

Research Grants:

Title: "Non-invasive optical imaging of the human brain"
Agency: NIH - US National Institute of Health
Period: 07/01/2000 – 06/30/2003
Total Amount: \$643,155
Role on Project: PI
Status: Active

Patents:

1. "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: June 4 1999, Issued: April 10, 2001).
2. "Photosensor with Multiple Light Sources," *Continuation-in-part of Pat. Nos. 5,772,587*, Inventors: E. Gratton, S. Fantini, **M. A. Franceschini**, W. W. Mantulin, B. Barbieri. U.S. Patent No. **6,192,261** (Filed: May 4, 1998, Issued: February 20, 2001).
3. "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: November 29 1995, Issued: June 30, 1998).
4. "Determining Material Concentrations in Tissues." Inventors: E. Gratton, J. S. Maier, **M. A. Franceschini**, S. Fantini, S. A. Walker. U.S. Patent No. **5,492,118** (Filed: June 3 1994, Issued: February 20 1996); Canada No. 2,137,878; Europe No. 94309361.7; Japan No. 332,542/94.
5. "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: December 16 1993, Issued: March 12 1996); Canada No. 2,137,878; Europe No. 94309361.7; Japan No. 332,542/94.

Publications - Refereed Journals:

1. Boas DA, **Franceschini MA**, Dunn AK, Strangman G. Non-invasive imaging of cerebral activation with diffuse optical tomography. *Book chapter* May 2001 (submitted).
2. **Franceschini MA**, Boas DA, Zourabian A, Diamond SG, Nadgir S, Lin DW, Moore JB, and Fantini S. Near-infrared spirometry: Non-invasive measurements of venous saturation in piglets and human subjects. *J Appl Physiol*, May 2001 (*in press*).
3. Fantini S, Aggarwal P, Chen K, **Franceschini MA**. Monitoring brain activity using near-infrared light. *Am. Lab.* (2001) (*in press*).
4. Fantini S and **Franceschini MA**. Frequency-domain techniques for tissue spectroscopy and imaging. "Optical Biomedical Diagnostics" chapter 7, V. Tucin Ed., SPIE Press (2001) (*in press*).
5. 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.* 46: 41-62 (2001).
6. Wolf M, **Franceschini MA**, Paunescu LA, Toronov V, Michalos A, Wolf U, Gratton E, and Fantini S. Absolute frequency-domain pulse oximetry of the brain: methodology and measurements. *International Society on Oxygen Transport to Tissue*, September 1999 (*in press*).

7. 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.* 27: 801-815 (2000).
8. **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* 6: 49-57 (2000).
9. 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.* 9: 142-149 (2000).
10. Fantini S and **Franceschini MA**. Tomografia Ottica (“Optical Tomography”). in *Enciclopedia Medica Italiana*, Agg. II, Tomo III, (*Italian Medical Encyclopedia*, Update 2), L. Vella editor, (UTET, Torino), 5824-5832 (2000).
11. Casavola C, Paunescu LA, Fantini S, **Franceschini MA**, Lugarà PM, and Gratton E. Application of near-infrared tissue oxymetry to the diagnosis of peripheral vascular disease. *Clin. Hemorheol. Microcirc.* 21: 389-393 (1999).
12. 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.* 27: 279-286 (1999).
13. **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.* 24: 829-831 (1999).
14. 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* 4: 308-314 (1999).
15. 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.* 44: 1543-1563 (1999).
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.* 37: 7447-7458 (1998).
17. 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.* 37: 1982-1989 (1998).
18. Moesta KT, Jess H, Totkas S, Fantini S, **Franceschini MA**, Kaschke M, and Schlag PM. Contrast features of breast cancer in frequency-domain laser scanning mammography. *J. Biomed. Opt.* 3: 129-136 (1998).
19. 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* 352: 727-735 (1997).
20. **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.* 2: 147-153 (1997).

21. Fantini S, Barbieri B, **Franceschini MA**, and Gratton E. Frequency-domain spectroscopy. in *Applications of Optical Engineering to the Study of Cellular Pathology*, E. Kohen, Ed., (Research Signpost, Trivandrum, India, 1997), pp. 57-66.
22. **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: initial clinical results. *Proc. Natl. Acad. Sci. USA* 94: 6468-6473 (1997).
23. 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.* 36: 116-124 (1997).
24. Fantini S, **Franceschini MA**, and Gratton E. Effective source term in the diffusion equation for photon transport in turbid media. *Appl. Opt.* 36: 156-163 (1997).
25. 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.* 23: 149-157 (1996).
26. Gratton E, Fantini S, **Franceschini MA**, Walker S, and Maier J. Spectroscopy and tomography of tissues in the frequency-domain. in *Analytical Use of Fluorescent Probes in Oncology* NATO ASI Series, Series A: Life Sciences Vol. 286, E. Kohen and J. G. Hirschberg, eds., (Plenum Press, New York, 1996), pp. 41-52.
27. 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"), in *Laser e Luce in Chirurgia e Medicina ed in Biotecnologia (Laser and Light in Surgery and Medicine and in Biotechnology)*, R. Pratesi, ed., (Consiglio Nazionale delle Ricerche-Area della Ricerca di Firenze, Florence, Italy, 1995), pp. 415-426.
28. 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.* 33: 228-230 (1995).
29. 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* 7: 446-456 (1995).
30. 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.* 34: 32-42 (1995).
31. Fishkin JB, So PTC, Cerussi AE, Fantini S, **Franceschini MA**, and Gratton E. Frequency-domain method for determining spectral properties in multiply scattering media: methemoglobin absorption spectrum in a tissue-like phantom. *Appl. Opt.* 34: 1143- 1155 (1995).
32. 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.* 19: 2062-2064 (1994).
33. 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* 11: 2128-2138 (1994).

34. 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.* 33: 5204-5213 (1994).
35. **Franceschini MA**, Pini R, Salimbeni R, Vannini M. Auto-prepulse operation of a long-pulse XeCl laser. *Appl. Physics B* **54**, 259-264 (1992).

Publications - Conference Proceedings:

1. **M. A. Franceschini**, A. Zourabian, J. B. Moore, A. Arora, S. Fantini, and D. A. Boas "Local measurement of venous saturation in tissue with non-invasive, near-infrared respiratory-oximetry," *Proc. SPIE* 4250: 164-170(2001).
2. S. Fantini, M. L. Hoimes, C. Casavola, and **M. A. Franceschini** "Spatial Mapping of Blood Flow and Oxygen Consumption in the Human Calf Muscle Using Near-Infrared Spectroscopy," *Proc. SPIE* 4241, (2000) (*in press*).
3. **M. A. Franceschini**, V. Toronov, M. E. Filiaci, M. Wolf, A. Michalos, E. Gratton, and S. Fantini, "Real-time video of brain activation in human subjects using a non-invasive near-infrared technique," *OSA Biomedical Topical Meetings*, (Optical Society of America, Miami Beach, FL 2000), 265-267.
4. S. Fantini, **M. A. Franceschini**, D. Hueber, B. Quistorff, G. Greisen, N. C. Brun, J. Ballesteros, Q. Zhang, H. Ma, V. Ntziachristos, and B. Chance, "Quantitative optical monitoring of the hemoglobin concentration and saturation in the piglet brain," *OSA Advances in Optical Imaging and Photon Migration (PM) Topical Meeting*, April 2-5, 2000 Miami Beach, Florida, 457.
5. E. L. Heffer, **M. A. Franceschini**, S. Fantini, S. Heywang-Köbrunner, L. Götz, A. Heinig, O. Schütz, H. Siebold, "Analysis of Frequency-Domain Optical Mammograms Using Spectral Information," *OSA Biomedical Topical Meetings*, (Optical Society of America, Miami Beach, FL 2000), 401-402.
6. **M. A. Franceschini**, S. Fantini, V. Toronov, M. E. Filiaci, E. Gratton, "Cerebral Hemodynamics Measured by Near-Infrared Spectroscopy at Rest and During Motor Activation," *OSA In Vivo Optical Imaging Workshop*, A. Gandjbakhche ed., (Optical Society of America, Washington, DC 2000), 73-80 (2000).
7. S. Fantini, E. L. Heffer, **M. A. Franceschini**, L. Götz, A. Heinig, S. Heywang-Köbrunner, O. Schütz, H. Siebold "Optical Mammography with Intensity-Modulated Light," *OSA In Vivo Optical Imaging Workshop*, A. Gandjbakhche ed., (Optical Society of America, Washington, DC 2000), 111-117 (2000).
8. **M. A. Franceschini**, E. Gratton, D. Hueber, and S. Fantini, "Near-Infrared Absorption and Scattering Spectra of Tissues *in Vivo*," *Proc. SPIE* **3597**, 526-531 (1999).
9. M. R. Stankovic, D. M. Hueber, D. Maulik, P. G. Stubblefield, W. Rosenfeld, E. Gratton, **M. A. Franceschini**, and S. Fantini, "Real-Time Optical Imaging and Spectroscopy of Brain Ischemia and Hemorrhage," *Proc. SPIE* **3597**, 676-684 (1999).
10. V. Toronov, M. Filiaci, **M. A. Franceschini**, S. Fantini, and E. Gratton, "Photon-density-wave fluctuation-correlation-spectroscopy: study of coherence in the brain and muscles," *Proc. SPIE* **3597**, 244-251 (1999).

11. C. Casavola, L. A. Paunescu, **M. A. Franceschini**, S. Fantini, L. Winter, J. Kim, D. Wood, and E. Gratton, "Near-infrared spectroscopy and tilting table protocol: a novel method to study the blood flow and the oxygen consumption in tissue," *Proc. SPIE* **3597**, 685-692 (1999).
12. L. A. Paunescu, C. Casavola, **M. A. Franceschini**, S. Fantini, L. Winter, J. Kim, D. Wood, and E. Gratton, "Calf muscle blood flow and oxygen consumption measured with near-infrared spectroscopy during venous occlusion," *Proc. SPIE* **3597**, 317-323 (1999).
13. S. Fantini, O. Schütz, J. Edler, S. Heywang-Köbrunner, L. Götz, **M. A. Franceschini**, and H. Siebold, "Clinical Applications of Frequency-Domain Optical Mammography," *Proc. SPIE* **3566**, 194-199 (1999).
14. **M. A. Franceschini**, A. Paunescu, S. Fantini, S. Pratesi, J. S. Maier, G. P. Donzelli, and E. Gratton, "Frequency-Domain Optical Measurements in Vitro on Two- and Three-Layered Tissue-Like Phantoms and in Vivo on Infant Heads," *OSA Trends in Optics and Photonics on Advances in Optical Imaging and Photon Migration*, J. G. Fujimoto and M. Patterson, eds., (Optical Society of America, Washington, DC 1998), Vol XXI, pp232-236.
15. L. A. Paunescu, **M. A. Franceschini**, S. Fantini, A. E. Cerussi, and E. Gratton, "Effective Optical Properties of Two-Layered Turbid Media Using the Frequency-Domain Multi-Distance Method," *OSA Trends in Optics and Photonics on Advances in Optical Imaging and Photon Migration*, J. G. Fujimoto and M. Patterson, eds., (Optical Society of America, Washington, DC 1998), Vol XXI, pp79-83.
16. S. Fantini, S. A. Walker, **M. A. Franceschini**, K. T. Moesta, P. M. Schlag, M. Kaschke, and E. Gratton, "Optical Characterization of Breast Tumors by Frequency-Domain Optical Mammography," *OSA Trends in Optics and Photonics on Advances in Optical Imaging and Photon Migration*, J. G. Fujimoto and M. Patterson, eds., (Optical Society of America, Washington, DC 1998), Vol XXI, pp289-293, and *OSA Trends in Optics and Photonics on Biomedical Optical Spectroscopy and Diagnostics*, E. Sevick-Muraca and J. A. Izatt, eds., (Optical Society of America, Washington, DC 1998), Vol XXII, pp143-147.
17. S. Fantini, K. T. Moesta, **M. A. Franceschini**, H. Jess, H. Erdl, E. Gratton, P. M. Schlag, and M. Kaschke, "Instrumentation and Clinical Applications in Frequency-Domain optical Mammography," *Proc. 19th Int. Conf.-IEEE/EMBS on Photon Migration Tomography (MS21)*, A. H. Hielscher and L. Wang, chairs, pp. 2741-2744 (1997).
18. **M. A. Franceschini**, S. Fantini, R. Palumbo, L. Pasqualini, G. Vaudo, E. Franceschini, E. Gratton, B. Palumbo, S. Innocente, and E. Mannarino, "Quantitative Near-Infrared Spectroscopy on Patients with Peripheral Vascular Disease," *Proc. SPIE* **3194**, 112-115 (1998).
19. V. Quaresima, **M. A. Franceschini**, S. Fantini, E. Gratton, and M. Ferrari, "Difference in Leg Muscles Oxygenation During Treadmill Exercise by a New Near-Infrared Frequency-Domain Oximeter," *Proc. SPIE* **3194**, 116-120 (1998).
20. **M. A. Franceschini**, D. Wallace, B. Barbieri, S. Fantini, W. W. Mantulin, S. Pratesi, G. P. Donzelli, and E. Gratton, "Optical Study of the Skeletal Muscle During Exercise with a Second Generation Frequency-Domain Tissue Oximeter," *Proc. SPIE* **2979**, 807-814 (1997).
21. S. Fantini, **M. A. Franceschini**, and E. Gratton, "Effect of Spatially Distributed Light Sources on the Frequency-Domain Solution to the Diffusion Equation ," *Proc. SPIE* **2979**, 509-514 (1997).
22. **M. A. Franceschini**, S. Fantini, A. E. Cerussi, B. Barbieri, B. Chance, and E. Gratton, "The Effect of Water in the Quantitation of Hemoglobin Concentration in a Tissue-Like Phantom by

- Near-Infrared Spectroscopy ,” OSA Trends in Optics and Photonics on Biomedical Optical Spectroscopy and Diagnostics, E. Sevick-Muraca and D. Benaron, eds. (Optical Society of America, Washington, DC 1996), Vol. 3, pp. 126-130.
23. A. E. Cerussi, J. Maier, S. Fantini, **M. A. Franceschini**, and E. Gratton, “The Frequency-Domain Multi-Distance Method in the Presence of Curved Boundaries,” OSA Trends in Optics and Photonics on Biomedical Optical Spectroscopy and Diagnostics, E. Sevick-Muraca and D. Benaron, eds. (Optical Society of America, Washington, DC 1996), Vol. 3, pp. 92-97.
 24. J. S. Maier, A. E. Cerussi, S. Fantini, **M. A. Franceschini**, and E. Gratton, “Quantitative Fluorescence in Tissue-Like Media,” OSA Trends in Optics and Photonics on Biomedical Optical Spectroscopy and Diagnostics, E. Sevick-Muraca and D. Benaron, eds. (Optical Society of America, Washington, DC 1996), Vol. 3, pp. 206-209.
 25. S. Fantini, **M. A. Franceschini**, G. Gaida, H. Jess, H. Erdl, W. W. Mantulin, E. Gratton, and M. Kaschke, “Contrast Enhancement by Edge Effect Corrections in Frequency-Domain Optical Mammography, ” OSA Trends in Optics and Photonics on Advances in Optical Imaging and Photon Migration, R. R. Alfano and J. G. Fujimoto, eds. (Optical Society of America, Washington, DC 1996), Vol. 2, pp. 160-163.
 26. H. Jess, H. Erdl, K. T. Moesta, S. Fantini, **M. A. Franceschini**, E. Gratton, and M. Kaschke, “Intensity-Modulated Breast Imaging: Technology and Clinical Pilot Study Results ,” OSA Trends in Optics and Photonics on Advances in Optical Imaging and Photon Migration, R. R. Alfano and J. G. Fujimoto, eds. (Optical Society of America, Washington, DC 1996), Vol. 2, pp. 126-129.
 27. G. P. Donzelli, S. Pratesi, C. Vecchi, G. Marconi, R. Salimbeni, R. Pratesi, S. Fantini, **M. A. Franceschini**, and E. Gratton, “Sistemi NIRS Puntuali (Monitoring) e Non Puntuali nella Diagnosi e Monitoraggio della Sofferenza Cerebrale Perinatale,” (“Instrumentation for Local and Non- Local Near-Infrared Spectroscopy for the Diagnosis and Monitoring of the Perinatal Brain Damage”), Proc. of the 6th National Conference on Perinatal Medicine, Spoleto (Italy), June 3-6, 1996.
 28. S. Fantini, **M. A. Franceschini**, G. Gaida, and M. Kaschke, “Frequency-Domain Optical Mammography: the Problem of Tissue Thickness Variations within the Scanned Region”, Proc. SPIE **2626**, 228-236 (1995).
 29. **M. A. Franceschini**, S. Fantini, S. A. Walker, J. S. Maier, and E. Gratton, “Multi-Channel Optical Instrument for Near-Infrared Imaging of Tissue,” Proc. SPIE **2389**, 264-272 (1995).
 30. S. Fantini, **M. A. Franceschini**, S. A. Walker, J. S. Maier, and E. Gratton, “Photon Path Distributions in Turbid Media: Applications for Imaging,” Proc. SPIE **2389**, 340-349 (1995).
 31. M. Ferrari, R. A. De Blasi, S. Fantini, **M. A. Franceschini**, B. Barbieri, V. Quaresima, and E. Gratton, “Cerebral and Muscle Oxygen Saturation Measurement by a Frequency-Domain Near-Infrared Spectroscopic Technique,” Proc. SPIE **2389**, 868-874 (1995).
 32. W. W. Mantulin, S. Fantini, **M. A. Franceschini**, S. A. Walker, J. S. Maier, and E. Gratton, “Tissue Optical Parameter Map Generated with Frequency- Domain Spectroscopy ,” Proc. SPIE **2396**, 323-330 (1995).
 33. J. S. Maier, B. Barbieri, A. Chervu, I. Chervu, S. Fantini, **M. A. Franceschini**, M. Levi W. W. Mantulin, A. Rosenberg, S. A. Walker, and E. Gratton, “In Vivo Study of Human Tissues with a Portable Near-Infrared Tissue Spectrometer,” Proc. SPIE **2387**, 240-248 (1995).

34. S. Fantini, **M. A. Franceschini**, J. S. Maier, S. A. Walker, and E. Gratton, "Frequency-Domain Multi-Source Optical Spectrometer and Oximeter," Proc. SPIE **2326**, 108-116 (1994).
35. E. Gratton, S. Fantini, **M. A. Franceschini**, J. B. Fishkin, and J. S. Maier "Near-Infrared Optical Spectroscopy of Tissues Using an LED Frequency Domain Spectrometer," OSA Proc. on Advances in Optical Imaging and Photon Migration **21**, 278-282 (1994).
36. **M. A. Franceschini**, S. Fantini, and E. Gratton, "LEDs in Frequency-Domain Spectroscopy of Tissues," Proc. SPIE **2135**, 300-306 (1994).
37. S. Fantini, **M. A. Franceschini**, J. B. Fishkin, and E. Gratton, "Absolute Measurement of Absorption and Scattering Coefficients Spectra of a Multiply Scattering Medium," Proc. SPIE **2131**, 356-364 (1994).
38. S. Fantini, **M. A. Franceschini**, J. B. Fishkin, W. W. Mantulin and E. Gratton, "The Absorption Spectra of a Chromophore in Highly Scattering Media," Proc. SPIE **2100**, 114-123 (1994).
39. **M. A. Franceschini**, S. Fu, R. Pini, R. Salimbeni, M. Vannini, "Auto Prepulse Operation of a XeCl Scaled up Laser Prototype: Modelling and Achievements," Proc. Int. Conf. LASERS '92, Houston, Texas, 146-151 (1992).
40. **M. A. Franceschini**, R. Pini, R. Salimbeni, M. Vannini, S. Fu, "Long Pulse XeCl Laser in Auto-Prepulse: Characteristics and Perspectives," Proc. SPIE **1810**, 435-438 (1992).
41. G. Benaim, S. Mattioli, M. Cremona, R. Pini, R. Salimbeni, M. Vannini, **M. A. Franceschini**, "In Vitro Tests of Excimer Laser Lithotripsy in Urinary Stones," Proc. SPIE **1643**, 73-77 (1992).
42. **M. A. Franceschini**, R. Pini, R. Salimbeni, M. Vannini, "Long Pulse XeCl Laser: A New Simple Approach," Proc. Int. Conf. LASERS '91, San Diego, California, 713-721 (1991).

Conferences: 2001

- ISOTT 2001, 29th annual meeting of the International Society on Oxygen Transport to Tissues, University of Pennsylvania, Philadelphia USA, August 11-15 2001.
 - M. A. Franceschini, D. A. Boas, A. Zourabian, S. G. Diamond, S. Nadgir, D. W. Lin, J. B. Moore, and S. Fantini, "Near-infrared spirometry: A non-invasive method to measure the venous saturation" (Poster presentation)
 - M. A. Franceschini, S. Nadgir, F. Fabbri, B. Frederick, K. Cayetano, P. F. Renshaw, and S. Fantini, "Bilateral optical maps of the human cerebral cortex during right and left hand tapping" (Poster presentation)
 - V. Quaresima, M. A. Franceschini, M. L. Hoimes, M. Ferrari, and S. Fantini, "Near-infrared frequency-domain mapping of vastus lateralis blood flow and oxygen consumption before and after isometric contraction" (Poster presentation)
- HBM 2001, 7th Annual Meeting of the Organization for Human Brain Mapping, Conference on Functional Mapping of the Human Brain, June 10-16, 2001 Brighton, England.
 - **M. A. Franceschini**, B. Frederick, P. F. Renshaw, S. Fantini, "Mapping the brain cortex with near infrared light: towards simultaneous fMRI and optical imaging of the brain" (Poster presentation)

- SPIE Biomedical Optics 2001, San Jose (CA), January 20-26, 2001.
 - **M. A. Franceschini**, A. Zourabian, J. B. Moore, A. Arora, S. Fantini, and D. A. Boas “Local measurement of venous saturation in tissue with non-invasive, near-infrared respiratory-oximetry.”

2000

- Optical Imaging Workshop From Bench to Bedside at the NIH, Bethesda (MD), September 7-8 2000.
 - M. A. Franceschini, E. Gratton, D. Hueber, V. Toronov, J. Ballesteros, H. Ma, Q. Zhang, B. Chance, and S. Fantini “Brain imaging and oximetry with non-invasive optical methods,” (Poster presentation)
- HBM 2000, 6th Annual Meeting of the Organization for Human Brain Mapping, Conference on Functional Mapping of the Human Brain, June 12-16, 2000 San Antonio, TX.
 - **M. A. Franceschini**, V. Toronov, M. E. Filiaci, M. Wolf, A. Michalos, E. Gratton, and S. Fantini, “Real-time video of cerebral hemodynamics in the human brain using non-invasive optical imaging.” (Oral and Poster presentation # 454)
 - M. Wolf, U. Wolf, V. Toronov, L. A. Paunescu, A. Michalos, **M. A. Franceschini**, S. Fantini, E. Gratton, “Fast cerebral functional signals in the 100 ms range detected by frequency-domain near-infrared spectroscopy.” (Poster presentation #515)
- OSA Biomedical Topical Meeting: *Advances in Optical Imaging and Photon Migration*, Miami Beach, Florida, April 2-5, 2000.
 - **M. A. Franceschini**, V. Toronov, M. E. Filiaci, M. Wolf, A. Michalos, E. Gratton, and S. Fantini, “Real-time video of brain activation in human subjects using a non-invasive near-infrared technique.”
 - S. Fantini, **M. A. Franceschini**, D. Hueber, B. Quistorff, G. Greisen, N. C. Brun, J. Ballesteros, Q. Zhang, H. Ma, V. Ntziachristos, and B. Chance, “Quantitative optical monitoring of the hemoglobin concentration and saturation in the piglet brain.”
 - E. L. Heffer, **M. A. Franceschini**, S. Fantini, S. Heywang-Köbrunner, L. Götz, A. Heinig, O. Schütz, H. Siebold, “Analysis of Frequency-Domain Optical Mammograms Using Spectral Information.”

1999

- OSA Annual Meeting, Santa Clara, California, September 26-30, 1999.
 - **M. A. Franceschini**, Symposium on “Near-Infrared Tissue spectroscopy and Functional Assessment,” Optics in Biology and Medicine Division, Organizer and Presider.
 - **M. A. Franceschini**, V. Toronov, M. E. Filiaci, E. Gratton, and S. Fantini, “Phase synchronization of cerebral hemoglobin waves with periodic external stimuli.”
- Inter-institute Workshop on *In Vivo Optical Imaging at the NIH*, Bethesda (MD), September 16-17, 1999.
 - **M. A. Franceschini**, “Cerebral Hemodynamics Measured by Near-Infrared Spectroscopy Under Rest Conditions and During Motor Activation.” (Invited Presentation)

- 27th Annual Meeting of American Society for Photobiology, Washington, DC, July 10-15, 1999.
 - **M. A. Franceschini**, “Tissue optics and medicine: light as a non-invasive sensor of breast tumors.” (Invited Presentation)
- SPIE Biomedical Optics '99, San Jose (CA), January 23-29, 1999.
 - **M. A. Franceschini**, E. Gratton, D. Hueber, and S. Fantini, “Near-Infrared Absorption and Scattering Spectra of Tissues *in Vivo*.”
 - S. Fantini, O. Schütz, J. Edler, **M. A. Franceschini**, S. Heywang-Köbrunner, L. Götz, and H. Siebold, “Performance of *N*-Images and Spectral Features in Frequency-Domain Optical Mammograph.”
 - M. Filiaci, **M. A. Franceschini**, S. Fantini, and E. Gratton, “Photon density waves in tissues: a study of the optical properties during changes in the oxygenation level.”
 - M. R. Stankovic, D. M. Hueber, D. Maulik, P. G. Stubblefield, W. Rosenfeld, E. Gratton, **M. A. Franceschini**, and S. Fantini, “Real-Time Optical Imaging and Spectroscopy of Brain Ischemia and Hemorrhage.”
 - V. Toronov, M. Filiaci, **M. A. Franceschini**, S. Fantini, and E. Gratton, “Photon-density-wave fluctuaction-correlation-spectroscopy: study of coherence in the brain and muscles.”
 - C. Casavola, L. A. Paunescu, **M. A. Franceschini**, S. Fantini, L. Winter, J. Kim, D. Wood, and E. Gratton, “Near-infrared spectroscopy and tilting table protocol: a novel method to study the blood flow and the oxygen consumption in tissue.”
 - L. A. Paunescu, C. Casavola, **M. A. Franceschini**, S. Fantini, L. Winter, J. Kim, D. Wood, and E. Gratton, “Calf muscle blood flow and oxygen consumption measured with near-infrared spectroscopy during venous occlusion.”

1998

- Gordon Conference on Laser in Medicine and Biology, Meriden (NH), June 14-19, 1998.
 - **M. A. Franceschini**, "Non-invasive optical studies of the human brain, breast, and skeletal muscle." (Invited Presentation)
- OSA Topical Meeting: Trends in Optics and Photonics on Advances in Optical Imaging and Photon Migration, Orlando, Florida, March 7-12, 1998.
 - **M. A. Franceschini**, A. Paunescu, S. Fantini, S. Pratesi, J. S. Maier, G. P. Donzelli, and E. Gratton, "Frequency-Domain Optical Measurements *in Vitro* on Two- and Three-Layered Tissue-Like Phantoms and *in Vivo* on Infant Heads."
 - S. Fantini, S. A. Walker, **M. A. Franceschini**, K. T. Moesta, P. M. Schlag, M. Kaschke, and E. Gratton, "Optical Characterization of Breast Tumors by Frequency-Domain Optical Mammography."
 - L. A. Paunescu, **M. A. Franceschini**, S. Fantini, A. E. Cerussi, and E. Gratton, "Effective Optical Properties of Two-Layered Turbid Media Using the Frequency-Domain Multi-Distance Method." (Poster presentation)
- NIH Bioengineering Symposium, Bethesda, Maryland, February 27-28, 1998

- E. Gratton, **M. A. Franceschini**, S. Fantini, J. Maier, "Optical Monitor for Vascular Insufficiency." (Invited Poster)

1997

- BiOS Europe '97, San Remo, Italy , 4-8 September 1997 .
 - **M. A. Franceschini**, S. Fantini, R. Palumbo, L. Pasqualini, G. Vaudo, E. Franceschini, E. Gratton, B. Palumbo, S. Innocente, and E. Mannarino, "Quantitative Near-Infrared Spectroscopy on Patients with Peripheral Vascular Disease."
 - V. Quaresima, **M. A. Franceschini**, S. Fantini, E. Gratton, and M. Ferrari, "Difference in Leg Muscles Oxygenation During Treadmill Exercise by a New Near-Infrared Frequency-Domain Oximeter."
- SPIE Biomedical Optics '97, San Jose (CA), February 9-12 1997.
 - **M. A. Franceschini**, D. Wallace, B. Barbieri, S. Fantini, W. W. Mantulin, S. Pratesi, G. P. Donzelli, and E. Gratton, "Optical Study of the Skeletal Muscle During Exercise with a Second Generation Frequency-Domain Tissue Oximeter."
 - S. Fantini, **M. A. Franceschini**, and E. Gratton, "Effect of Spatially Distributed Light Sources on the Frequency- Domain Solution to the Diffusion Equation."

1996

- OSA Topical Meeting: Biomedical Optical Spectroscopy and Diagnostics, Orlando, Florida, March 20-22, 1996.
 - A. Cerussi, J. Maier, S. Fantini, **M. A. Franceschini**, and E. Gratton, "The Frequency-Domain Multi- Distance Method in the Presence of Curved Boundaries."
 - **M. A. Franceschini**, S. Fantini, A. E. Cerussi, B. Barbieri, B. Chance, and E. Gratton, "The Effect of Water in the Quantitation of Hemoglobin Concentration in a Tissue- Like Phantom by Near-Infrared Spectroscopy."
 - J. S. Maier, A. E. Cerussi, S. Fantini, **M. A. Franceschini**, and E. Gratton, "Quantitative Fluorescence in Tissue-Like Media." (Poster presentation)
- OSA Topical Meeting: Advances in Optical Imaging and Photon Migration, Orlando, Florida, March 18-20, 1996.
 - H. Jess, H. Erdl, K. T. Moesta, S. Fantini, **M. A. Franceschini**, E. Gratton, and M. Kaschke, "Intensity-Modulated Breast Imaging: Technology and Clinical Pilot Study Results ," (Invited Presentation).
 - S. Fantini, **M. A. Franceschini**, G. Gaida, H. Erdl, W. W. Mantulin, E. Gratton, P. M. Schlag, K. T. Moesta, and M. Kaschke, "Contrast Enhancement by Edge Effect Corrections in Frequency-Domain Optical Mammography."

1995

- Convegno Annuale di Fotobiologia, Bressanone (BZ) Italy, June 2-3 1995.
 - S. Fantini, **M. A. Franceschini**, B. Barbieri, and E. Gratton, "Spectroscopy and Imaging of Tissues in the Near-Infrared" (Invited Presentation).
- SPIE Biomedical Optics '95, San Jose (CA), February 5-7 1995.

- **M. A. Franceschini**, S. Fantini, S. A. Walker, J. S. Maier, and E. Gratton, “Multi-Channel Optical Instrument for Near-Infrared Imaging of Tissue.”
- S. Fantini, **M. A. Franceschini**, S. A. Walker, J. S. Maier, and E. Gratton, “Photon Path Distributions in Turbid Media: Applications for Imaging.”
- M. Ferrari, R. A. De Blasi, S. Fantini, **M. A. Franceschini**, B. Barbieri, V. Quaresima, and E. Gratton, “Cerebral and Muscle Oxygen Saturation Measurement by a Frequency-Domain Near-Infrared Spectroscopic Technique.”
- W. W. Mantulin, S. Fantini, **M. A. Franceschini**, S. A. Walker, J. S. Maier, and E. Gratton, “Tissue Optical Parameter Map Generated with Frequency-Domain Spectroscopy.”
- J. S. Maier, B. Barbieri, A. Chervu, I. Chervu, S. Fantini, **M. A. Franceschini**, M. Levi, W. W. Mantulin, A. Rosenberg, S. A. Walker, and E. Gratton, “In Vivo Study of Human Tissues with a Portable Near-Infrared Tissue Spectrometer.”

1994

- EC-BIOMED NIRS & Imaging of Biological Tissue Workshop on NIR Imaging in Medicine, Bad Wörishofen Germany, December 9-11 1994.
 - S. Fantini, **M. A. Franceschini**, S. A. Walker, J. S. Maier, and E. Gratton, “Absorption and Scattering Maps in Frequency-Domain Imaging” (Invited Presentation).
- Gordon Conference on Laser in Medicine and Biology, Meriden (NH), July 3-8 1994.
 - E. Gratton, **M. A. Franceschini**, S. Fantini, and B. Barbieri, “Frequency-Domain Non-Invasive Tissue Oximeter” (Invited Presentation).
 - **M. A. Franceschini**, S. A. Walker, S. Fantini, J. S. Maier, and E. Gratton, “Multichannel Instrument for Optical Tomography.” (Poster presentation)
 - S. Fantini, **M. A. Franceschini**, J. S. Maier, S. A. Walker, and E. Gratton, “Optical Detector for Non-Invasive Tissue Spectroscopy.” (Poster presentation)
- 38th Annual Meeting of the Biophysical Society, New Orleans (LA), March 6-10 1994.
 - S. Fantini, **M. A. Franceschini**, S. A. Walker, and E. Gratton, “Optical Detector for Non-Invasive Tissue Spectroscopy.” (Poster presentation)
 - S. A. Walker, S. Fantini, **M. A. Franceschini**, and E. Gratton, “Multichannel Instrument for Optical Tomography in the Near Infrared.” (Poster presentation)
 - J. B. Fishkin, P. T. C. So, A. E. Cerussi, S. Fantini, **M. A. Franceschini**, and E. Gratton, “A Frequency-Domain Measurement of the Spectral Properties of a Multiply Scattering Medium Containing Methemoglobin.” (Poster presentation)
- SPIE Biomedical Optics '94, Los Angeles (Ca), January 22-29 1994.
 - **M. A. Franceschini**, S. Fantini, and E. Gratton, “LEDs in Frequency-Domain Spectroscopy of Tissues.”
 - S. Fantini, **M. A. Franceschini**, J. B. Fishkin, and E. Gratton, “Absolute Measurement of Absorption and Scattering Coefficients Spectra of a Multiply Scattering Medium.”

1993

- Annual fall Meeting of the Biomedical Engineering Society Meeting, Memphis (TN), November 1993.
 - J. B. Fishkin, P. T. C. So, A. E. Cerussi, S. Fantini, **M. A. Franceschini**, and E. Gratton, “A Measurement of Absolute Absorption Spectra in a Multiply Scattering Medium.”