CURRICULUM VITAE

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PART I: General Information

Name: Maria Angela Franceschini

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Place of Birth: Arezzo, Italy

Education:

1992	PH.D. (Physics), University of Florence

Postdoctoral Training:

01/93-12/96	Post Doctoral Research Associate, Biomedical Optic, Laboratory for Fluorescence Dynamics, Department of Physics, University of Illinois at Urbana-Champaign, IL

Academic Appointments:

1996-1999	Research Physicist, Department of Physics, Univeristy of Illinois at Urbana-Champaign, IL
1999-2002	Research Assistant Professor, Department of Electrical Engineering and Computer Science, Tufts University, Medford, MA
2000-2002	Research Fellow in Radiology, Radiology-Massachusetts General Hospital, Boston, MA
2002-2003	Instructor in Radiology, Radiology-Massachusetts General Hospital, Boston, MA
2003-	Assistant Professor, Harvard Medical School, Boston, MA

Hospital or Affiliated Institution Appointments:

01/00-	Assistant Physicist, Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Charlestown, MA

Professional Societies:

1998-	Optical Society of America (OSA), Member
2000-	Organization for Human Brain Mapping (OHBM), Member

2005- Society for Neuroscience (SFN), Member

Part II: Research, Teaching, and Clinical Contributions

A. Narrative report of Research, Teaching, and Clinical Contributions

My research activity focuses broadly on the development and application of non-invasive optical techniques to studies of the human brain. Near-infrared spectroscopy (NIRS) and diffuse optical imaging (DOI) use light in the visible and near-infrared spectral regions (wavelength range: 650-950 nm) to quantify absolute or relative changes in hemoglobin concentration in biological tissues.

My interdisciplinary research activity covers diverse areas such as design and development of instrumentation, development of data processing algorithms for image reconstruction, data collection with human subjects and animal models, and the search for potential clinical applications.

I began working with NIRS in the early 1990s, when the field was just emerging, and I have contributed to the development of instruments now commercially available and widely used. As a pioneer in the field I have made substantial contributions to the modeling and testing of the diffusion theory to describe light propagation in turbid media. As an experimentalist interested in biomedical applications, I have tested the technique for several medical applications, including detection of breast cancer, assessment of peripheral vascular disease, non-invasive blood glucose monitoring, and brain oxygenation monitoring.

Since 1999, I have focused on optical functional brain studies in humans and animals. The methods we use are very sensitive to hemoglobin changes at depths of up to several cm. The information one can obtain is mostly related to changes in the blood flow and in the oxygen saturation of hemoglobin in the cerebral cortex. This is relevant because one can detect and investigate the hemodynamic changes associated with brain activity in healthy and diseased brain. Furthermore, the methods may be sensitive to the direct effects of neuronal activation, thus opening new opportunities for the investigation of neurovascular coupling.

Neurovascular coupling is my key research interest and I have designed and performed a number of multimodal studies using fMRI, MEG and EEG.

Another primary interest is development of a near-infrared spectroscopy device for continuous monitoring of the regional tissue oxygenation, cerebral blood volume and oxygen consumption in the neonate’s brain. Such a device shows potential for detecting brain tissue compromise before the development of irreversible structural damage, thus allowing for timely and specific intervention. In the past two years we have collected data in more than 100 infants and demonstrated the ability of NIRS to detect brain damage. In addition, we have recently shown that we can follow the development of brain vasculature in healthy humans from birth to 1 year of age. We are now measuring deviations from the normal development due to brain damage. The long-term objective of this project is to establish NIRS as new standards for monitoring neonatal brain health and metabolic and hemodynamic development in the normal and diseased brain.

My teaching interests encompass supervising the laboratory activity of graduate and undergraduate students. I have mentored several students visiting the lab; I have guided them through their research projects, teaching them the procedures for data collection and analysis, and the organization of the material for oral and written presentation of the results.

B. Funding Information

2000-2009 Co-Investigator, NIH/NIBIB, 2P41RR14075-07, Brain Functional Imaging Regional Resource. Project 4: Diffuse Optical Tomography

2000-2008	P.I., NIH/NIBIB, 2R01EB001954-07, Non-Invasive Optical Imaging of the Human Brain
2001-2002	Co-Investigator, NIH/NIDA, 1R01DA14178, High Field MR Research in Drug Abuse: A Bioengineering Partnership
2002-2008	P.I., NIH/NICHD, 1R01HD42908-04, Optical Monitoring of Cerebral Oxygenation in Infants
2003-2004	Co-Investigator, CIMIT, KFSH, Optical imaging for rapid determination of pain
2003-2005	Collaborator, NIH/INDS, 1R01NS44623, Neural-electromagnetic hemodynamic links in humans
2003-2008	Co-Inestigator, NIH/NIBIB, 1R01EB002482-04, Imaging CMRO2 with Combined DOT and MRI
2004-2007	PI of the sub-contract, NIH/NINDS, 2R44NF044785-02, Use of Diffuse Optical Tomography from Stroke
2006-2008	P.I., Foundation, Claflin Distinguished Scholar , Neonatal Brain Health Assessment with Frequency-Domain Near-Infrared Spectroscopy
2007-2008	P.I., MGH, ECOR Interim Support Fund, Optical Monitoring of Cerebral Oxygenation in Infants

D. Report of Teaching

1. Local contributions

g. Advisees/Trainees

Training Duration	*Name*	*Current Position*
2002-2003	Andres Bur	Tufts Medical Student
2002-2003	Kathleen Chen	Resident at Cornell Medical School
2002-2003	Merja Hotakainen	Other
2003-2005	Sonal Thaker	Northrop Grumman Corporation
2003-2006	George Themelis	Post-Doctoral Fellow in Greece
2005-2006	Arielle Tambini	Graduate Student
2005-2007	Ilkka Nissila	Post-Doctoral Fellow in Finland
2006-	Harsha Radhakrishnan	Laboratory Research Technologist
2007-	Nadège Roche	Post-Doctoral Fellow
2007-	Kiran Thakur	Tufts Medical Student

2. Regional, national, or international contributions

a. Invited Presentations

National

2004	Diffuse optical imaging and spectroscopy of the brain, Infant OT/NIRS workshop, The Charles Hotel, Cambridge, MA *[Invited Lecture]*
2005	Diffuse Optical Imaging, MEG and fMRI in functional brain studies: a multi-modality approach, Turning to the light: New methods in Optical Medical Imaging, New York Academy of Sciences, New York, NY *[Invited Lecture]*
2007	Brain injury studies with DOT, The MIND Institute, Albuquerque, NM *[Invited Lecture]*

International

1998 Tissue optics and medicine: Light as a non-invasive sensor of breast tumors, Gordon Conference on Laser in Medicine and Biology, Meriden, NH *[Invited Lecture]*

1999 Non-invasive optical studies of the human brain, breast, and skeletal muscle, 27th Annual Meeting of American Society for Photobiology, Washington, DC *[Invited Lecture]*

1999 Cerebral hemodynamics measured by Near-Infrared Spectroscopy under rest conditions and during motor activation, First Inter-institute Workshop on In Vivo Optical Imaging at the NIH, Bethesda, MD *[Invited Lecture]*

2000 Real-time video of cerebral hemodynamics in the human brain using non-invasive optical imaging, HBM 2000, 6th Annual Meeting of the Organization for Human Brain Mapping, San Antonio, TX *[Selected Presentation]*

2002 Optical imaging of brain function, Photonics Boston: Biomedical workshop, Boston, MA *[Invited Lecture]*

2002 Quest for a robust measurement of the fast signal, Third Inter-Institute Workshop on Diagnostic Optical Imaging and Spectroscopy: The Clinical Adventure. Bethesda, MD *[Invited Lecture]*

2003 Non-invasive optical signals in humans, Optical Imaging Workshop at the annual meeting of the Society for Psychophysiological Research, Chicago, IL *[Invited Lecture]*

2004 Diffuse optical imaging of the brain, BIROW II Workshop, RSNA/NIH, Bethesda, MD *[Invited Lecture]*

2004 Exploring neurophysiology using diffuse optical imaging, Biomedical Optics, OSA, Miami, FL *[Invited Lecture]*

2004 Diffuse Optical Imaging bridges MEG and fMRI in functional brain studies, Fourth Inter-Institute Workshop on Optical Diagnostic Imaging from bench to bedside at NIH, Bethesda, MD *[Invited Lecture]*

2007 NIRS data in infants, science and clinic, Engineering Conference International, Advances in Optics for Biotechnology, Medicine and Surgery, Naples, FL *[Invited Lecture]*

Part III: Bibliography

Original Articles

1. Franceschini MA, Pini R, Salimbeni R, Vannini M. Auto-prepulse operation of a long-pulse XeCl laser. Appl. Physics B. 1992;54:259-64.
2. Fantini S, Franceschini MA, and Gratton E. Semi-infinite-geometry boundary problem for light migration in highly scattering media: a frequency-domain study in the diffusion approximation. J. Opt. Soc. Am. B. 1994;11:2128-38.
3. Fantini S, Franceschini MA, Fishkin JB, Barbieri B, Gratton E. Quantitative determination of the absorption spectra of chromophores in strongly scattering media: a light-emitting-diode based technique. Appl. Opt. 1994;33:5204-13.
4. Maier JS, Walker SA, Fantini S, Franceschini MA, and Gratton E. Possible correlation between blood glucose concentration and reduced scattering coefficient of tissues in the near-infrared. Opt. Lett. 1994;19:2062-4.
5. De Blasi RA, Fantini S, Franceschini MA, Ferrari M, and Gratton E. Cerebral and muscle oxygen saturation measurement by frequency-domain near-infra-red spectrometer. Med. Biol. Eng. Comput. 1995;33:228-30.
6. Fantini S, Franceschini MA, Maier JS, Walker SA, Barbieri B, and Gratton E. Frequency-domain multichannel optical detector for non-invasive tissue spectroscopy and oximetry. Opt. Eng. 1995;34:32-42.
7. Fishkin JB, So PTC, Cerussi AE, Fantini S, Franceschini MA, and Gratton E. Frequency-domain method for determining spectral properites in multiply scattering media: methemoglobin absorption spectrum in a tissue-like phantom. Appl. Opt. 1995;34:1143-55.
8. Gratton G, Fabiani M, Friedman D, Franceschini MA, Fantini S, Corballis PM, and Gratton E. Rapid changes of optical parameters in the human brain during a tapping task. J. Cognitive Neuroscience. 1995;7:446-56.
9. Fantini S, Franceschini MA, Gaida G, Gratton E, Jess H, Mantulin WW, Moesta KT, Schlag PM, and Kaschke M. Frequency-domain optical mammography: edge effect corrections. Med. Phys. 1996;23:149-57.
10. Cerussi E, Maier JS, Fantini S, Franceschini MA, Mantulin WW, and Gratton E. Experimental verification of a theory for the time-resolved fluorescence spectroscopy of thick tissues. Appl. Opt. 1997;36:116-24.
11. Fantini S, Franceschini MA, and Gratton E. Effective source term in the diffusion equation for photon transport in turbid media. Appl. Opt. 1997;36:156-63.
12. Franceschini MA, Fantini S, Cerussi AE, Barbieri B, Chance B, and Gratton E. Quantitative spectroscopic determination of hemoglobin concentration and saturation in a turbid medium: analysis of the effect of water absorption. J. Biomed. Opt. 1997;2:147-53.
13. Franceschini MA, Moesta KT, Fantini S, Gaida G, Gratton E, Jess H, Mantulin WW, Seeber M, Schlag PM, and Kaschke M. Frequency-domain instrumentation enhances optical mammography: inital clincal results. Proc. Natl. Aca. Sci. USA. 1997;2:147-53.
14. Gratton E, Fantini S, Franceschini MA, Gratton G, and Fabiani M. Measurement of scattering and absorption changes in muscle and brain. Phil. Trans. R. Soc. of Lond. B. 1997;352:727-35.
15. Fantini S, Walker SA, Franceschini MA, Moesta KT, Schlag PM, Kaschke M, and Gratton E. Assessment of the size, position, and optical properties of breast tumors in vivo by non-invasive optical methods. Appl. Opt. 1998;37:1982-89.
16. Franceschini MA, Fantini S, Paunescu LA, Maier JS, and Gratton E. Influence of a superficial layer in the quantitative spectroscopic study of strongly scattering media. Appl. Opt.

1998;37:7447-58.

17. Moesta KT, Jess H, Totkas S, Fantini S, Franceshini MA, Kaschke M, and Schlag PM. Contrast features of breast cancer in frequency-domain laser scanning mammography. J. Biomed. Opt. 1998;3:129-36.
18. Casavola C, Paunescu LA, Fantini S, Franceschini MA, Lugara PM, and Gratton E. Application of near-infrared tissue oximetry to the diagnosis of peripheral vascular disease. Clin. Hemorheol. Microcirc. 1999;21:389-93.
19. Fantini S, Franceschini MA, Gratton E, Hueber D, Rosenfeld W, Maulik D, Stubblefield PG, and Stankovic MR. Non-invasive optical mapping of the piglet brain in real time. Opt. Express. 1999;4:308-14.
20. Fantini S, Hueber D, Franceschini MA, Gratton E, Rosenfeld W, Stubblefield PG, Maulik D, and Stankovic MR. Non-invasive optical monitoring of the newborn piglet brain using continuous-wave and frequency-domain methods. Phys. Med. Biol. 1999;44:1543-63.
21. Franceschini MA, Gratton E, and Fantini S. Non-invasive optical method to measure tissue and arterial saturation: an application to absolute pulse oximetry of the brain. Opt. Lett. 1999;24:829-31.
22. Stankovic MR, Maulik D, Rosenfeld W, Stubblefield PG, Kofinas AD, Drexler S, Nair R, Franceschini MA, Hueber D, Gratton E, and Fantini S. Real-time optical imaging of experimental brain ischemia and hemorrhage in neonatal piglets. J. Perinat. Med. 1999;27:279-26.
23. Franceschini MA, Toronov V, Filiaci ME, Gratton E, and Fantini S. On-line optical imaging of the human brain with 160-ms temporal resolution. Opt. Express. 2000;6:49-57.
24. Stankovic MR, Maulik D, Rosenfeld W, Stubblefield PG, Kofinas AD, Gratton E, Franceschini MA, Fantini S, Hueber DM. Role of frequency domain optical spectroscopy in the detection of neonatal brain hemorrhage: a newborn piglet study. J. Matern. Fetal Med. 2000;9:142-49.
25. Toronov V, Franceschini MA, Filiaci M, Wolf M, Fantini S, and Gratton E. Near-infrared study of fluctuations in cerebral hemodynamics during rest and motor stimulation: spatial mapping and temporal analysis. Med. Phys. 2000;27:801-15.
26. Hueber DM, Franceschini MA, Ma HY, Xu Q, Ballesteros JR, Fantini S, Wallace D, Ntziachristos V, and Chance B. 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. 2001;46:41-62.
27. Franceschini MA, Boas DA, Zourabian A, Diamond SG, Nadgir S, Lin DW, Moore JB, and Fantini S. Near-infrared spiroximetry: Non-invasive measurements of venous saturation in piglets and human subjects. J. Appl. Physiol. 2002;92:372-84.
28. Fabbri F, Henry ME, Renshaw PF, Nadgir S, Ehrenberg BL, Franceschini MA, Fantini S. Bi-lateral near-infrared monitoring of the cerebral concentration and oxygen-saturation of hemoglobin during right unilateral electro-convulsive therapy. Brain Research. 2003;992:193-204.
29. Fabbri F, Franceschini MA, Fantini S. Characterization of spatial and temporal variations in the optical properties of tissue-like media with diffuse reflectance imaging. Appl. Opt. 2003;42:3063-72.
30. Franceschini MA, Fantini S, Thompson JJ, Culver JP, Boas DA. Hemodynamic evoked response of the sensorimotor cortex measured non-invasively with near infrared optical imaging. Psychophysiology. 2003;40:548-60.
31. Prince S, Kolehmainen V, Kaipio JP, Franceschini MA, Boas DA, Arridge SR. Time series estimation of biological factors in optical diffusion tomography. Phys. Med. Biol. 2003;48:1491-1504.
32. Strangman G, Franceschini MA, Boas DA. Factors affecting the accuracy of near-infrared

spectroscopy concetration calculations for focal changes in hemodynamics. NeuroImage. 2003;18:865-79.

33. Boas DA, Chen K, Grebert D, Franceschini MA. Improving diffuse optical imaging spatial resolution of cerebral hemodynamic response to brain activation in humans. Opt. Lett. 2004;29 (13):1506-08.
34. Boas DA, Dale AM, Franceschini MA. Diffuse optical imaging of brain activation: approaches to optimizing image sensitivity, resolution, and accuracy. NeuroImage. 2004;23:275-88.
35. Franceschini MA, Boas DA. Non-invasive measurement of neuronal activity with near-infrared optical imaging. NeuroImage. 2004;21:372-86.
36. Quaresima V, Ferrari M, Franceschini MA, Hoimes ML, Fantini S. Spatial distribution of vastus lateralis blood flow and oxyhemoglobin saturation measured at the end of isometric quadriceps contraction by multi-channel near-infrared spectroscopy. J. Biomed. Opt. 2004;9(2):413-20.
37. Culver JP, Siegel AM, Franceschini MA, Mandeville JP, Boas DA. Evidence that cerebral blood volume provides brain activation maps with better spatial resolution than deoxygenated hemoglobin. NeuroImage. 2005;27:947-59.
38. D'Arceuil HE, Hotakainen MP, Liu C, Themelis G, de Crespigny AJ, Franceschini MA. Near-infrared frequency-domain optical spectrometry (NIRS) and magnetic resonance imaging (MRI): a combined approach to studying cerebral maturation in neonatal rabbits. J. Biomed. Opt. 2005;10(1):011011.
39. Hoge RD, Franceschini MA, Huppert TJ, Covolan RJM, Mandeville JB, Boas DA. Simultaneous recording of task-induced changes in blood oxygenation, volume, and flow using diffuse optical imaging and arterial spin-labeling MRI. NeuroImage. 2005;25:701-7.
40. Selb J, Stott JJ, Franceschini MA, Sorenson G, and Boas DA. Improved sensitivity to cerebral hemodynamics during brain activation with a time-gated optical system: analytical model and experimental validation. J. Biomed. Opt. 2005;10(1):011013.
41. Zhang Y, Brooks DH, Franceschini MA, Boas DA. Eigenvector-based spatial filtering for reduction of physiological interference in diffuse optical imaigng. J. Biomed. Opt. 2005;10 (1):011014.
42. Diamond SG, Huppert TJ, Kolehmainen V, Franceschini MA, Kaipio JP, Arridge SR and Boas DA. Dynamic physiological modeling for functional diffuse optical tomography. NeuroImage. 2006;30(1):88-101.
43. Franceschini MA, Joseph DK, Huppert TJ, Diamond SG, and Boas DA. Diffuse optical imaging of the whole head. J. Biomed. Opt. 2006;11(5):054007.
44. Huppert TJ, Hoge RD, Dale AM, Franceschini MA, Boas DA. Quantitative spatial comparison of diffuse optical imaging with blood oxygen level-dependent and arterial spin labeling-based functional magnetic resonance imaging. J. Biomed. Opt. 2006;11:064018.
45. Huppert TJ, Hoge RD, Diamond SG, Franceschini MA and Boas DA. A temporal comparison of BOLD, ASL and NIRS hemodynamic responses to motor stimuli in adult humans. NueroImage. 2006;29(2):368-82.
46. Joseph DK, Huppert TJ, Franceschini MA, and Boas DA. Diffuse optical tomography system to image brain activation with improved spatial resolution and validation with functional magnetic resonance imaging. Appl. Opt. 2006;45(31):8142-51.
47. Franceschini MA, Thaker S, Themelis G, Krishnamoorthy KK, Bortfeld H, Diamond SG, Boas DA, Arivn K, and Grant PE. Assessment of infant brain development with frequency-domain near-infrared spectroscopy. Pediatric Research. 2007;61(5).
48. Themelis G, D'Arceuil H, Diamond SG, Thaker S, Huppert TJ, Boas DA, and Franceschini MA. NIRS measurement of the pulsatile component of cerebral blood flow and volume from the arterial oscillations. J. Biomed. Opt. 2007;12(1):014033.

Proceedings of Meetings

1. Franceschini MA, Pini R, Salimbeni R, Vannini M. Long Pulse XeCl Laser: A New Simple Approach. In: Proceedings of Int. Conf. LASERS 1991; San Diego, California. ;1991. p. 713-21.
2. Benaim G, Mattioli S, Cremona M, Pini R, Salimbeni R, Vannini , Franceschini MA. In Vitro Tests of Excimer Laser Lithotripsy in Urinary Stones. In: Proceedings SPIE 1643; Los Angeles, California. ;1992. p. 73-7.
3. Franceschini MA, Pini R, Salimbeni R, Vannini M, Fu S. Long Pulse XeCl Laser in Auto-Prepulse: Characteristics and Perspectives. In: Proceedings SPIE 1810; Los Angeles, California. ;1992. p. 435-38.
4. Franceschini MA, Fu S, Pini R, Salimbeni R, Vannini M. Auto Prepulse Operation of XeCl Scaled up Laser Prototype: Modelling and Achievements. In: Proceedings of Int. Conf. LASERS 1992; Houston, Texas. ;1992. p. 146-51.
5. Fantini S, Franceschini MA, Maier JS, Walker SA, and Gratton E. Frequency-Domain Multi-Source Optical Spectrometer and Oximeter. In: Proceedings SPIE 2326; ;1994. p. 108-16.
6. Franceschini MA, Fantini S, and Gratton E. LEDs in Frequency-Domain Spectroscpy of Tissues. In: Proceedings SPIE 2135; Los Angeles, California. ;1994. p. 300-6.
7. Gratton E, Fantini S, Franceschini MA, Fishkin JB, and Maier JS. Near-Infrared Optical Spectroscopy of tissues Using an LED Frequency Domain Spectrometer. In: Proceedings of OSA, Trends in Optics and Photonics on Advances in Optical Imaging and Photon Migration 21; Orlando, Florida. ;1994. p. 278-82.
8. Fantini S, Franceschini MA, Fishkin JB, Mantulin WW and Gratton E. The Absorption Spectra of a Chromophore in Highly Scattering Media. In: Proceedings SPIE 2100; ;1994. p. 114-23.
9. Fantini S, Franceschini MA, Fishkin JB, and Gratton E. Absolute Measurement of Absorption and Scattering Coefficients Spectra of a Multiply Scattering Medium. In: Proceedings SPIE 2131; Los Angeles, California. ;1994. p. 356-64.
10. Mantulin WW, Fantini S, Franceschini MA, Walker SA, Maier JS, and Gratton E. Tissue Optical Parameter Map Generated with Frequency-Domain Near-Infrared Spectroscopy. In: Proceedings SPIE 2396; San Jose, California. ;1995. p. 323-30.
11. Ferrari M, De Blasi RA, Fantini S, Franceschini MA, Barbieri B, Quaresima V, and Gratton E. Cerebral and Muscle Oxygen Saturation Measurement by a Frequency-Domain Near-Infrared Spectroscopic Technique. In: Proceedings SPIE 2389; San Jose, California. ;1995. p. 868-74.
12. Franceschini MA, Fantini S, Walker SA, Maier JS, and Gratton E. Multi-Channel Optical Instrument for Near-Infrared Imaging of Tissue. In: Proceedings SPIE 2389; San Jose, California. ;1995. p. 264-72.
13. Fantini S, Franceschini MA, Gaida G, and Kaschke M. Frequency-Domain Optical Mammography: the Problem of Tissue thickness Variations within the Scanned Region. In: Proceedings SPIE 2626; ;1995. p. 228-36.
14. Fantini S, Franceschini MA, Walker SA, Maier JS, and Gratton E. Photon Path Distributions in Turbid Media: Applications for Imaging. In: Proceedings SPIE 2389; San Jose, California. ;1995. p. 340-49.
15. Maier JS, Barbieri B, Chervu A, Chervu I, Fantini S, Franceschini MA, Levi M, Mantulin WW, Rosenberg A, Walker SA, Gratton E. In Vivo Study of Human Tissues with a Portable Near-Infrared Tissue Spectrometer and Oximeter. In: Proceedings SPIE 2387; ;1995. p. 240-48.
16. Maier JS, Cerusi AE, Fantini S, Franceschini MA, and Gratton E. Quantitative Flourescence in Tissue-Like Media. In: E. Sevick-Muraca and D. Benaron, editors. Proceedings of OSA, Trends in Optics and Photonics on Advances in Optical Spectroscopy and Diagnostics 3; Washington, DC. ;1996. p. 206-9.
17. Fantini S, Franceschini MA, Gaida G, Jess H, Erdl H, Mantulin WW, Gratton E, and Kaschke M.

Contrast Enhancement by Edge Effect Corrections in Frequency-Domain Optical Mammography. In: R.R. Alfano and J.G. Fujimoto, editors. Proceedings of OSA, Trends in Optics and Photonics on Advances in Optical Imaging and Photon Migration 2; Washington, DC. ;1996. p. 160-3.

18. Cerussi AE, Maier JS, Fantini S, Franceschini MA, and Gratton E. The Frequency-Domain Multi-Distance Method in the Presence of Curved Boundaries. In: E. Sevick-Muraca and D. Benaron, editors. Proceedings of OSA, Trends in Optics and Photonics on Biomedical Optical Spectroscopy and Diagnostics 3; Washington, DC. ;1996. p. 92-7.
19. Franceschini MA, Fantini S, Cerussi AE, Barbieri B, Chance B, and Gratton E. The Effect of Water in the Quantitation of Hemoglobin Concentration in a Tissue-Like Phantom by Near-Infrared Spectroscopy. In: E. Sevick-Muraca and D. Benaron, editors. Proceedings of OSA, Trends in Optics and Photonics on Biomedical Optical Spectroscopy and Diagnostics 3; Washington, DC. ;1996. p. 126-30.
20. Jess H, Erdl H, Moesta KT, Fantini S, Franceschini MA, Gratton E, and Kaschke M. Intensity-Modulated Breast Imaging: Technology and Clinical Pilot Study Results. In: R.R. Alfano and J.G. Fujimoto, editors. Proceeding of OSA, Trends in Optics and Photonics on Advances in Optical Imaging and Photon Migration 2; Washington, DC. ;1996. p. 126-9.
21. Fantini S, Moesta KT, Franceschini MA, Jess H, Erdl H, Gratton E, Schlag PM, and Kaschke M. Instrumentation and Clinical Applications in Frequency-Domain Optical Mammography. In: A.H. Hielscher and L. Wang, chairs. Proceedings of 19th Int. Conf. IEEE/EMBS on Photon Migration Tomography MS21; ;1997. p. 2741-4.
22. Fantini S, Franceschini MA, and Gratton E. Effect of Spatially Distributed Light Sources on the Frequency-Domain Solution to the Diffusion Equation. In: Proceedings SPIE 2979; San Jose, California. ;1997. p. 509-14.
23. Franceschini MA, Wallace D, Barbieri B, Fantini S, Mantulin WW, Pratesi S, Donzelli GP, and Gratton E. Optical Study of the Skeletal Muscle During Exercise with a Second Generation Frequency-Domain Tissue Oximeter. In: Proceeding SPIE 2979; San Jose, California. ;1997. p. 807-14.
24. Quaresima V, Franceschini MA, Fantini S, Gratton E, and Ferrari M. Difference in Leg Muscles Oxygenation During Treadmill Exercise by a New Near-Infrared Frequency-Domain Oximeter. In: Proceedings SPIE 3194; San Remo, Italy. ;1998. p. 116-20.
25. Paunescu LA, Franceschini MA, Fantini S, Cerussi AE, and Gratton E. Effective Optical Properties of Two-Layered Turbid Media Using the Frequency-Domain Multi-Distance Method. In: J.G. Fujimoto and M. Patterson, editors. Proceedings of OSA, Trends in Optics and Photonics on Advances in Optical Imaging and Photon Migration 21; Washington, DC. ;1998. p. 79-83.
26. Franceschini MA, Paunescu LA, Fantini S, Pratesi S, Maier JS, Donzelli GP, and Gratton E. Frequency-Domain Optical Measurements in Vitro on Two-and Three-Layered Tissue-Like Phantoms and in Vivo on Infant Heads. In: J.G. Fujimoto and M. Patterson, editors. Proceedings of OSA, Trends in Optics and Photonics on Advances in Optical Imaging and Phton Migration 21; Washington, DC. ;1998. p. 232-6.
27. Fantini S, Walker SA, Franceschini MA, Moesta KT, Schlag PM, Kaschke M, and Gratton E. Optical Characterization of Breat Tumors by Frequency-Domian Optical Mammography. In: J.G. Fujimoto and M. Patterson, editors. Proceedings of OSA, Trends in Optics and Photonics on Advances in Optical Imaging and Photon Migration 21; Washington, DC. ;1998. p. 289-93.
28. Franceschini MA, Fantini S, Palumbo R, Pasqualini L, Vaudo G, Franceschini E, Gratton E, Palumbo B, Innocente S, and Mannarino E. Quantitative Near-Infrared Spectroscopy on Patients with Peripheral Vascular Disease. In: Proceedings SPIE 3194; San Remo, Italy. ;1998. p. 112-5.
29. Franceschini MA, Gratton E, Hueber DM, and Fantini S. Near-infrared Absorption and Scattering Spectra of Tissues in Vivo. In: Proceedings SPIE 3597; San Jose, California. ;1999. p.

526-31.

30. Toronov V, Filiaci M, Franceschini MA, Fantini S, and Gratton E. Photon-density-wave fluctuaction-correlation-spectroscopy: study of coherence in the brain and muscles. In: Proceedings SPIE 3597; San Jose, California. ;1999. p. 244-51.
31. Paunescu LA, Casavola C, Franceschini MA, Fantini S, Winter L, Kim J, Wood D, and Gratton E. Calf muscle blod flow and oxygen consumption measured with near-infrared spectroscopy during venous occlusion. In: Proceedings SPIE 3597; San Jose, California. ;1999. p. 317-23.
32. Fantini S, Schutz O, Edler J, Heywang-Kobrunner S, Gotz L, Franceschini MA, and Siebold H. Clinical Applications of Frequency-Domain Optical Mammography. In: Proceedings SPIE 3566; San Jose, California. ;1999. p. 194-9.
33. Casavola C, Paunescu LA, Franceschini MA, Fantini S, Winter L, Kim J, Wood D, and Gratton E. Near-infrared spectroscopy and tilting table protocol: a novel method to study the blood flow and the oxygen consumption in tissue. In: Proceedings SPIE 3597; San Jose, California. ;1999. p. 685-92.
34. Stankovic MR, Hueber DM, Maulik D, P, Stubblefield G, Rosenfeld W, Gratton E, Franceschini MA, and Fantini S. Real-Time Optical Imaging and Spectroscopy of Brain Ischemia and Hemorrhage. In: Proceedings SPIE 3597; San Jose, California. ;1999. p. 676-84.
35. Franceschini MA, Toronov V, Filiaci M, Wolf M, Michalos A, Gratton E, and Fantini S. Real-time video of brain activation in human subjects using a non-invasive near-infrared technique. In: Proceedings of OSA, Advances in Optical Imaging and Photon Migration, Topical Meeting; Miami Beach, Florida. ;2000. p. 265-67.
36. Franceschini MA, Fantini S, Toronov V, Filiaci ME, Gratton E. Cerebral Hemodynamics Measured by Near-Infrared Spectroscopy at Rest and During Motor Activation. In: A. Gandjbakhche, editor. Proceedings of OSA, In Vivo Optical Imaging; Washington, DC. ;2000. p. 73-80.
37. Fantini S, Heffer EL, Franceschini MA, Gotz L, Heinig A, Heywang-Kobrunner S, Schutz O, Siebold H. Optical Mammography with Intensity-Modulated Light. In: A. Gandjbakhche, editor. Proceedings of OSA, In Vivo Optical Imaging; Washington, DC. ;2000. p. 111-7.
38. Fantini S, Franceschini MA, Hueber DM, Quistorff B, Greisen G, Brun NC, Ballesteros J, Zhang Q, Ma H, Ntziachristos V, and Chance B. Quantitative optical monitoring of the hemoglobin concentration and saturation in the piglet brain. In: Proceedings of OSA, Advances in Optical Imaging and Photon Migration, Topical Meeting; April 2-5, 2000; Miami Beach, Florida. ;2000. p. 457.
39. Heffer EL, Franceschini MA, Fantini S, Heywang-Kobrunner S, Gotz L, Heinig A, Schutz O, Siebold H. Analysis of Frequency-Domain Optical Mammograms Using Spectral Information. In: Proceedings of OSA, Advances in Optical Imaging and Photon Migration, Topical Meeting; Miami Beach, Florida. ;2000. p. 401-2.
40. Franceschini MA, Zourabian A, Moore JB, Arora A, Fantini S, and Boas DA. Local measurement of venous saturation in tissue with non-invasive, near-infrared respiratory-oximetry. In: Proceedings SPIE 4250; San Jose, California. ;2001. p. 164-70.
41. Nadgir S, Fantini S, Renshaw PF, Henry M, Franceschini MA. Monitoring cerebral hemodynamic using near-infrared spectroscopy during electro-convulsive therapy. In: Proceedings of OSA, Biomedical Topical Meeting; Miami Beach, Florida. ;2002. p. 167-9.
42. Aggarwal P, Chen K, Franceschini MA, Ehrenberg B, Fantini S. Concurrent cerebral near-infrared spectroscopy and electroencephalography during all-night sleep. In: Proceedings of OSA, Biomedical Topical Meeting; Miami Beach, Florida. ;2002. p. 297-9.
43. Franceschini MA, Thompson J, Culver JP, Strangman G, Boas DA. Looking for the fast signal: Neuronal and hemodynamic evoked responses of the sensory-motor cortex. In: Proceedings of OSA, Biomedical Topical Meeting; Miami Beach, Florida. ;2002. p. 208-10.

44. Culver JP, Siegel A, Franceschini MA, Marota JJ, Mandevile JB, Boas DA. Which hemodynamic contrast best localizes neuronal activity? A diffuse optical tomography study. Proceedings of ISMRM, 10th Scientific Meeting; Honolulu, Hawaii. ;2002.
45. Culver JP, Siegel A, Franceschini MA, Marota JJ, Mandeville JB, Boas DA. Which hemodynamic contrast best localizes neuronal activity? In: Proceedings of OSA, Biomedical Topical Meeting; Miami Beach, Florida. ;2002. p. 41-3.
46. D'Arceuil HE, Hotakainen MP, Liu C, De Crespigny A, Franceschini MA. Postnatal Brain Maturation in Rabbits Studied by Combined NIRS and MRI. Proceedings of ISMRM, 12th Scientific Meeting; Japan. ;2004.
47. Huppert TJ, Hoge RD, Franceschini MA, Boas DA. A Temporal Comparison of Simultaneously Acquired BOLD fMRI and Near-Infrared Spectroscopy(NIRS) Hemodynamic Response Functions. In: Proceedings of HBM, 10th Annual Meeting of the Organization for Human Brain Mapping, conference on Functional Mapping of the Human Brain, Neuroimage 22; June 13-17, 2004; Budapest, Hungary. ;2004. p. 24.
48. Themelis G, Selb J, Thaker S, Stott JJ, Custo A, Boas DA, Franceschini MA. Depth of arterial oscillation resolved with NIRS time and frequency domain. In: Proceedings of OSA, Biomedical Topical Meeting; Miami Beach, Florida. ;2004. p. WF2.
49. Selb J, Stott JJ, Franceschini MA, and Boas DA. Improvement of depth sensitivity to cerebral hemodynamics with a time domain system. In: Proceedings if OSA, Biomedical Topical Meeting; Miami Beach, Florida. ;2004. p. FC3.
50. Franceschini MA, Andre CJ, Huppert TJ, Joseph D, Stott J, and Boas DA. Diffuse optical imaging of the whole head. Proceedings of HBM, 10th Annual Meeting of the Organization for Human Brain Mapping, conference on Functional Mapping of the Human Brain, Neuroimage 22; June 13-17, 2004; Budapest, Hungary. ;2004.
51. Zhang Y, Brooks DH, Franceschini MA, Boas DA. Improved localization of evoked hemodynamic response in diffuse otpical functional imaging using a spatial subspace approach. In: Proceedings of OSA, Biomedical Topical Meeting; Miami Beach, Florida. ;2004. p. WF3.
52. Huppert TJ, Hoge RD, Franceschini MA, Boas DA. Calculation of task-evoked changes in the cerebral metabolic rate of oxygen consumption from simultaneous. In: Proceedings of OSA, Biomedical Topical Meeting; Miami Beach, Florida. ;2004. p. WF4.
53. Diamond SG, Huppert TJ, Kolehmainen V, Franceschini MA, Kaipio JP, Arridge SR, and Boas DA. Physiological System Identification with the Kalman Filter in Diffuse Optical Tomography. In: Proceedings of Lecture Notes in Computer Science, MICCAI 3750; ;2005. p. 649-56.
54. Themelis G, D'Arceuil H, Thaker S, Diamond SG, Franceschini MA. Cerebral blood flow and volume measurement in piglets using CW NIRS system. Proceedings of ECBO; Munich, Germany. ;2005.
55. Thaker S, Chaves T, Themelis G, Almeida P, Krishnamoorthy K, Arvin K, Grant E, Franceschini MA. NIRS measurements of cerebral hemoglobin concentration and oxygenation in neonates. Proceedings of ECBO; Munich, Germany. ;2005.
56. Themelis G, D'Arceuil H, Diamond SG, Thaker S, Huppert TJ, Boas DA, Franceschini MA. NIRS Measurement of Pulsatile Component of Cerebral Blood Flow and Volume from the Arterial Oscillations. Proceedings of OSA, Biomedical Topical Meeting; Fort Lauderdale, Florida. ;2006.
57. Joseph DK, Huppert TJ, Franceschini MA, Boas DA. Design and Validation of a Diffuse Optical Tomography System with Improved Spatial Resolution for Functional Brain Imaging. proceedings of OSA, Biomedical Topical Meeting; Fort Lauderdale, Florida. ;2006.
58. Franceschini MA, Nissila I, Wu W, Bonmassar G, Boas DA. Neurovascular Coupling in the Rat Somatosensory Cortex: A Non-Invasive Diffuse Optical Imaging and Electroencephalography Study. Proceedings of OSA, Biomedical Topical Meeting; Fort Lauderdale, Florida. ;2006.

59. Nissila I, Stufflebeam S, Diamond SG, Huppert TJ, Hamalainen M, Franceschini MA. Responses to Median Nerve Stimulation as Recorded by Simultaneous Diffuse Optical Imaging and Magnetoencephalography. Proceedings of OSA, Biomedical Topical Meeting; Fort Lauderdale, Florida. ;2006.
60. Grant EP, Themelis G, Arvin K, Thaker S, Krishnamoorthy KK, Bortfeld H, Franceschini MA. Alterations in Regional Oxygen Saturation (StO2) and Blood Volume (HbT) in Infants with Brain Injuries and ECMO. Proceedings of OSA, Biomedical Topical Meeting; Fort Lauderdale, Florida. ;2006.

Reviews/Chapters/Editorials

1. Fantini S and Franceschini MA. Studio ottico di tessuti biologici nel vicino infrarosso: spettroscopia e tomografia (Optical study of biological tissues in the near-infrared: spectroscopy and tomography), R. Pratesi, editor. Laser e Luce in Chirurgia e Medicina ed in Biotecnologia (Laser and Light in Surgery and Medicine and in Biotechnology). 1995:415-26.
2. Gratton E, Fantini S, Franceschini MA, Walker S, and Maier J. Spectroscopy and tomography of tissues in the frequency-domain. In: E. Kohen and J.G. Hirschberg, editors. Analytical Use of Fluorescent Probes in Oncology. NATO ASI Series, Series A: Life Sciences. New York: Plenum Press;1996. p. 41-52.
3. Fantini S, Barbieri B, Franceschini MA, and Gratton E. Frequency-domain specroscopy. In: E. Kohen, editor. Applications of Optical Engineering to the Study of Cellular Pathology. Trivandum, India: Research Signpost;1997. p. 57-66.
4. Fantini S, and Franceschini MA. Frequency-domain techniques for tissue spectroscopy and imaging. In: V.V. Tuchin, editor. Handbook of Optical Biomedical Diagnostics. Bellingham, WA: SPIE Press;2002. p. 405-53.
5. Boas DA, Franceschini MA, Dunn AK, Strangman G. Non-invasive imaging of cerebral activation with diffuse optical tomography. In: R.D. Frostig, editor. In Vivo Optical Imaging of Brain Function. Boca Raton, London, New York, Washington DC: CRC Press;2002. p. 193-221.
6. Wolf M, Franceschini MA, Paunescu LA, Toronov V, Michalos A, Wolf U, Gratton E, Fantini S. Absolute frequency-domain pulse oxymetry of the brain: Methodology and measurements. Adv. Exp. Med. Bio. 2003;536:61-74.

Educational Materials

1. Fantini S, Franceschini MA. Tomografia Ottica (Optical Tomography). 2000.

Patents

1. Gratton E, Maier JS, Franceschini MA, Fantini S, Walker SA. Determining Material Concentrations in Tissues. U.S. Patent No. 5,492,118. 1996 Feb 20.
2. Gratton E, Fantini S, Franceschini MA, Mantulin WW, Barbieri B. Photosensor with Multiple Light Sources. U.S. Patent No. 5,497,769. 1996 Mar 12.
3. Gratton E, Fantini S, Franceschini MA, Manutlin WW, Barbieri B. Photosensor with Multiple Light Sources. Continuation in part. Us Patent No. 5,772,587. 1998 Jun 30.
4. Gratton E, Fantini S, Franceschini MA, Mantulin WW, Barbieri B. Photosensor with Multiple Light Sources. Continuation in part. US Patent No. 6,192,261. 2001 Feb 20.
5. Franceschini MA, Fantini S, Gratton E. Method for Measuring Absolute Saturation of Time-Varying and Other Hemoglobin Compartments. US Patent No. 6,216,021. 2001 Apr 10.

6. Boas DA, Franceschini MA, Fantini S. Method for Measuring Venous Oxygen Saturation. US Patent No. 6,985,763 B2. 2006 Jan 10.