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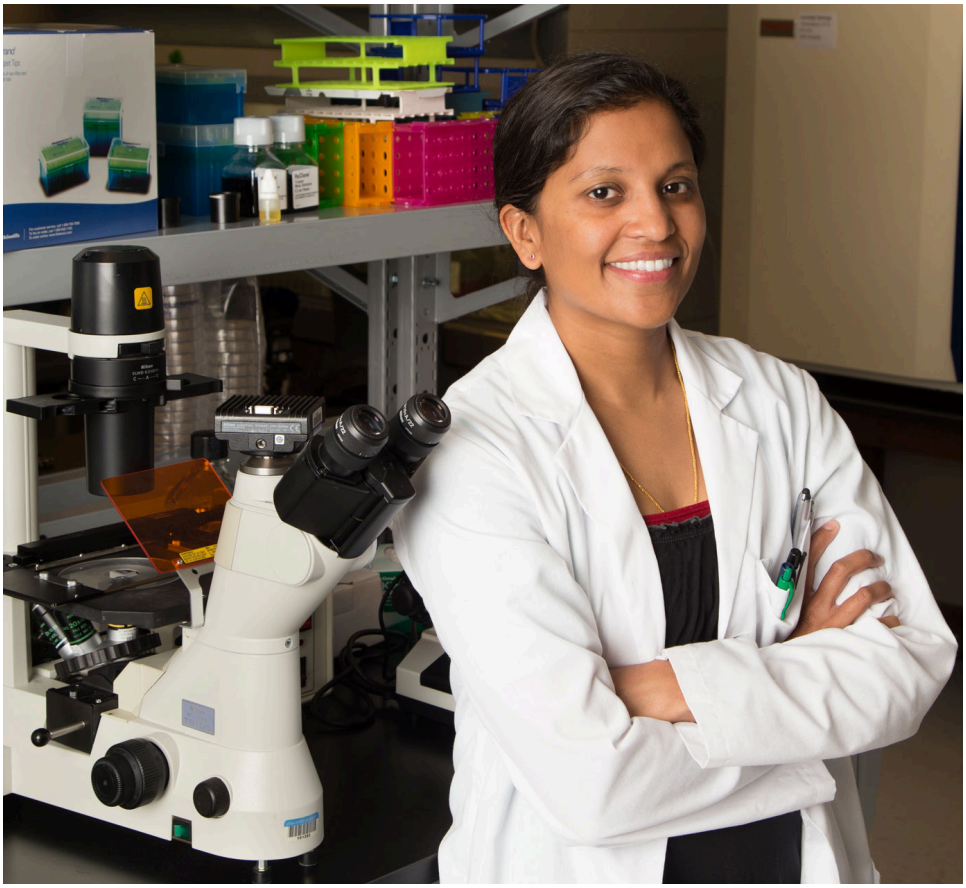
Vision: An Engineer's Tool in the Fight Against Eye Disease | College of Engineering

11/05/2015

Nov. 5, 2015 - If you've seen the latest news headlines about Dr. Elizabeth Vargis, you'd think she was an ophthalmologist – a medical expert on vision-related disease and treatment. But Vargis is no physician. She's an engineer – pure and simple.



Hired in 2013, Vargis is the newest assistant professor to join the Biological Engineering Department. She and her team of student researchers are using nanoscale engineering tools to better understand biological phenomena and leading a new study to combat eye disease.

In one study, Vargis is building nano-scale models of retinal disease to explore how age-related macular degeneration affects eye tissue. Unlike normal cell behavior, cells impacted by macular degeneration start a domino sequence that causes neighboring cells to die. The size of the diseased areas can affect how powerful this chain reaction is. By controlling the exact size and location of cells within her in vitro disease models, Vargis can evaluate cell behavior and possibly identify a method to reverse the disease or prevent its escalation.

"As an engineer, we have the tools and expertise to really change how biological and biomedical problems are solved," she said. "I'm thrilled that we will be using our methods to better understand retinal disease."

“Elizabeth Vargis, right, and Ph.D. student Cindy Hanson are leading innovative studies in eye disease research and Raman Spectroscopy.”

The Vargis Lab is using similar technology to model an often blinding eye disorder found in premature infants. Retinopathy of prematurity usually develops in both eyes and can lead to lifelong vision problems and blindness. This exciting research has support from the Knights Templar Eye Foundation which contributed $60,000 to help Vargis fund the next stage of research in her ongoing work to combat vision-related disorders.

Vision health isn’t the only line of work at Vargis’ Lab. Ph.D. student Cindy Hanson, is implementing USU’s Raman microscopy system for biological detection. Her work involves detecting and identifying bacteria using Raman spectroscopy in conjunction with dielectrophoresis. For her commitment to the field of biological and optical engineering, Hanson was awarded a 2015 Optics and Photonics Education Scholarship by SPIE, the international society for optics and photonics.