Company Overview

SphereVis LLC is developing a simple, generic, optical super-resolution method of imaging biological and photonic structures that can overcome the spatial resolution limitations of microscopes. The technology SphereVis is developing can provide two- to three-fold enhanced spatial resolution capabilities.

Product

The imaging resolution of a standard optical microscope is limited to ~250 nm. Improved optical imaging resolution would enable better intra-cellular imaging for medical diagnoses and therapies. Our company is developing novel microscope cover slides composed of arrays of high-index microspheres embedded in elastomers, such as Polydimethylsiloxane (PDMS). When the cover slides are placed over the specimen, each microsphere acts as an auxiliary lens that collects the information about the sub-diffraction-limited features of the specimen and transmits them to the microscope objective lens, enhancing the spatial resolution provided by the users’ current microscopy setup by a factor of at least two to three. In addition to medical research and clinical diagnostic applications, this technology can be used for forensic imaging, materials surface characterization, spectroscopy, nanopatterning, and industrial manufacturing [QA departments].

Competitive Advantage

Our improved-resolution imaging method is advantageous in terms of its inherent simplicity and cost-effectiveness. Our method is considerably less expensive than adding a high-resolution optical lens to an existing microscope, or purchasing a very expensive fluorescent super-resolution imaging microscope. In addition, our method eliminates the need for oil-immersion to achieve high resolution. Our microsphere-immersed solid films can be prefabricated and used as cover slips and imaging can be performed by both upright and inverted microscopes.

Team Information

Alejandro Carabe-Fernandez, PhD, is a Co-founder of SphereVis and an Assistant Professor at the University of Pennsylvania School Of Medicine. He is an expert in medical and clinical physics.

Arash Darafsheh, PhD, is a Co-founder of SphereVis and a Postdoctoral Research Fellow at the University of Pennsylvania. He is an expert in the field of microsphere-assisted super-resolution imaging technology.

Consuelo Guardiola Salmeron, PhD, is a co-founder of SphereVis and a Postdoctoral Research Fellow at the Perelman Center of Advanced Medicine at University of Pennsylvania School of Medicine. She is an expert in microelectronics and particle physics.

Gary D. Fletcher, PhD, is the manager of SphereVis and an R&D leader experienced in medical device new product development. He has expertise in determining customer needs, assessing new technologies, and building and managing product development teams.

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