

Irving J. Bigio, PhD. - University of Michigan



Boston University:

Professor, Department of Biomedical Engineering
Department of Electrical and Computer Engineering

Recently inducted into AIMBE "for outstanding contributions advancing basic theory and practice in biomedical optics, including optical biopsy, interstitial laser thermotherapy, and optical pharmacokinetics"

Research Interests:

- Medical applications of optics, lasers and spectroscopy, Biomedical Optics and Biophotonics
- Biomolecular dynamics
- Applied spectroscopy, especially to biomedical problems
- Nonlinear optics, quantum electronics and laser physics

Current Research:

The core theme of biomedical optics/photonics is minimally invasive optical diagnostics and therapeutics. The current national trend in health care is a growing emphasis on preventive medicine, early diagnosis, reduced invasiveness of procedures, outpatient procedures - in short, an overall reduction in the cost of providing health care. Minimally invasive techniques address such aims in addition to providing significant patient benefits. Current developments in optical technologies are rapidly increasing the technical options available. Moreover, the ongoing growth in use of endoscopes and laparoscopes in medicine makes this theme very timely. Some components of Dr. Bigio's current research:

- Advanced spectroscopic technologies for tissue diagnosis
- Noninvasive measurement of drug concentrations in tissue
- Interstitial laser thermotherapy and photodynamic therapy
- Computational methods for modeling optical transport in tissue
- Multi-capability endoscopic and laparoscopic instruments

Selected Recent Publications:

1. J. Bigio, S.C Bown, G. Briggs, S. Lakhani, D. Pickard, P.M. Ripley, I.G. Rose and C. Saunders "Diagnosis of breast cancer using elastic-scattering spectroscopy: preliminary clinical results" *Journal of Biomedical Optics* 5: 221-228 (2000)

Judith R. Mourant, Tamara M. Johnson, Gerrit Los, Irving J. Bigio "Noninvasive measurement of chemotherapy drug concentrations in tissue: preliminary demonstrations of in vivo measurements" *Journal of Physics in Medicine and Biology* 44: 1397-1417 (1999)

Irving J. Bigio, Judith R. Mourant "Ultraviolet and visible spectroscopies for tissue diagnostics: fluorescence spectroscopy and elastic-scattering spectroscopy" *Journal of Physics in Medicine and Biology* 42: 803-814(1997)

A.H. Hielscher, J.R. Mourant, I. J. Bigio "Influence of particle size and concentration on the diffuse backscattering of polarized light from tissue phantoms and biological cell suspensions" *Applied Optics* 36: 125-135 (1997)

J. R. Mourant, T. Fuselier, J. Boyer, T. Johnson, I. J. Bigio "Predictions and measurements of scattering and absorption over broad wavelength ranges in tissue phantoms" *Applied Optics* 36: 949-957 (1997)

J.R. Mourant, J. Boyer, A. Hielscher, I.J. Bigio "Influence of the scattering phase function on light transport measurements in turbid media performed with small source- detector separations" *Optics Letters* 21: pp.546-548 (1996)