

CURRICULUM VITAE

Education

- 09/97 – 04/04 Ph.D. in Physics: “*Non-Invasive Measurements of Tissue Hemodynamics with Hybrid Diffuse Optical Methods*”, Advisor: Arjun G. Yodh,
Department of Physics and Astronomy, University of Pennsylvania, PA, USA
- 09/93 – 05/97 Bachelor of Arts in Physics and Minor in Mathematics (GPA: 3.43/4.00)
Department of Physics and Astronomy, University of Pennsylvania, PA, USA

Relevant Work Experience

- 02/09- Assistant Professor
ICFO-The Institute of Photonic Sciences
Castelldefels (Barcelona), Spain
- 04/09- Adjunct Assistant Professor
Dept. of Radiology, U. of Pennsylvania
- 05/06-04/09 Research Associate
Dept. of Radiology, U. of Pennsylvania
Joint Appt. with Dept. of Physics and Astronomy, U. of Pennsylvania
Co-PI of Optics Core for Center for Magnetic Resonance and Optical Imaging
- 11/05–12/05 Guest Scientist with Dr H Wabnitz and Dr R McDonald
Physikalisch-Technische Bundesanstalt (PTB), Berlin, Germany
- 09/03–05/06 Postdoctoral Fellow with Dr. A. G. Yodh,
Dept. of Physics and Astronomy, U. of Pennsylvania

Honors, Scholarships, Grants, Patents

- 2009-2011 Grant: “3D Tomographer to Study Ischemic Stroke”, Fundació Cellex Barcelona
- 2009-2011 Grant: “Trans-Atlantic Network for Development of a Non-invasive, Continuous, Bed-Side, Diffuse Optical Monitor of Cerebral Hemodynamics for the Neuro-Intensive Care Unit”, Fundació Cellex Barcelona
- 2008-2014 Grant: Optics Core Leader, “Neuroscience Neuroimaging Center” (PI:Detre), NIH- P30 NS045839
- 2005-2010 Grant: CO-Investigator (Optics Core), “A Resource for Magnetic Resonance and Optical Research” (PI: Reddy), NIH-5-P41RR002305
- 2008-013 Grant: Co-Investigator, “Diffuse Optics for Acute Stroke Management” (PI: Yodh), NIH-R01NS060653
- 2007-09 Grant: Principal Investigator, “Absolute Measurement of Cerebral Blood Flow Using Diffuse Optics”, NIH-R21 EB007610
- 2007-09 Grant: Principal Investigator, “Diffuse optical measurement of absolute cerebral blood flow in neonates”, Thrasher Research Fund New Researcher Award Program
- 2006,2007 Paper: “Bulk optical properties of healthy female breast tissue” was short listed for the Physics in Medicine and Biology Highest Citations Prize 2006, Third Place in 2007.
- 2006-9 Grant: Co-Investigator, “Assessment of Muscle Vascular Disease with Diffuse Light”, NIH-R21HL0830225 (PI: Yu)
- 2004 Optical Measurement of Tissue Blood Flow, Hemodynamics and Oxygenation, United States Patent 20060063995 , <http://www.freepatentsonline.com/20060063995.html>

- 2004-8 Grant: Co-Investigator, “Diffuse Light Imaging of Flow, Oxygen and Brain Metabolism”, NIH-R01HL077699 (PI: Yodh)
- 2004-7 Grant: Co-Investigator, “Real-Time Diffuse Optical Measurements for *In Vivo* PDT Dosimetry of Human Prostate”, DAMD17-PC030037-NIA, Department of Defense, Prostate Cancer Research Program (PI: Yu)

Publications

- [1] Buckley E M, Cook N M, Durduran T, Kim M N, Zhou C, Choe R, Yu G, Shultz S, Sehgal C M, Licht D J, Arger P H, Putt M E, Hurt H H, and Yodh A G. *Cerebral hemodynamics in preterm infants during positional intervention measured with diffuse correlation spectroscopy and transcranial doppler ultrasound*. Optics Express, **17**:12571–12581, 2009.
- [2] Cerniglia G J, Pore N, Tsai J H, Schultz S, Mick R, Choe R, Xing X, Durduran T, Yodh A G, Evans S M, Koch C J, Hahn S M, Quon H, Sehgal C M, Lee W M F, and Maity A. *Epidermal growth factor receptor inhibition modulates the microenvironment by vascular normalization to improve chemotherapy and radiotherapy efficacy*. PLoS ONE, **4**(8):e6539, 2009.
- [3] Choe R, Konecky S D, Corlu A, Lee K, Durduran T, Busch D R, Pathak S, Czerniecki B J, Tchou J, Fraker D L, DeMichele A, Chance B, Arridge S R, Schweiger M, Culver J P, Schnall M D, Putt M E, Rosen M A, and Yodh A G. *Differentiation of benign and malignant breast tumors by in-vivo three-dimensional parallel-plate diffuse optical tomography*. J Biomed Opt, **14**(2):024020, 2009.
- [4] Durduran T, Zhou C, Edlow B L, Yu G, Choe R, Kim M N, Cucchiara B L, Putt M E, Shah Q, Kasner S E, Greenberg J H, Yodh A G, and Detre J A. *Transcranial optical monitoring of cerebrovascular hemodynamics in acute stroke patients*. Optics Express, **17**(5):3884–3902, 2009.
- [5] Kim M N, Durduran T, Frangos S, Edlow B L, Buckley E M, Heather E M, Zhou C, Choe R, E M, Wolf R L, Woo J H, Grady M S, Greenberg J H, Levine J M, Yodh A H, Detre J A, and Kofke W A. *Validation of non-invasive, diffuse optical cerebral blood flow measurements against xenon-enhanced ct in brain-injured humans*. J Neurosurg, **submitted**, 2009.
- [6] Luckl J, Zhou C, Durduran T Turgut, Yodh A G, and Greenberg J H. *Characterization of peri-infarct flow transients with laser speckle and doppler after middle cerebral artery occlusion in the rat*. Journal of Neuroscience Research, **87**(5):1219–1229, 2009.
- [7] Zhou C, Eucker S, Durduran T, Yu G, Ralston J, Friess S H, Ichord R N, Margulies S S, and Yodh A G. *Diffuse optical monitoring of hemodynamic changes in piglet brain with closed head injury*. Journal of Biomedical Optics, **14**:034015, 2009.
- [8] Zhou C, Shimazu T, Durduran T, Luckl J, Kimberg D Y, Yu G, Chen X H, Detre J A, Yodh A G, and Greenberg J H. *Acute functional recovery of cerebral blood flow after forebrain ischemia in rat*. J Cereb Blood Flow Metab, **28**(7):1275, 2008.
- [9] Corlu A, Choe R, Durduran T, Rosen M A, Schweiger M, Arridge S R, Schnall M D, and Yodh A G. *Three-dimensional in vivo fluorescence diffuse optical tomography of breast cancer in humans*. Optics Express, **15**(11):6696–6716, 2007.
- [10] Sunar U, Makonnen S, Zhou C, Durduran T, Yu G, Wang H W, Lee W M, and Yodh A G. *Hemodynamic responses to antivascular therapy and ionizing radiation assessed by diffuse optical spectroscopies*. Opt Express, **15**(23):15507–15516, 2007.
- [11] Yu G, Floyd T, Durduran T, Zhou C, Wang J J, Detre J A, and Yodh A G. *Validation of diffuse correlation spectroscopy for muscle blood flow with concurrent arterial-spin-labeling perfusion*. Opt Exp, **15**:1064–75, 2007.
- [12] Zhou C, Choe R, Shah N, Durduran T, Yu G, Durkin A, Hsiang D, Mehta R, Butler J, Cerussi A, Tromberg B J, and Yodh A G. *Diffuse optical monitoring of blood flow and oxygenation in human breast cancer during early stages of neoadjuvant chemotherapy*. J Biomed Opt, **12**(5):051903, 2007.
- [13] Sunar U, Quon H, Durduran T, Zhang J, Du J, Zhou C, Yu G, Choe R, Kilger A, Lustig R, Loevner L, Nioka S, Chance B, and Yodh A G. *Non-invasive diffuse optical*

- measurement of blood flow and blood oxygenation for monitoring radiation therapy in patients with head and neck tumors: a pilot study.* J Biomed Opt, **11**:064021, 2006.
- [14] Yu G, Durduran T, Zhou C, Zhu T C, Finlay J C, Busch T M, Malkowicz S B, Hahn S M, and Yodh A G. *Real-time in situ monitoring of human prostate photodynamic therapy with diffuse light.* Photochem Photobiol, **82**:1279–84, 2006.
- [15] Zhou C, Yu G, Furuya D, Greenberg J H, Yodh A G, and Durduran T. *Diffuse optical correlation tomography of cerebral blood flow during cortical spreading depression in rat brain.* Opt Exp, **14**:1125–44, 2006.
- [16] Choe R, Corlu A, Lee K, Durduran T, Konecky S D, Grosicka-Koptyra M, Arridge S R, Czerniecki B J, Fraker D L, DeMichele A, Chance B, Rosen M A, and Yodh A G. *Diffuse optical tomography of breast cancer during neoadjuvant chemotherapy: a case study with comparison to MRI.* Med Phys, **32**:1128–39, 2005.
- [17] Corlu A, Choe R, Durduran T, Lee K, Schweiger M, Hillman E M C, Arridge S R, and Yodh A G. *Diffuse optical tomography with spectral constraints and wavelength optimization.* Appl Opt, **44**:2082–93, 2005.
- [18] Durduran T, Choe R, Yu G, Zhou C, Tchou J C, Czerniecki B J, and Yodh A G. *Diffuse optical measurement of blood flow in breast tumors.* Opt Lett, **30**:2915–17, 2005.
- [19] Yu G, Durduran T, Lech G, Zhou C, Chance B, Mohler E R, and Yodh A G. *Time-dependent blood flow and oxygenation in human skeletal muscle measured with noninvasive near-infrared diffuse optical spectroscopies.* J Biomed Opt, **10**(3):024027–1–12, 2005.
- [20] Yu G, Durduran T, Zhou C, Wang H W, Putt M E, Saunders M, Seghal C M, Glatstein E, Yodh A G, and Busch T M. *Noninvasive monitoring of murine tumor blood flow during and after photodynamic therapy provides early assessment of therapeutic efficacy.* Clin Cancer Res, **11**:3543–3552, 2005.
- [21] Durduran T. *Noninvasive measurements of tissue hemodynamics with hybrid diffuse optical methods.* Med Phys (peer reviewed dissertation abstract), **31**:2178, 2004.
- [22] Durduran T, Burnett M G, Yu G, Zhou C, Furuya D, Yodh A G, Detre J A, and Greenberg J H. *Spatio-temporal quantification of cerebral blood flow during functional activation in rat somatosensory cortex using laser speckle flowmetry.* J Cereb Blood Flow Metab, **24**:518–525, 2004.
- [23] Durduran T, Yu G, Burnett M G, Detre J A, Greenberg J H, Wang J, Zhou C, and Yodh A G. *Diffuse optical measurements of blood flow, blood oxygenation and metabolism in human brain during sensorimotor cortex activation.* Opt Lett, **29**:1766–1768, 2004.
- [24] Choe R, Durduran T, Yu G Q, Nijland M J M, Chance B, Yodh A G, and Ramanujam N. *Transabdominal near infrared oximetry of hypoxic stress in fetal sheep brain in utero.* Proc Natl Acad Sci USA, **100**:12950–12954, 2003.
- [25] Corlu A, Durduran T, Choe R, Schweiger M, Hillman E M C, Arridge S R, and Yodh A G. *Uniqueness and wavelength optimization in continuous-wave multispectral diffuse optical tomography.* Opt Lett, **28**:2339–2341, 2003.
- [26] Culver J P, Choe R, Holboke M J, Zubkov L, Durduran T, Slemple A, Ntziachristos V, Pattanayak D N, Chance B, and Yodh A G. *3D diffuse optical tomography in the plane parallel transmission geometry: Evaluation of a hybrid frequency domain/continuous wave clinical system for breast imaging.* Med Phys, **30**:235–247, 2003.
- [27] Culver J P, Durduran T, Furuya D, Cheung C, Greenberg J H, and Yodh A G. *Diffuse optical tomography of cerebral blood flow, oxygenation and metabolism in rat during focal ischemia.* J Cereb Blood Flow Metab, **23**:911–24, 2003.
- [28] Yu G, Durduran T, Furuya D, Greenberg J H, and Yodh A G. *Frequency-domain multiplexing system for in vivo diffuse light measurements of rapid cerebral hemodynamics.* Appl Opt, **42**:2931–39, 2003.
- [29] Culver J P, Durduran T, Furuya D, Cheung C, Greenberg J H, and Yodh A G. *Diffuse optical measurement of hemoglobin and cerebral blood flow in rat brain during hypercapnia, hypoxia and cardiac arrest.* Adv Exp Biol, **XXIII**:293–298, 2002.

- [30] Durduran T, Choe R, Culver J P, Zubkov L, Holboke M J, Giammarco J, Chance B, and Yodh A G. *Bulk optical properties of healthy female breast tissue*. Phys Med Biol, **47**:2847–2861, 2002.
- [31] Li X D, Pattanayak D N, Durduran T, Culver J P, Chance B, and Yodh A G. *Near-field diffraction tomography with diffuse photon density waves*. Phys Rev E, **61**(4):4295–4309, 2000.
- [32] Durduran T, Culver J P, Holboke M J, Li X D, Zubkov L, Chance B, Pattanayak D N, and Yodh A G. *Algorithms for 3d localization and imaging using near-field diffraction tomography with diffuse light*. Optics Express, **4**(8):247–262, 1999.
- [33] Zhu Q, Durduran T, Ntziachristos V, Holboke M, and Yodh A G. *Imager that combines near-infrared diffusive light and ultrasound*. Opt Lett, **24**(15):1050–1052, 1999.
- [34] Durduran T, Chance B, Yodh A G, and Boas D A. *Does the photon diffusion coefficient depend on absorption?* J Opt Soc Am A, **14**:3358–3365, 1997.
- [35] Li X D, Durduran T, Chance B, Yodh A G, and Pattanayak D N. *Diffraction tomography for biochemical imaging with diffuse-photon density waves*. Opt Lett, **22**(8):573–575, 1997.

Invited Talks

- [1] Durduran T. *Diffuse optical monitors for bed-side monitoring of cerebral hemodynamics at the neuro-intensive care unit*. In *IEEE-LEOS Annual Meeting*. IEEE, Turkey, 2009.
- [2] Durduran T. *Optical diffuse correlation spectroscopy (dcs); a new tool for bed-side monitoring*. In *105th ICB Seminar on Light and Optics in Medical Diagnosis*. International Centre of Biocybernetics, Warsaw, Poland, 2009.
- [3] Durduran T and Yodh A G. *New, hybrid optical techniques to non-invasively measure oxygen metabolism*. In *TOPIM '09: Hot Topics in Molecular Imaging*. Les Houches, France, 2009.
- [4] Durduran T, Kim M N, Buckley E M, Zhou C, Yu G, Choe R, Greenberg J H, Detre J A, and Yodh A G. *Diffuse optical monitoring of cerebral oxygen metabolism at the bed-side in cerebrovascular disorders*. In *OSA: Annual Meeting, Frontiers in Optics 2008*. Rochester, NY, 2008.
- [5] Durduran T. *Functional imaging of blood flow in brain and in tumors during therapy*. In *OSA: Annual Meeting, Frontiers in Optics 2006*. Rochester, NY, 2006.
- [6] Durduran T. *Functional imaging of blood flow in brain and in tumors during therapy*. In *Natural Sciences and Mathematics, Departmental Colloquium*. Richard Stockton College of New Jersey, NJ, 2006.
- [7] Durduran T. *Optical measurement of cerebral blood flow, oxygenation and metabolism: From benchtop to the clinic*. In *Gordon Research Conferences, Lasers in Medicine and Biology*. Plymouth, NH, 2006.
- [8] Durduran T. *Optical methods for tissue hemo-dynamics and metabolism*. In *OSA Biomedicals Topicals*. Fort Lauderdale, FL, 2006.
- [9] Durduran T. *Diffuse correlation/wave spectroscopy: A tutorial*. In *Biomedical Optics Series*. Physikalisch-Technische Bundesanstalt, Berlin, Germany, 2005.
- [10] Durduran T. *Optical mammography at university of pennsylvania*. In *Biomedical Optics Series*. Physikalisch-Technische Bundesanstalt, Berlin, Germany, 2005.
- [11] Durduran T. *Optical measurement of cerebral blood flow, oxygenation and metabolism*. In *Berlin Neuro-Imaging Center Talks*. Charite, Berlin, Germany, 2005.
- [12] Durduran T. *Non-invasive measurements of tissue hemodynamics with diffuse light*. In *McNair Scholars Program Speaker Series*. University of Alabama, Birmingham, AL, 2004.
- [13] Durduran T. *Optical methods for imaging/spectroscopy of cerebral hemodynamics: From small animals to adult brain*. In *Seminar Series at Photon Migration Imaging Laboratory at the MGH/MIT/HMS*. Massachusetts General Hospital, MA, 2004.

- [14] Durduran T. *In Vivo measurements of brain hemodynamics in rat brain using diffuse optical tomography and diffuse correlation spectroscopy.* In *March Meeting, American Physical Society.* Indianapolis, IN, 2002.
- [15] Durduran T. *Optical tomography/spectroscopy of the breast, brain and muscle.* In *The Biomedical Optics Research Laboratory Seminar.* University College London, London, UK, 2002.
- [16] Durduran T. *In Vivo measurements of rat brain hemodynamics using diffuse optical tomography and diffuse correlation spectroscopy.* In *Chalk-Talk Series, Institute of Medicine and Engineering.* University of Pennsylvania, Philadelphia, 2001.

Proceedings and Presentations

The complete list of first authored and co-authored presentations in meetings organized by Optical Society of America (OSA), The International Society for Optical Engineering (SPIE), International Society For Cerebral Blood Flow and Metabolism (ISCBFM), International Society on Oxygen Transport to Tissue (ISOTT), American Physical Society (APS), Gordon Research Conferences (GRC), United Engineering Foundation (UEF), Engineering Conferences International (ECI), Human Brain Mapping (HBM) and American Heart Association (AHA), American Neurological Association (ANA), European Society for Molecular Imaging (ESMI), Institute of Electrical and Electronics Engineers (IEEE) and others are available upon request.

Barcelona, Spain/Philadelphia, USA, September 4, 2009