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JOSEPH A IZATT, PROFESSOR

Biophotonics is concerned with the application of cutting-edge optoelectronic technologies to problems in the biomedical sciences. My research centers on the application of optical technologies for non-invasive, high-resolution imaging and sensing in living biological tissues. The technologies we use in my laboratory include acousto-optic and integrated-optic devices, femtosecond lasers, and ultrabroadband fiber optic telecommunications equipment. The applications of the systems we build include noninvasive medical diagnostics, in-vivo tomographic microscopes, and high-throughput three-dimensional small animal imaging systems for genomics studies. Our work involves multiple collaborations with engineers, biologists, and physicians at Duke and elsewhere.

Contact Info:

Office Location: 2573 CIEMAS
Office Phone: (919) 660-5128
Email Address: [redacted]
Web Page: http://www.fitzpatrick.duke.edu/biophotonics

Education:

PhD, Massachusetts Institute of Technology, 1991
SM, Massachusetts Institute of Technology, 1988
SB, Massachusetts Institute of Technology, 1986

Specialties:

Medical Imaging
Photonics
Medical Diagnostics

Research Interests:

Professor Izatt's research interests are in the area of biophotonics and include coherence-based biomedical imaging and microscopy, novel technologies for ophthalmic imaging, and nanoscale studies of cellular morphology and dynamics.

Areas of Interest:

Optical coherence tomography and microscopy
Ophthalmic imaging technology
Field-based optical microscopy at the nanoscale
Laser-tissue interactions
Optical and ultrasonic signal processing
Novel methods for high-resolution minimally invasive medical imaging and tissue characterization

Awards, Honors, and Distinctions

Fellow, American Institute for Medical and Biological Engineering, 2007
Fellow, Society of Photo-Instrumentation Engineers (SPIE), 2008
NSF Early CAREER Award, National Science Foundation, 1996-2000
Fellow, American Society for Laser Medicine and Surgery, 1995

Recent Publications (More Publications)

1. A. Davis and J. Izatt and F. Rothenerg, *Quantitative Measurement of Blood Flow Dynamics in Embryonic Vasculature Using Spectral Doppler Velocimetry*, Anatomical Record-advances In Integrative Anatomy And Evolutionary Biology, vol. 292 no. 3 (March, 2009), pp. 311 -- 319 [abs].
2. S. Asrani and M. Sarunic and C. Santiago and J. Izatt, *Detailed visualization of the anterior segment using Fourier-domain optical coherence tomography*, Archives Of Ophthalmology, vol. 126 no. 6 (June, 2008), pp. 765 -- 771 [abs].
3. C. S. Johnson and S. I. Mian and S. Moroi and D. Epstein and J. Izatt and N. A. Afshari, *Role of corneal elasticity in damping of intraocular pressure*, Investigative Ophthalmology \& Visual Science, vol. 48 no. 6 (June, 2007), pp. 2540 -- 2544 [abs].
4. Ellerbee, Audrey K. and Izatt, Joseph A., *Phase retrieval in low-coherence interferometric microscopy*, Optics Letters, vol. 32 no. 4 (2007), pp. 388 - 390 [OL.32.000388] [abs].
5. A. Louie and J. Izatt and K. Ferrara, *Biomedical imaging graduate curricula and courses: Report from the 2005 Whitaker Biomedical Engineering Educational Summit*, Annals Of Biomedical Engineering, vol. 34 no. 2 (February, 2006), pp. 239 -- 247 [abs].

Biomedical Engineering Department
Pratt School of Engineering | Duke University
Room 136 Hudson Hall • Box 90281 • Durham, NC 27708-0281
Phone: (919) 660-5131 • Fax: (919) 684-4488