

Post Doctoral Research Opportunities at the NIST Combinatorial Methods Center

National Institute of Standards and Technology, Gaithersburg, MD

The **NIST Combinatorial Methods Center (NCMC)** is an exciting place to pursue Postdoctoral research, and to gain valuable experience in the development and application of combi and high-throughput methodologies for materials science. Known worldwide for innovative combi measurement solutions, the NCMC also provides ample opportunities for career networking, in both academia and industry. Indeed, knowledge of and experience in combinatorial research methods are increasingly desired in faculty and industrial job postings, and these skills will change the way you look at research! To date, more than 25 NCMC Postdoctoral researchers have gained top positions in industry, at universities, and in government. Postdoctoral positions are available for U.S. citizens and non-U.S. citizens, with salaries starting at \$50,000/year, and tenures of 2 years. **Specific research opportunities are listed below.**

Combinatorial Methods for Nanoparticle-laden Films and Formulations

Two Positions: Postdoctoral Researchers

Tenure: 2 years

Project Description: A wide range of technologies, from advanced coatings to cosmetics, are multicomponent complex fluids formulated from a diverse set of liquids, polymers, surfactants and particles. To achieve tailored properties and to enhance performance, current technologists are focusing in fluids formulations that evolve nanoscale structuring through self-assembly (e.g. micelles, microemulsions) or through the application of nanoparticle additives (both inorganic and organic). These new systems exhibit very complex structures and behaviors that are governed by a huge number compositional and processing parameters. Accordingly, at the NCMC we are developing combinatorial measurement approaches that will help accelerate the discovery, optimization and science of nanostructured complex fluid. Postdoctoral research in this position will develop and apply new, essential, techniques for fabricating combinatorial libraries of film or fluid materials that incorporate polymer, functionalized nanoparticles, and surfactant additives. These techniques will advance and employ automated liquid handling, new deposition techniques that leverage direct write and inkjetting technologies, and microfluidics; with the aim of producing sample arrays that are amenable to high-throughput analysis by x-ray scattering, polarized light microscopy and fluorescence measurements. Researchers on this project will have a prime opportunity to extend combinatorial techniques to this emerging class of formulations.

Desired Expertise Position 1: Polymer thin films. Functionalized nanoparticles. Surface functionalization. X-ray scattering of polymer film systems. Atomic Force or Electron Microscopy. Experience in film deposition techniques.

Desired Expertise Position 2: Complex Fluids. Polymer solution properties. Dynamic and Static Light Scattering. Functionalized nanoparticles. Experience with automated liquid handling and dispensing equipment or microfluidics.

Complex Interfaces

Position: Postdoctoral Researcher

Tenure: 2 years

Project Description: New technologies, such as flexible electronics and sensors, consist of hierarchical structures fabricated out of combinations of both soft and hard materials, with each material type lending unique properties and performance characteristics to the final integrated system. This complexity is especially apparent in systems where a large number of materials (e.g., polymers, metal, ceramics, biomaterials) having disparate properties are assembled together or when the interfaces in these systems display the patterned and confined geometries inherent to device technologies. The goal of this project is to merge high-throughput measurement methods with combinatorial library design to elucidate the role of surface properties, interfacial interactions, and material properties on the interfacial strength and adhesion at complex interfaces. Moreover, hybrid approaches based on merging combinatorial libraries and design of experiments will allow multidimensional parameter space to be explored in new and unique ways.

Desired Expertise: Interfacial adhesion, contact & fracture mechanics, surface chemistry functionalization and characterization. Interest in application technologies such as flexible electronics.

If you are interested in any of these positions, please send a resume and cover letter to NCMC Director, Michael Fasolka, mfasolka@nist.gov.

For more information on the NIST Combinatorial Methods Center, see the NCMC website: <http://www.nist.gov/combi>

Other research opportunities in the NCMC can be found in on the [National Research Council's Associateship Web site](http://www7.nationalacademies.org/rap/) (<http://www7.nationalacademies.org/rap/>.) Search for the keyword, "combinatorial." *The NRC Post Doctoral Fellowship program is limited to US Citizens.*