

Title: NER: Directed Assembly of Microscopic Wires from Semiconductor Nanoparticles

Granting Agency: The National Science Foundation

Award Number: DMI-0304413

Award Amount: \$47,255.00

Person-Months per Year: 1 month

Project Summary: Employing the biological principles of *spontaneous assembly* in the formation of targeted nanostructures holds promise as a revolutionary approach to shrinking the dimensions of electronic components down to (as low as) the diameter of the building block (~3nm). This project focuses on methods for externally directed, spontaneous assembly in 2D populations of semiconductor nanoparticles. The *objective of this project* is to form microscopic interconnects between both pre-designated and arbitrarily chosen points in a circuit. The key to rationally designing methods for achieving this objective is a working knowledge of the interparticle potential, which is largely uncharacterized for systems of semiconductor nanoparticles. Therefore, this study seeks knowledge of how the experimental parameters can be used to tailor the phase structure (specific aim #1). A particular aim is to induce the formation of wires of microscopic diameter and arbitrary length (specific aim #2). These studies will facilitate the development of methods for externally interacting with the population, which will advance this research effort towards the *long-term goal* of using spontaneous assembly in the assembly of nanoscopic electronic components.

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