Biotechnology for Non-Medical Army Applications

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ABSTRACT:

This talk will provide an introduction to the work being done in the Optics Branch of the Sensors & Electron Devices Directorate of ARL.

An important aspect of our efforts is research into improved methods and technologies for the detection of hazardous materials on the battlefield. These methods include optical (fluorescence and Surface enhanced Raman spectroscopy) and electrochemical techniques. This work involves a number of university partners and the Institute for Collaborative Biotechnologies. We have also begun efforts examining the feasibility of biological power generation methods such as microbial fuel cells that can convert waste directly to electrical power. We are beginning to investigate biologically-directed or templated assembly of metallic and semi-conductor structures for modern electronic applications. This work takes advantage of the unique capability of biological systems to self-assemble into complex structures.

I will briefly describe our research in enabling technologies to improve high energy lasers (HEL) in terms of beam quality, thermal management and power to permit development of compact HEL sources that can be easily transported on the battlefield for counter-rocket, artillery, and mortar missions. These developments are partially funded by the Joint Technology Office for High Energy Lasers, our mission programs, and collaborative efforts with major defense contractors.

This talk will highlight opportunities for cadet involvement through the summer AIAD program and on-going collaborative efforts with faculty to involve them and cadets in research during the academic year. We have successfully worked with both cadets and faculty over the last several years to involve USMA personnel in our research efforts.

KEYWORDS: High energy lasers, thermal management, optical beam quality, biosensors, fluorescence, Surface enhanced Raman spectroscopy, electrochemical biosensors, microbial fuel cells, biological self-assembly

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