Overview of Strategic and Trusted Microelectronics Divisions of the Naval Surface Warfare Center, Crane

and

A Colloidal Nanocrystal Approach to Fighting Counterfeit Products

Engineers from NSWC Crane will present the technical concepts of the Strategic and Trusted Microelectronics Divisions. Unique capabilities to be discussed include rad-hard design IV&V; radiation testing of strategic electronics; trusted microelectronics, failure/materials analysis, and counterfeit detection; component obsolescence management; component test and evaluation; component qualification; and radiation effects modeling.

The division overview will be followed by a technical talk on engineering nanocrystals to fight counterfeit products. Globally, the trade of counterfeit goods has an estimated economic impact upwards of $USD 1.7 trillion annually as reported by the Business Action to Stop Counterfeiting and Piracy (BASCP). Counterfeit goods are pervasive across an array of markets, including apparel, currency, fuels, automotive components, pharmaceuticals, and microelectronics. In addition to the economic fallout from brand protection concerns, counterfeit goods in the latter two categories can have severe adverse secondary effects. For example, counterfeit pharmaceuticals have been coined ‘‘murder by medicine’’ as they pose public health risks. Additionally, counterfeit microelectronics have been both found in the supply chain of and deployed in critical devices resulting in, for example, the failure of a communications satellite. Collectively, these adverse economic, device reliability, and health effects of counterfeit goods create a great demand for anti-counterfeit approaches. We present such an approach by demonstrating that the far-field scattering of randomly deposited colloidal nanocrystals (NCs) serve as a physically unclonable optical function for anti-counterfeit applications in which the scattering patterns are easily produced yet impractical to replicate. The facile deposition method coupled with the intense scattering and optical response of metal NCs provide physically unclonable features with the ability to serve as authentication and tamper-evident labels.

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Speaker: Alison F. Smith, PhD

Dr. Alison F. Smith is the seminal Chief Engineer of Materials Analysis for Microelectronic Component Technologies within Flight Systems Division at NSWC Crane, where she is responsible for maintaining state of the art materials analysis capabilities including: developing and executing capital investment and human resource strategies, shaping R&D investments and collaborations, and developing technical rigor processes and standards. She is also a practicing Materials Scientist and Researcher with a focus on utilizing nanoscale engineering to support the Strategic Systems Programs of the United States. Dr. Smith has almost two decades-worth of R&D experience in materials analysis, microanalytical devices, and materials design. By collaborating with academia, she is able to provide the DoD enhanced capabilities for structural health monitoring, lifetime prediction and extension, and anti-counterfeit strategies through the design of various nanomaterial platforms. In 2018, she became the first alumna from the College of Science & Technology to be selected for the Distinguished Alumni Award by her alma mater, Southeastern Louisiana University, and is also the first DoD recipient of the Samuel J. Heyman Service to America (more commonly referred to as the "Sammies" and regarded as the “Oscars” of Public Service) People’s Choice Award. In addition to her R&D career in materials analysis and design, she also served as NSWC Crane’s first STEM Director, a role in which she forged regional partnerships to build and grow an award-winning K-12 STEM program for the region. She also serves on the Naval Innovative Science & Engineering (NISE/219) selection panel within the Strategic Systems Hardware Working Group to align NSWC Crane strategic initiatives with R&D project execution and continuously serves to develop new-hires and graduate students within both NSWC Crane and academia.

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