

Creating Nano-technology for Early Cancer Detection



Viktor Gruev

Assistant Professor, Computer Science and Engineering

CURRENT RESEARCH

Drawing inspiration from natural vision systems to improve medical optical equipment

Dr. Viktor Gruev is intrigued by medical research, a field in which he hopes his engineering background will help in potential breakthroughs. He has particular excitement towards the field of neuroimaging, which he believes is on the verge of great discoveries.

Nearly a billion years of evolution have led nature to develop a variety of complex and extremely efficient sensory systems. Dr. Viktor Gruev of Washington University in St. Louis realizes the advances natural systems boast and is working to draw inspiration from nature to develop more efficient and effective low-power integrated sensory systems. These imaging sensors integrate new nanomaterials with standard vision equipment, like a cell-phone camera, to create compact, ultra-sensitive imaging devices. These devices have both pre- and postoperative applications, and are typically attached a nano-meter thick to existent medical devices like endoscopes to give surgeons a wider range of visual capabilities before, during, and after surgeries.

Dr. Gruev has developed his sensory systems based on the inspiration from a variety of natural vision systems in the animal kingdom. With slight variations to the cameras and nano-cells, Dr. Gruev is able to specialize his equipment to perform functions that tackle multiple distinct medical issues. Leading research is concentrated on three vision systems:

- Drawing inspiration from the visual system of the "mantis shrimp," which is able to detect 22 visual channels, Dr. Gruev has designed artificial material able to detect color, polarization and spectral information at high resolution in real time. The system uses nano-technology that is placed upon endoscopes or cell-phone cameras....

AFFILIATION



Washington University

EDUCATION

- Ph.D. in Electrical and Computer Engineering 2004 , Johns Hopkins University
- M.S. in Electrical and Computer Engineering 2000 , Johns Hopkins University
- B.S. in Electrical Engineering 1997 , Southern Illinois University

RESEARCH AREAS

Life Science, Oncology / Cancer, Oceanic, Oncology / Cancer

FUNDING REQUEST

Dr. Gruev's work is reaching high levels of maturity, but requires further funding to make it more robust and fully functioning. Donation dollars will be directed towards improving the engineering of these sensory systems to enable them to be used independent of engineering assistance. Funding for clinical trials will provide useful information on how to make these devices not only more user-friendly for the surgeon, but more effective for patient and surgeon alike.

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