
BIOGRAPHICAL SKETCH

NAME		POSITION TITLE	
Mertz, Jerome Charles		Associate Professor of Biomedical Engineering	
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Princeton University	B.A.	1984	Physics
University Paris VI / UC Santa Barbara	Ph.D.	1991	Quantum Optics
University of Konstanz (Germany)	Post-doc	1992-1995	Probe microscopy
Cornell University	Post-doc	1995-1998	Nonlinear optics

A. Positions and Honors.**Positions and Employment**

1984-1986	Senior Technical Assistant, AT&T Bell Laboratories, Murray Hill, NJ
1998-2002	Lecturer/Researcher, Ecole Supérieure de Physique et Chimie Industrielle, Paris, France
2002-2003	Research Director, Centre Nationale de Recherche Scientifique, Paris, France
2003-	Associate Professor, Dept. of Biomedical Engineering, Boston University

Other Experience

2000-2002	Program Committee, SPIE BIOS Conference, San Jose, CA.
2001-2003	Lecturer for "Imaging Structure and Function in the Nervous System", Cold Spring Harbor Laboratory Summer Courses, NY
2002	Lecturer for "EMBO Practical Course on Living Specimen Light Microscopy", European Molecular Biology Laboratory, Heidelberg, Germany,
2003	Program Committee, SPIE BIOS Conference, Munich, Germany
2003	Program Committee, Optical Society of America, Special Topics, Miami, FL.

Honors

1992-1995	Alexander von Humboldt Fellowship, Germany
2001	Fabry-de-Gramont Prize, French Optical Society
2002	Aimé-Cotton Prize, French Physical Society

B. Selected peer-reviewed publications (in chronological order).

Research Publications post 1994 (prior publications dealt with quantum optics only)

- 1) **J. Mertz**, M. Hipp, J. Mlynek, O. Marti, "Optical Near-Field Imaging with a Semiconducting Probe Tip," Appl. Phys. Lett. 64, 2338-2341 (1994).
- 2) **J. Mertz**, C. Xu, W. W. Webb, "Single Molecule Detection by Two-Photon Excited Fluorescence," Opt. Lett. 20, 2532-2534 (1995).
- 3) J.-Y. Courtois, J.-M. Courty, **J. Mertz**, "Internal Dynamics of Multi-Level Atoms Near a Vacuum-Dielectric Interface," Phys. Rev. A 55, 1862-1878 (1996).
- 4) **J. Mertz**, "Molecular photophysics involved in multi-photon excitation fluorescence microscopy," Eur. Phys. J. D 3, 53-66 (1998).
- 5) E. Beaurepaire, L. Moreaux, F. Amblard, **J. Mertz**, "Combined scanning optical coherence and two-photon excitation microscopy", Opt. Lett. 24, 969-971 (1999).
- 6) L. Ventelon, L. Moreaux, **J. Mertz**, M. Blanchard-Desce, "New quadrupolar fluorophores with high two-photon excited fluorescence", Chem. Commun., 2055-2056 (1999).

- 7) L. Moreaux, O. Sandre, M. Blanchard-Desce, **J. Mertz**, "Membrane imaging by simultaneous second-harmonic generation and two-photon microscopy", *Opt. Lett.* 25, 320-322 (2000).
- 8) L. Moreaux, O. Sandre, **J. Mertz**, "Membrane imaging by second-harmonic generation microscopy", *J. Opt. Soc. Am. B* 17, 1685-1694 (2000).
- 9) L. Moreaux, O. Sandre, M. Blanchard-Desce, **J. Mertz**, "Simultaneous second-harmonic generation and two-photon excited fluorescence microscopy", *Nonlinear Optics* 25, 183-188 (2000).
- 10) **J. Mertz**, "Radiative absorption, fluorescence and scattering of a classical dipole near a lossless interface: a unified description", *J. Opt. Soc. Am. B* 17, 1906-1917 (2000).
- 11) L. Ventelon, Y. Morel, P. Baldeck, L. Moreaux, **J. Mertz**, M. Blanchard-Desce, "Novel quadrupolar extended biphenyl derivatives with enhanced nonlinear absorptivities for optical limiting applications", *Nonlinear Optics* 27, 249-258 (2001).
- 12) S. Charpak, **J. Mertz**, E. Beaurepaire, L. Moreaux, K. Delaney, "Odor evoked calcium signals in mitral cells", *Proc. Natl. Acad. Sci. USA* 98, 1230-1234 (2001).
- 13) L. Moreaux, O. Sandre, S. Charpak, M. Blanchard-Desce, **J. Mertz**, "Coherent Scattering in Multi-harmonic generation microscopy", *Biophys. J* 80, 1568-1574 (2001).
- 14) E. Beaurepaire, M. Oheim, **J. Mertz**, "Ultra-deep two-photon fluorescence excitation in turbid media", *Opt. Commun.* 188, 25-29 (2001).
- 15) L. Ventelon, S. Charier, L. Moreaux, **J. Mertz**, M. Blanchard-Desce, "Nanoscale push-push dihydrophenanthrene derivatives as novel fluorophores for two-photon excited fluorescence", *Angew. Chem. Int. Ed.* 40, 2098-2101 (2001).
- 16) **J. Mertz**, L. Moreaux, "Second harmonic generation by focused excitation of inhomogeneously distributed scatterers", *Opt. Commun.* 196, 325-330 (2001).
- 17) M. Oheim, E. Beaurepaire, E. Chaigneau, **J. Mertz**, S. Charpak, "Two-photon microscopy in brain tissue: parameters influencing the imaging depth", *J. Neuro. Meth.* 111, 29-37 (2001); 112, 205 (2001).
- 18) **J. Mertz**, L. Moreaux, T. Pons, "Perturbative theory of the electro-optic response of second-harmonic generation membrane potential sensors", *Proc. SPIE* 4620, 182-190 (2002).
- 19) L. Ventelon, L. Moreaux, **J. Mertz**, M. Blanchard-Desce, "Optimization of quadrupolar chromophores for molecular two-photon absorption", *Synth. Metals* 127, 17-21 (2002).
- 20) O. Mongin, L. Porrès, L. Moreaux, **J. Mertz**, M. Blanchard-Desce, "Synthesis and photophysical properties of new conjugated fluorophores designed for two-photon excited fluorescence", *Org. Lett.* 4, 719-722 (2002).
- 21) E. Beaurepaire, **J. Mertz**, "Epi-fluorescence collection in two-photon microscopy", *Appl. Opt.* 41, 5376-5382 (2002).
- 22) T. Pons, L. Moreaux, **J. Mertz**, "Photo-induced flip-flop of amphiphilic molecules in lipid bilayer membranes", *Phys. Rev. Lett.* 89, 288104 (2002).
- 23) C. Yang, **J. Mertz**, "Transmission confocal laser scanning microscopy with a virtual pinhole based on nonlinear detection", *Opt. Lett.* 28, 224-226 (2003).
- 24) O. Mongin, L. Porres, C. Katan, T. Pons, **J. Mertz**, M. Blanchard-Desce, "Synthesis and two-photon absorption of highly soluble three-branched fluorenylene-vinylene derivatives", *Tetrahed. Lett.* 44, 8121-8125 (2003).
- 25) L. Moreaux, T. Pons, M. Blanchard-Desce, **J. Mertz**, "Electro-optic response of second-harmonic generation membrane potential sensors", *Opt. Lett.* 25, 625-627 (2003).
- 26) T. Pons, L. Moreaux, O. Mongin, M. Blanchard-Desce, **J. Mertz**, "Mechanisms of membrane potential sensing with second harmonic generation microscopy", *J. Biomed. Opt.* 8, 428-431 (2003).
- 27) L. Porrès, O. Mongin, C. Katan, M. Charlot, T. Pons, **J. Mertz**, M. Blanchard-Desce, "Enhanced two-photon absorption with novel octupolar propeller-shaped fluorophores derived from triphenylamine", *Org. Lett.* 6, 47-50 (2004).
- 28) L. Porrès, C. Katan, O. Mongin, T. Pons, **J. Mertz**, M. Blanchard-Desce, "Two-Photon Absorption and Fluorescence in Nanoscale Multipolar Chromophores: Effect of dimensionality and charge-symmetry", *J. Mol. Struct.*, in press.
- 29) T. Pons, **J. Mertz**, "Autoconfocal microscopy using nonlinear transmitted light detection", *J. Opt. Soc. Am. B* (to be published).

Book chapters

- 1) **J. Mertz**, L. Moreaux, E. Beaufepaire, S. Charpak, "Applications biologique de la microscopie nonlinéaire ", in *Systèmes Femtosecondes*, ed. P. Laporte and F. Salin, (University of St. Etienne Press), 2001
- 2) E. Beaufepaire, L. Moreaux, **J. Mertz**, "Simultaneous optical coherence and two-photon fluorescence microscopy," in *Waves and Imaging through Complex Media*, P. Sebbah & J.-M. Tualle Eds, Kluwer Academic Publishers, 2001.
- 3) **J. Mertz** and W. W. Webb, "The New Microscopies," in *The New Optics*, edited by P. L. Knight (Cambridge University Press, Cambridge), to be published.
- 4) **J. Mertz**, "Second harmonic generation microscopy", in *Multi-photon laser scanning microscopy*, Ed. A. Dixon, (BIOS Press, Oxford), in press.
- 5) **J. Mertz**, "How to build a two-photon microscope", in *Imaging Neurons: A Laboratory Manual*, Eds. R. Yuste and A. Konnerth (Cold Spring Harbor Laboratory Press, New York), to be published.

C. Research Support

Ongoing Research Support

Whitaker Research Initiative Mertz (PI) 9/01/03-9/1/07
Start-up funding to build new Biomicroscopy laboratory
Role: PI

Completed Research Support

Ultimatech (France) Amblard (PI) 1/1/97-1/1/99
The goal of this project was to investigate new imaging modalities
Role: Co-Investigator

Action Coordonnée Optique (CNRS – France) Mertz (PI) 1/1/99-1/1/02
The goal of this project was to image membrane potential using novel optical techniques
Role: PI

Action Recherche Cancer (France) Ferraci (PI) 1/1/01-1/1/02
The goal of this project was to investigate cell adhesion dynamics
Role: Co-Investigator