



BIOMEDICAL ENGINEERING

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ANDREAS H. HIELSCHER

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EDUCATION

- 1995-98: Postdoctoral Fellow, Los Alamos National Laboratory, Los Alamos, NM
- 1995: Ph.D., Electrical and Computer Engineering, Rice University, Houston, TX
- 1991: M.S., Applied Physics, University of Hannover, Germany
- 1987: B.S., Physics, University of Hannover, Germany

AWARDS/HONORS

- 2003: Fellow of the Department of Biomedical Engineering and Laser Medicine, Free University, Berlin, Germany
- 2000: Young Investigator Research Award, National Institutes of Health
- 1999: The New York City Council Speaker's Award for Biomedical Research
- 1999: Whitaker Foundation Young Investigator Award
- 1998: Marie Curie Fellowship offered by the European Commission (declined)
- 1997: Shechao Charles Feng Best Paper Memorial Prize, SPIE Conference on Optical Tomography and Spectroscopy of Tissue
- 1995-97: Los Alamos National Laboratory Director's Postdoctoral Fellowship
- 1995-97: Robert A. Welch Foundation Predoctoral Fellowship

ACTIVE GRANT SUPPORT

- National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)
- National Cancer Institute (NCI)

- National Institute of Biomedical Imaging and Bioengineering (NIBIB)
- New York State Foundation for Science, Technology and Innovation (NYSTAR)

RESEARCH SUMMARY

In the [Biophotonics and Optical Radiology Laboratory](#) we are developing numerical and experimental techniques for optical medical diagnostics. We are focusing on the design of novel electro-optical instrumentation and algorithms that allow for tomographic reconstruction of cross sections through various parts of the body. The cross-sections may display physiological parameters; such total hemoglobin concentration and blood oxygen saturation, or can be used to monitor gene expression and protein interactions. We employ "Optical Tomography" in various clinical and preclinical studies that focus on the detection of rheumatoid arthritis in joints and cancer in the breast, bone, kidney, prostate and gastric system. Furthermore, we explore hemodynamic effects in the brain for stroke diagnostics and the study of epilepsy.

RECENT PUBLICATIONS

- C.D. Klose, A.D. Klose, U. Netz, J. Beuthan, and A.H. Hielscher, "Multi-parameter classifications of optical tomographic images," *Biomedical Optics Letters* (in press).
- A.K. Klose, A.H. Hielscher, "Diffuse Optical Tomography with the Equation of Radiative Transfer," *International Journal for Numerical Methods in Heat and Fluid Flow* 18(3/4), pp. 443-464 (2008).
- J.M. Masciotti, J.L. Lasker, A.H. Hielscher, "Digital Lock-in Detection for Discriminating Multiple Modulation Frequencies with High Accuracy and Computational Efficiency," *IEEE Transactions on Instrumentation and Measurement* 57(1), pp. 182-189 (2008).
- U.J. Netz, J. Beuthan, A.H. Hielscher, "Multipixel System for Gigahertz Frequency-Domain Optical Imaging of Finger Joints," *Review of Scientific Instruments* 79(8) 034301 (2008).
- K. Ren, G. Bal, A.H. Hielscher, "Transport- and diffusion-based optical tomography in small domains: A comparative study," *Applied Optics* 46 (27), pp. 6669-6679 (2007).
- J.M. Lasker, J. Masciotti, M. Schoenecker, C. Schmitz, A.H. Hielscher, "Digital-Signal-Processor-Based Dynamic Optical Tomography Imaging System," *Review of Scientific Instruments* 78(8) 083706 (2007).
- J.M. Lasker, Christopher J. Fong, Daniel T. Ginat, E. Dwyer, A.H. Hielscher, "Dynamic Optical Imaging of Vascular and Metabolic Reactivity in Rheumatoid Joints," *Journal of Biomedical Optics* 12(5), 052001 (September/October 2007).
- X. Gu, K. Ren, A.H. Hielscher, "Frequency-domain sensitivity analysis for small imaging domains using the equation of radiative transfer," *Applied Optics* 46 (10), pp. 1624-1632 (2007).

[View the complete list of publications.](#)

COURSES TAUGHT

- BME E4894: Biomedical Imaging, Fall 2008
- BME E3810: Biomedical Engineering Lab I - Optics Module, Spring 2008
- BME E4898: Biophotonics, Spring 2007

Optical medical instrumentation and image reconstruction algorithms. Clinical and preclinical imaging of joint diseases, cancer (breast, kidney, stomach, bone, prostate), cerebral hemodynamics (stroke, epilepsy), and vascular reactivity.