

Sergio Fantini

Curriculum Vitae

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PART I: GENERAL INFORMATION

Name:

Sergio Fantini

Address:

Department of Biomedical Engineering
Tufts University
4 Colby Street
Medford, MA 02155-6013
Tel: (617) 627-4356
Fax: (617) 627-3231
E-mail: sergio.fantini@tufts.edu
<http://ase.tufts.edu/biomedical/faculty-staff/fantini.asp>

Academic Appointments:

- 9/2006 – *present*: Professor, Department of Biomedical Engineering, Tufts University, Medford, MA.
- 9/2006 – 8/2009: Associate Dean for Graduate Education, School of Engineering, Tufts University, Medford, MA.
- 9/2004 – 8/2005: Acting Associate Dean, School of Engineering, Tufts University, Medford, MA.
- 9/2003 – 8/2006: Associate Professor, Department of Biomedical Engineering, Tufts University, Medford, MA.
- 11/2002 – 8/2003: Assistant Professor, Department of Biomedical Engineering, Tufts University, Medford, MA.
- 10/1999 – 10/2002: Assistant Professor, Department of Electrical Engineering and Computer Science, Tufts University, Medford, MA.
- 8/1996 – 9/1999: Research Assistant Professor, Department of Physics, University of Illinois at Urbana-Champaign, Urbana, IL.
- 8/1995 – 7/1996: Visiting Lecturer, Department of Physics, University of Illinois at Urbana-Champaign, Urbana, IL.

Postdoctoral training:

- 1/1993 – 7/1995: Postdoctoral Research Associate, Department of Physics, University of Illinois at Urbana-Champaign, Urbana, IL.
Research Area: Near-infrared spectroscopy of biological tissue.
Postdoctoral Advisor: Dr. Enrico Gratton.

Education:

- Doctoral Degree: University of Florence, Italy, 1983 – 1992; Physics.
Dissertation Topic: “Raman Spectroscopy of the Superconductor $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ in the Temperature Range 25–900 K”.
Dissertation Advisor: Dr. Lorenzo Ulivi.

Memberships in Professional Societies:

- Biomedical Engineering Society
- Optical Society of America
- SPIE – The International Society for Optical Engineering

Professional activities at scientific meetings:

- *Moderator of the “BiOS Hot Topics” plenary session at the SPIE (International Society for Optical Engineering) Photonics West, San Jose/San Francisco, CA, 2003- 2011.*
- *Member of Program Committees for conferences on “Multimodal Biomedical Imaging” and “Optical Tomography and Spectroscopy of Tissue” at BiOS Symposium, part of SPIE (International Society for Optical Engineering) Photonics West Conference, San Jose/San Francisco, CA, (January 2008-2010).*
- *Member of the Organizing Committee for the Biomedical Optics track of the “World Congress on Medical Physics and Biomedical Engineering 2006 (WC2006),” Seoul, Korea, August 27 - September 1, 2006.*
- *Co-Chair of the Session on “Novel Instrumentations for Biological and Medical Imaging,” at the BMES (Biomedical Engineering Society) Annual Fall Meeting, Baltimore, MD, September 28-October 1, 2005.*
- *Member of the Scientific Organizing Committee for the PIBM (Photonics and Imaging in Biology and Medicine) 2005 International Conference, Tianjin, P.R.China, September 3-6, 2005.*
- *Chair of the Technical Program Committee for Medical and Biological Applications at CLEO (Conference on Lasers and Electro-Optics) 2005 (Baltimore, MD, May 22-27), 2004 (San Francisco, CA, May 16-21).*
- *Member of the Technical Program Committee for the OSA (Optical Society of America) Biomedical Topical Meeting, Miami Beach, FL, April 14-17, 2004.*
- *Chair of the session on “Diffuse Optical Tomography” at the BMES (Biomedical Engineering Society) Annual Fall Meeting, Nashville, TN, October 2-4, 2003.*
- *Chair of the session on “Photon Migration Spectroscopy” at the 2nd International Symposium on Biophotonics, San Antonio, TX, August 2-3, 2003.*
- *Member of the Technical Program Committee for the 2003 OSA/SPIE (Optical Society of America/International Society for Optical Engineering) meeting on Biomedical Optics, Munich, Germany, June 23-27, 2003.*
- *Member of the Technical Program Committee for Medical and Biological Applications at CLEO (Conference on Lasers and Electro-Optics) 2003, Baltimore, MD, June 1-6, 2003.*
- *Organizer and Chair of the Industry Forum on Biomedical Optics at the SPIE (International Society for Optical Engineering) Photonics Boston Conference, Boston, MA, July 30-31, 2002.*
- *Co-chair of the Session on “Optical Computed Tomography and Optical Imaging” at the 2002 PIERS (Progress in Electromagnetics Research Symposium), Cambridge, MA, July 1-5, 2002.*
- *Member of the Technical Program Committee for the OSA (Optical Society of America) Biomedical Topical Meeting, Miami Beach, FL, (April 7-10, 2002; April 2-5, 2000).*

University committee appointments and special activities (Tufts University):

- BME Undergraduate Program Director (9/2010 – present).
- Engineering Committee on Outcomes & Objectives Assessment (9/2010 – present)
- Member of the Interdisciplinary Doctorate Overseers Committee (1/2001 – present).
- Associate Dean for Graduate Education, School of Engineering (9/2006 – 8/2009).
- Acting Associate Dean of Engineering (9/2004 – 8/2005).

- Member of the Committee on Conflict of Interest in Research (9/2004 – 8/2009).
- Member (9/2003 – 8/2009) and Chair (9/2004 – 5/2005; 9/2006 – 8/2009) of the Engineering Graduate Studies Committee.

Honors and Awards:

- Graduate Student Council's Award for *Outstanding Faculty Contribution to Graduate Studies*, Tufts University (2004).
- NSF CAREER Award, National Science Foundation, Division of Bioengineering and Environmental Systems, Directorate for Engineering, 2001 – 2007.
- *Outstanding Faculty Award*, Tufts University (2001).
- Placed on the “*Incomplete List of Teachers Ranked as Excellent by Their Students*,” University of Illinois at Urbana-Champaign (Fall 1996).

PART II: TEACHING

Courses taught [numbers in square brackets are the average student evaluations of instructor on a scale of 1(worst)-5(best)]:

- Professor in the Department of Biomedical Engineering, Tufts University (2006 – present):
 - BME/BIO/EE131 (*Principles of Medical Imaging*), Spring 2009 **[4.1]**.
 - BME93-1 (*BME Junior Project*), Fall 2007 **[4.9]**.
 - BME141 (BME193-AT) (*Analytical Tools for Biomedical Engineering*), Fall 2010 **[4.1]**, Fall 2008 **[4.1]**, Fall 2007 **[3.8]**, Fall 2006 **[4.4]**.
- Associate Professor in the Department of Biomedical Engineering, Tufts University (2003 – 2006):
 - BME/BIO/EE131 (*Principles of Medical Imaging*), Spring 2004 **[4.6]**, Spring 2005 **[4.5]**, Spring 2006 **[4.4]**.
 - BME193-AT (*Analytical Tools for Biomedical Engineering*), Fall 2005 **[4.4]**.
 - BME/EE156 (*Medical Optics Laboratory*), Spring 2004 (team-taught) **[N/A]**.
 - BME/EE101 (*Introduction to Medical Optics and Lasers*), Fall 2003 **[4.5]**.
 - ES3 (*Introduction to Electrical Engineering*), Fall 2003 **[3.4]**.
- Assistant Professor in the Department of Biomedical Engineering, Tufts University (2003):
 - EE/BIO/BME131 (*Principles of Medical Imaging*), Spring 2003 **[4.3]**.
 - EE/BME156 (*Medical Optics Laboratory*), Spring 2003 (team-taught) **[N/A]**.
- Assistant Professor in the Department of Electrical Engineering and Computer Science, Tufts University (1999 – 2002):
 - ES3 (*Introduction to Electrical Engineering*), Fall 2001 **[4.3]**, Fall 2002 **[4.4]**.
 - EE101 (*Introduction to Medical Optics and Lasers*), Fall 2000 **[4.8]**.
 - EE194-MII (*Medical Instrumentation for Imaging*), Spring 2000 **[4.3]**, Spring 2001 **[4.8]**.
 - EE193-BIO (*Biomedical Optics*), Fall 1999 **[4.9]**.
- Research Assistant Professor in the Department of Physics, University of Illinois at Urbana-Champaign (1996 – 1999):
 - Phycs 113 (*General Physics: Thermal Physics*), Spring 1998 **[N/A]**.
 - Phycs 108 (*Waves and Quantum Physics*), Spring 1997; Section 1: **[4.1]**; Section 2: **[4.9]**.
 - Phycs 450 (*Biomolecular Physics*), Fall 1996 **[4.7]**, Fall 1997 **[4.3]**.

- Visiting Lecturer in the Department of Physics, University of Illinois at Urbana-Champaign (1995 – 1996):
 - Phys 108 (*Waves and Quantum Physics*), Fall 1995 **[4.4]**, Spring 1996 **[4.6]**.

Master's Theses Supervised (Tufts University):

- Geethika Weliwitigoda, 2011 – present.
- Elleesse Pillas, 2011 – present.
- Feng Zheng, received M.S. in Biomedical Engineering, 2011.
- Xiao Da, received M.S. in Biomedical Engineering, 2010.
- Chia-Hui Chen, received M.S. in Biomedical Engineering, 2009.
- Asif Khan, received M.S. in Biomedical Engineering, 2009.
- Michael Coutts, received M.S. in Biomedical Engineering, 2009.
- Rich Matulewicz, received M.S. in Biomedical Engineering, 2006.
- Jeffrey Martin, received M.S. in Biomedical Engineering, 2006.
- Ning Liu, received M.S. in Electrical Engineering, 2004.
- Kathleen Chen, received M.S. in Electrical Engineering, 2003.
- Shalini Nadgir, received M.S. in Biomedical Engineering, 2003.
- Vivian Pera, received M.S. in Electrical Engineering, 2002.
- Payal Aggarwal, received M.S. in Electrical Engineering, 2002
- Matthew Hoimes, received M.S. in Biomedical Engineering, 2002.

Ph.D. Dissertations Supervised (Tufts University):

- Michele Pierro, 2010 – present.
- Bertan Hallacoglu, 2009 – present.
- Yang Yu, 2006 – present.
- Debbie Chen, 2005 – received Ph.D. in Biomedical Engineering, 2010.
- Ning Liu, 2003 – received Ph.D. in Biomedical Engineering, 2009.
- Yunjie Tong, 2002 – received Ph.D. in Biomedical Engineering, 2008.
- Carl Geisler, 2001 – 2003 (co-advised with Prof. Goldner).
- Erica Heffer, 2000 – received Ph.D. in Electrical Engineering, 2004.

Postdoctoral Fellows/Research Associates supervised (Tufts University):

- Angelo Sassaroli, 7/2002 – present.
- Francesco Fabbri, 4/2001 – 2/2004.

PART III: SCHOLARSHIP

Research interests:

- Optical spectroscopy and imaging of turbid media.
- Optical study of biological tissue *in vivo*.
- Medical applications of near-infrared techniques.

Grant support:

- Grant support - Active:
 - *“Bringing brain-computer interfaces into mainstream HCI,”* 9/2011 – 8/2014; NSF; \$935,522; Co-Investigator (PI: Rob Jacob, Tufts Comp Sci);
 - *“Functional near-infrared imaging using the phase of hemodynamic oscillations,”* 3/2011 – 2/2013; NIH; \$148,865; Co-Investigator (PI: Angelo Sassaroli, Tufts BME);
 - *“Biological mechanism of fast near-infrared signals in peripheral nerves,”* 6/2008 – 5/2012; NIH; \$645,901; Co-Investigator (PI: Peter Bergethon, BU Medical School).
- Grant support - Past:
 - *“HCC: Human-Computer Interaction and Brain Measurement Using fNIR Spectroscopy,”* 8/1/2007 – 7/31/2010; NSF; \$444,620; Co-PI (PI: Rob Jacob, Computer Science Dept., Tufts Univ.).
 - *“Concurrent fMRI and NIRS of frontal lobe activation during marijuana smoking,”* 9/1/2007 – 8/31/2010; NIH; \$125,300; Co-Investigator (PI: Blaise Frederick, McLean Hospital).
 - *“Multi-optode probe for evaluation of diabetic neuropathy,”* 6/2009 – 6/2010; CIMIT; \$46,200; Co-Investigator (PI: Peter Bergethon, Boston University Medical School).
 - *“Near-infrared oximetry of breast tumors [R33 phase],”* 2/1/2007 – 1/31/2010; NIH; \$695,197; PI.
 - *“Tissue Engineering Resource Center,”* 8/04 – 7/09; NIH/NIBIB (P41-EB002520); \$3,957,834; Core Collaborator (PI: David Kaplan).
 - *“A device for imaging the neuroanatomy and transport function of peripheral nerves,”* 10/2007 – 3/2009; CIMIT; \$14,304; Co-Investigator (PI: Peter Bergethon, Boston University Medical School).
 - *“Near-infrared oximetry of breast tumors [R21 phase],”* 9/2004 – 8/2006; NIH/NCI (R21 CA095885); \$394,565; Principal Investigator.
 - *“High Field MR Research in Drug Abuse: a Bioengineering Partnership,”* 9/2001 – 8/2006, NIH/NIDA (R01 DA14178); \$4,500,000 (subcontract to Tufts University: \$235,000); Principal Investigator of subcontract to Tufts University (“Concurrent Near-Infrared Imaging and fMRI”).
 - *“Optical Spectroscopy and Imaging of Tissues,”* 6/2001 – 5/2007; NSF (CAREER; BES-93840); \$375,000; Principal Investigator.
 - *“Non-Invasive Optical Imaging of the Human Brain,”* 7/2000 – 6/2003; NIH/NIMH (R01 MH62854); \$643,155; Co-Investigator (PI: Maria Franceschini).
 - *“Intensity-modulation of a laser beam at a frequency of 110 MHz,”* 11/2001 – 10/2002; Faculty Research Fund Program, Tufts University; \$5,000; Principal Investigator.
 - *“Frequency-Domain Optical Mammography,”* 10/1999 – 9/2002; DoD/Department of the Army (DAMD17-99-1-9218); \$331,000; Principal Investigator.
 - *“Frequency-domain optical sensor at 970 nm,”* 3/2000 – 10/2000; Faculty Research Fund Program, Tufts University; \$5,000; Principal Investigator.

- “Optical imaging of thick tissues,” 12/1998 – 11/2001; NIH/NCI (R01 CA57032); \$678,772; Co-Investigator (PI: Enrico Gratton).

Patents:

1. “Electro-Optical Sensor for Peripheral Nerves,” Inventors: P. R. Bergethon and S. Fantini, Filed: 3/16/2006.
2. “Optical Imaging and Oximetry of Tissue,” Inventor: S. Fantini, Filed: 3/13/2003.
3. “Method for Measuring Venous Oxygen Saturation,” Inventors: M. A. Franceschini, S. Fantini, and D. A. Boas, U.S. Patent No. 6,985,763 (Filed: 11/30/2001, Issued: 1/10/2006).
4. “Method for Measuring Absolute Saturation of Time-Varying and Other Hemoglobin Compartments,” Inventors: M. A. Franceschini, S. Fantini, and E. Gratton, U.S. Patent No. 6,216,021 (Filed: 6/4/1999, Issued: 4/10/2001).
5. “Photosensor with Multiple Light Sources,” *Continuation-in-part of Pat. Nos. 5,497,769; 5,492,118 and 5,772,587*, Inventors: E. Gratton, S. Fantini, M. A. Franceschini, W. W. Mantulin, B. Barbieri, U.S. Patent No. 6,192,261 (Filed: 5/4/1998, Issued: 2/20/2001).
6. “Photosensor with Multiple Light Sources,” *Continuation-in-part of Pat. Nos. 5,497,769 and 5,492,118*, Inventors: E. Gratton, S. Fantini, M. A. Franceschini, W. W. Mantulin, B. Barbieri, U.S. Patent No. 5,772,587 (Filed: 11/29/1995, Issued: 6/30/1998).
7. “Determining Material Concentrations in Tissues,” *Continuation-in-part of Pat. No. 5,497,769*, Inventors: E. Gratton, J. S. Maier, M. A. Franceschini, S. Fantini, S. A. Walker, U.S. Patent No. 5,492,118 (Filed: 6/3/1994, Issued: 2/20/1996); Canada No. 2,137,878; Europe No. 94309361.7; Japan No.332,542/94.
8. “Photosensor with Multiple Light Sources,” Inventors: E. Gratton, S. Fantini, M. A. Franceschini, W. W. Mantulin, B. Barbieri, U.S. Patent No. 5,497,769 (Filed: 12/16/1993, Issued: 3/12/1996); Canada No. 2,137,878; Europe No. 94309361.7; Japan No.332,542/94.

Publications:

- **A. Original Articles (i.e., reports of original investigations in refereed journals):**
 1. Y. Yu, A. Sassaroli, and S. Fantini, “Depth discrimination in diffuse optical imaging of the female breast by planar scanning of collinear and off-axis optical fibers,” *IEEE Trans Med. Imaging* (2011). *Submitted*.
 2. E. T. Solovey, F. Lalooses, K. Chauncey, D. Weaver, M. Parasi, M. Scheutz, A. Sassaroli, S. Fantini, P. Schermerhorn, A. Girard, and R. J. K. Jacob, “Sensing cognitive multitasking for a brain-based adaptive user interface,” CHI 2011, May 7-12, 2011, Vancouver, BC, Canada, (*refereed*); *in press* (2011).
 3. F. Larusson, S. Fantini, and E. L. Miller, “Hyperspectral image reconstruction for diffuse optical tomography,” *Biomed. Opt. Express* (2011). *In press*.
 4. A. Sassaroli, F. Zheng, M. Pierro, P. R. Bergethon, and S. Fantini, “Phase difference between low-frequency oscillations of cerebral deoxy- and oxy-hemoglobin concentrations during a mental task,” *J. Innov. Opt. Health Sci* DOI No: [10.1142/S1793545811001332](https://doi.org/10.1142/S1793545811001332).
 5. B. Hallacoglu, A. Sassaroli, I. Rosenberg, S. Fantini, and A. Troen, “Cerebral perfusion and oxygenation are impaired by folate deficiency in rat: Absolute measurements with non-invasive near-infrared spectroscopy,” *J. Cereb. Blood Flow Metab.*, *in press* (2011).
 6. Y. Yu, A. Sassaroli, D. K. Chen, M. J. Homer, R. A. Graham, and S. Fantini, “Near-infrared, broad-band spectral imaging of the human breast for quantitative oximetry: Applications to healthy and cancerous breasts,” *J. Innov. Opt. Health Sci.* **3**, 267-277 (2010).

7. M. K. Erb, D. K. Chen, A. Sassaroli, S. Fantini, and P. R. Bergethon, "Diffuse optical signals in response to peripheral nerve stimulation reflect skeletal muscle kinematics," *Biomed. Optics Express* **1**, 943-954 (2010).
8. D. K. Chen, M. K. Erb, Y. Tong, Y. Yu, A. Sassaroli, P. R. Bergethon, and S. Fantini, "Spectral and spatial features of diffuse optical signals in response to peripheral nerve stimulation," *Biomed. Optics Express* **1**, 923-942 (2010).
9. F. Zheng, A. Sassaroli, and S. Fantini, "Phasor representation of oxy- and deoxyhemoglobin concentrations: what is the meaning of out-of-phase oscillations as measured by near-infrared spectroscopy?" *J. Biomed. Opt. (Letters)* **15**, 040512/1-3 (2010). [Selected for the *Virtual Journal of Biological Physics Research* **20**(5), Sept. 1, 2010].
10. A. Sassaroli, F. Martelli, and S. Fantini, "Perturbation theory for the diffusion equation by use of the moments of the generalized temporal point-spread function. III. Frequency-domain and time-domain results," *J. Opt. Soc. Am. A* **27**, 1723-1742 (2010). [Selected for the *Virtual Journal for Biomedical Optics* **5**(11), August 25, 2010]
11. B. Hallacoglu, R. S. Matulewicz, H. J. Paltiel, H. Padua, P. Gargollo, G. Cannon, A. Alomari, A. Sassaroli, and S. Fantini, "Noninvasive assessment of testicular torsion in rabbits using frequency-domain near-infrared spectroscopy: Prospects for pediatric urology," *J. Biomed. Opt.* **14**, 054027/1-7 (2009).
12. Y. Yu, N. Liu, A. Sassaroli, and S. Fantini, "Near-infrared spectral imaging of the female breast for quantitative oximetry in optical mammography," *Appl. Opt.* **48**, D225-D235 (2009). [Selected for the *Virtual Journal for Biomedical Optics* **4**(6), May 26, 2009].
13. A. Sassaroli, F. Martelli, and S. Fantini, "Higher-order perturbation theory for the diffusion equation in heterogeneous media: application to layered and slab geometries," *Appl. Opt.* **48**, D62-D73 (2009). [Selected for the *Virtual Journal for Biomedical Optics* **4**(6), May 26, 2009].
14. L. M. Hirshfield, E. T. Solovey, A. Girouard, J. Kebinger, R. J. K. Jacob, A. Sassaroli, and S. Fantini, "Brain measurements for usability testing and adaptive interfaces: an example of uncovering syntactic workload with functional near infrared spectroscopy," *CHI 2009*, pp. 2185-2194 (2009). (*Refereed*).
15. L. M. Hirshfield, K. Chauncey, R. Gulotta, A. Girouard, E. T. Solovey, R. J. K. Jacob, A. Sassaroli, and S. Fantini, "Combining electroencephalograph and functional near infrared spectroscopy to explore users' mental workload," *HCI 2009* (16), pp. 239-247 (2009). (*Refereed*).
16. E. T. Solovey, A. Girouard, K. Chauncey, L. M. Hirshfield, A. Sassaroli, F. Zheng, S. Fantini, and R. J. K. Jacob, "Using fNIRS Brain Sensing in Realistic HCI Settings: Experiments and Guidelines," *UIST 2009 Symposium on User Interface Software and Technology*, ACM Press, pp. 157-166 (2009). (*Refereed*).
17. A. Girouard, E. T. Solovey, L. M. Hirshfield, K. Chauncey, A. Sassaroli, S. Fantini, and R. J. K. Jacob, "Distinguishing difficulty levels with non-invasive brain activity measurements," *INTERACT 2009*, T. Gross *et al.*, Eds., Part I, LNCS **5726**, 440-452 (2009). (*Refereed*).
18. A. Sassaroli, F. Zheng, L. H. Hirshfield, A. Girouard, E. T. Solovey, R. J. K. Jacob, and S. Fantini, "Discrimination of mental workload levels in human subjects with functional near-infrared spectroscopy," *J. Innov. Opt. Health Sci.* **1**, 227-237 (2008).
19. K. H. Kim, C. Buehler, K. Bahlmann, T. Ragan, W.-C. A. Lee, E. Nedivi, E. L. Heffer, S. Fantini, and P. T. C. So, "Multifocal multiphoton microscopy based on multianode photomultiplier tubes," *Opt. Express* **15**, 11658-11678 (2007).
20. N. Liu, A. Sassaroli, and S. Fantini, "Paired-wavelength spectral approach to measuring the relative concentrations of two localized chromophores in turbid media: an experimental study," *J. Biomed. Opt.* **12**, 051602/1-7 (2007). [Selected for the *Virtual Journal of Biological Physics Research (Instrumentation Development section)* **14**(7),

October 1, 2007].

21. T. V. Vo, P. E. Hammer, M. L. Hoimes, S. Nadgir, and S. Fantini, "Mathematical model for the hemodynamic response to venous occlusion measured with near-infrared spectroscopy in the human forearm," *IEEE Trans. Biomed. Eng.* **54**, 573-584 (2007).
22. A. Sassaroli, B. deB. Frederick, Y. Tong, P. F. Renshaw, and S. Fantini, "Spatially weighted BOLD signal for comparison of functional magnetic resonance imaging and near-infrared imaging of the brain," *NeuroImage* **33**, 505-514 (2006).
23. Y. Tong, J. M. Martin, A. Sassaroli, P. R. Clervil, P. R. Bergethon, and S. Fantini, "Fast optical signals in the peripheral nervous system," *J. Biomed. Opt.* **11**, 044014/1-5 (2006).
24. A. Sassaroli, F. Martelli, and S. Fantini, "Perturbation theory for the diffusion equation by use of the moments of the generalized temporal point spread function. II. Continuous-wave results," *J. Opt. Soc. Am. A* **23**, 2119-2131 (2006).
25. A. Sassaroli, F. Martelli, and S. Fantini, "Perturbation theory for the diffusion equation by use of the moments of the generalized temporal point-spread function. I. Theory," *J. Opt. Soc. Am. A* **23**, 2105-2118 (2006).
26. N. Liu, A. Sassaroli, and S. Fantini, "Two-dimensional phased-arrays of sources and detectors for depth discrimination in diffuse optical imaging," *J. Biomed. Opt.* **10**, 051801/1-7 (2005).
27. N. Liu, A. Sassaroli, M. A. Zucker, and S. Fantini, "Three-element phased-array approach to diffuse optical imaging based on post-processing of continuous-wave data," *Opt. Lett.* **30**, 281-283 (2005).
28. A. Sassaroli and S. Fantini, "Comment on the modified Beer-Lambert law for scattering media," *Phys. Med. Biol.* **49**, N255-N257 (2004).
29. E. L. Heffer, V. E. Pera, O. Schütz, H. Siebold, S. Heywang-Köbrunner, L. Götz, A. Heinig, and S. Fantini, "Near-infrared imaging of the human breast: Complementing hemoglobin concentration maps with oxygenation images," *J. Biomed. Opt.* **9**, 1152-1160 (2004).
30. V. Quaresima, M. Ferrari, M. A. Franceschini, M. L. Hoimes, and S. Fantini, "Spatial distribution of vastus lateralis blood flow and oxyhemoglobin saturation measured at the end of isometric quadriceps contraction by multichannel near-infrared spectroscopy," *J. Biomed. Opt.* **9**, 413-420 (2004).
31. F. Fabbri, A. Sassaroli, M. E. Henry, and S. Fantini, "Optical measurements of absorption changes in two-layered diffusive media," *Phys. Med. Biol.* **49**, 1183-1201 (2004).
32. F. Fabbri, M. E. Henry, P. F. Renshaw, S. Nadgir, B. L. Ehrenberg, M. A. Franceschini, and S. Fantini, "Bilateral near-infrared monitoring of the cerebral concentration and oxygen-saturation of hemoglobin during right unilateral electro-convulsive therapy," *Brain Research* **992**, 193-204 (2003).
33. M. A. Franceschini, S. Fantini, J. H. Thompson, J. P. Culver, and D. A. Boas, "Hemodynamic evoked response of the sensorimotor cortex measured noninvasively with near-infrared optical imaging," *Psychophysiology* **40**, 548-560 (2003).
34. F. Fabbri, M. A. Franceschini, and S. Fantini, "Characterization of spatial and temporal variations in the optical properties of tissue-like media with diffuse reflectance imaging," *Appl. Opt.* **42**, 3063-3072 (2003).
35. V. E. Pera, E. L. Heffer, H. Siebold, O. Schütz, S. Heywang-Köbrunner, L. Götz, A. Heinig, and S. Fantini, "Spatial second-derivative image processing: An application to optical mammography to enhance the detection of breast tumors," *J. Biomed. Opt.* **8**, 517-524 (2003).
36. S. Fantini, "A haemodynamic model for the physiological interpretation of *in vivo* measurements of the concentration and oxygen saturation of haemoglobin," *Phys. Med. Biol.* **47**, N249-N257 (2002).
37. E. L. Heffer and S. Fantini, "Quantitative oximetry of breast tumors: A novel near-infrared method that identifies two optimal wavelengths for each tumor," *Appl. Opt.* **41**, 3827-3839

- (2002).
38. M. A. Franceschini, D. A. Boas, A. Zourabian, S. G. Diamond, S. Nadgir, D. W. Lin, J. B. Moore, and S. Fantini, "Near-Infrared Spiroximetry: Non-Invasive Measurement of Venous Saturation in Piglets and Human Subjects," *J. Appl. Physiol.* **92**, 372-384 (2002).
 39. D. M. Hueber, M. A. Franceschini, H. Y. Ma, Q. Xu, J. R. Ballesteros, S. Fantini, D. Wallace, V. Ntziachristos, and B. Chance, "Non-Invasive and Quantitative Near-Infrared Hemoglobin Spectrometry in the Piglet Brain During Hypoxic Stress, Using a Frequency-Domain Multi-Distance Instrument," *Phys. Med. Biol.* **46**, 41-62 (2001).
 40. C. Casavola, L. A. Paunescu, S. Fantini, and E. Gratton, "Blood Flow and Oxygen Consumption with Near-Infrared Spectroscopy and Venous Occlusion: Spatial Maps and the Effect of Time and Pressure of Inflation," *J. Biomed. Opt.* **5**, 269-276 (2000).
 41. V. Toronov, M. A. Franceschini, M. Filiaci, M. Wolf, S. Fantini, and E. Gratton, "Near-Infrared Study of Fluctuations in Cerebral Hemodynamics During Rest and Motor Stimulation: Spatial Mapping and Temporal Analysis," *Med. Phys.* **27**, 801-815 (2000).
 42. M. A. Franceschini, V. Toronov, M. E. Filiaci, E. Gratton, and S. Fantini, "On-Line Optical Imaging of the Human Brain with 160-ms Temporal Resolution," *Opt. Express* **6**, 49-57 (2000).
 43. S. Fantini and E. Gratton, "Fluorescence Photon-Density Waves in Optically Diffusive Media," *Opt. Comm.* **173**, 73-79 (2000).
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