaller than 200 nm has posed considerable challenges in current methodologies. However, our research has turned towards using dielectrophoresis (DEP) to accomplish this task. DEP leverages non-uniform electrical fields to effectively trap polarizable particles. In our design, we aim to significantly augment the volume of liquid at an accelerated flow rate of mL/min, as compared to the conventional μL/hour in typical DEP devices. To capture these nanoparticles, it is imperative to generate large field gradients, necessitating the utilization of conductive nanofiber mats that will be separated with an insulative membrane. This design will be securely housed within a 3D printed beaker that can quantify nanoparticle trapping. Initial testing will involve the utilization of 210 nm fluorescent particles in static fluid before using a flow through device. There will be repeated tests at different voltages and AC frequencies. By adopting this methodology, we hope to see our device to be successful in trapping these nanoparticles.

Biography of Presenter

Hannah Stanley will be an incoming freshman at the Georgia Institute of Technology having just graduated from the Craft Academy for Excellence in Science and Mathematics at Morehead State University where she earned the Presidential Scholar Award. She is currently a student researcher at the University of Louisville's IMPACT-NG REU.