# BIOMEDICAL & SENSORS FRONTIERS

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***Publications***

*1. Nair A, Liu CH, Singh M, Das S, Le T, Du Y, Soomro S, Aglyamov S, Mohan C, Larin KV. Assessing colitis ex vivo using optical coherence elastography in a murine model. Quantitative Imaging in Medicine and Surgery 2019;9(8):1429-40.*

*2. Liu C-H, Nevozhay D, Zhang H, Das S, Schill A, Singh M, Aglyamov S, Sokolov KV, Larin KV. Longitudinal elastic wave imaging using nanobomb optical coherence elastography. Optics Letters 2019;44(12):3162-65.*

*3. Larin KV, Zhu D, Priezzhev A, Sampson DD. Recent progress in optical probing and manipulation of tissue: introduction. Biomedical Optics Express 2019;10(10):5159-61.*

*4. Liu C-H, Nevozhay D, Schill A, Singh M, Das S, Nair A, Han Z, Aglyamov S, Larin KV, Sokolov KV. Nanobomb optical coherence elastography. Optics Letters 2018;43(9):2006-9.*

*5. Larin KV, Sampson DD. Optical coherence elastography - OCT at work in tissue biomechanics [Invited]. Biomedical Optics Express 2017;8(2):1172-202.*

*6. Liu C-H, Assassi S, Theodore S, Smith C, Schill A, Singh M, Aglyamov S, Mohan C, Larin KV. Translational optical coherence elastography for assessment of systemic sclerosis. Journal of Biophotonics 2019;0(0):e201900236.*

*7. Larin K. Dynamic optical coherence elastography: Emerging tool for noninvasive quantification of mechanical properties of ocular tissues. The Journal of the Acoustical Society of America 2019;145(3):1675.*

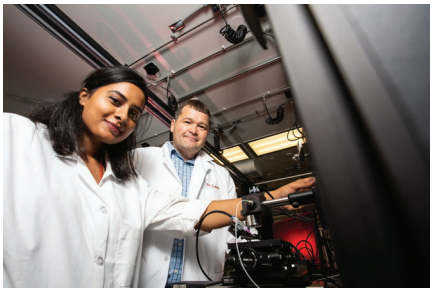
***Patents***

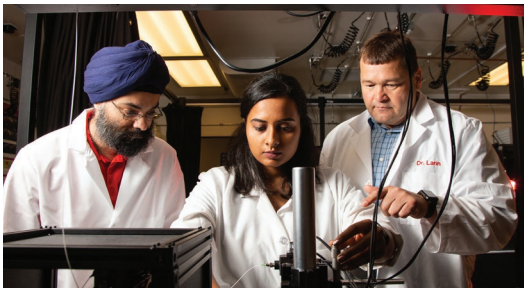
*1. US Patent No. 10,405,740; Optical Coherence Elastography to Assess Biomechanics and Detect Progression of Ocular and Other Tissues Degenerative Disease.*

*2. US Provisional Patent Application No.62/851,149; Assessment of Systemic Sclerosis by Optical Coherence Tomography and Optical Coherence Elastography.*

Dr. Larin holds a Masters degree in Laser Physics and Mathematics from Saratov State University in Russia and a Masters degree in Cellular Physiology and Molecular Biophysics and a Doctorate in Biomedical Engineering from the University of Texas Medical Branch in Galveston. He is the recipient of several international and national awards for his significant contributions in optics: Presidential Award from Russian President Boris Yeltsin, Wallace Coulter Young Investigator Translation Award, Office of Naval Research Young Investigator Award, Outstanding Young Investigator Award from the Houston Society for Engineers in Medicine and Biology, and Herbert Allen award from American Society for Mechanical Engineers. He is a Fellow member of The Optical Society (OSA) and SPIE, the international society for optics and photonics.

Under the direction of Dr. Larin, the Biomedical Optics Laboratory has successfully developed new and improved methods that utilize imaging technologies such as optical coherence tomography, optical coherence elastography, Brillouin spectroscopy, and multi-photon light sheet microscopy for tissue structural and functional imaging. These new methods have provided minimally invasive, reliable and accurate assessment of optical and biomechanical properties of tissues in diseases, such as Ulcerative Colitis, Acute Glomerulonephritis and Systemic Sclerosis. Dr. Larin has published extensively on these new methods of optical imaging and holds a patent for one of these optical imaging methods.





## ULCERATIVE COLITIS (UC)

UC causes regions of ulceration within the interior of the colon. Dr. Larin's laboratory has demonstrated the use of optical coherence elastography (OCE) to distinguish between healthy and colitis-diseased murine colon tissue that exhibit lesions that are very similar to human inflammatory bowel disease.

## ACUTE GLOMERULONEPHRITIS

Acute glomerulonephritis can arise from multiple triggers that include anti-glomerular basement membrane immune attack. Dr. Larin's laboratory has demonstrated the use of minimally invasive optical coherence tomography (OCT) combined with optical coherence elastography (OCE) to distinguish nephritic kidneys from healthy kidneys with 95% prediction accuracy.

## SYSTEMIC SCLEROSIS

Systemic sclerosis (SSc-scleroderma) is associated with widespread fibrosis in the skin and internal organs and high morbidity and mortality. Dr. Larin's laboratory has demonstrated use of optical coherence tomography (OCT) and optical coherence elastography (OCE) for a safe, rapid, and accurate assessment of skin fibrosis in SSc. This technology outperforms the current gold standard, modified Rodnan skin score, for correlation with histological dermal thickness in the forearm area.

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