

BIOGRAPHICAL SKETCH

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NAME		POSITION TITLE		
SCHNITZER, Mark, J.		Assistant Professor		
INSTITUTION AND LOCATION		DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Harvard University	Cambridge, MA	A.B. <i>summa cum laude</i>	1988-1992	Physics
Cambridge University	Cambridge, UK	Certificate	1992-1993	Mathematics
Princeton University	Princeton, NJ	M.A.	1993-1994	Physics
Princeton University	Princeton, NJ	Ph.D.	1994-1999	Physics (<i>advisor: Prof. Steven M. Block</i>)

A. Positions and Honors.

2008-present Investigator, Howard Hughes Medical Institute; Stanford University.
 2006-present Janelia Farm Research Campus, Howard Hughes Medical Institute, Scientific Visitor Program, Ashburn VA.
 2003-present Assistant Professor, Dept. of Applied Physics and Dept. of Biological Sciences; Faculty Member, Neuroscience Program, Biophysics Program, Stanford Univ., Stanford, CA.
 1999-2003 Member of Technical Staff, Physical Sciences Laboratory, Biological Computation Research Department, Bell Laboratories, Lucent Technologies, Murray Hill, NJ.
 1994-1999 Ph.D. Research, with Steven M. Block, Dept. of Molecular Biology, Princeton University, Princeton, NJ.

Awards:

Investigator, Howard Hughes Medical Institute, 2008.
 W.M.F. Keck Medical Program grant, 2008.
 NIH Director's Pioneer Award, 2007.
 The Brilliant 10, Top ten brilliant scientists under age 40, Popular Science Magazine, 2007.
 Coulter Translational Partner Funding Award, Wallace H. Coulter Foundation, 2006.
 Terman Fellow, Stanford University, 2006.
 Beckman Interdisciplinary Translational Research Program Award, 2005.
 Packard Fellowship in Science & Engineering, David & Lucille Packard Foundation, 2005.
 Presidential Early Career Award in Science & Engineering, awarded at White House 6/13/2005.
 Alfred P. Sloan Research Fellowship, 2005.
 Klingenstein Fellowship in the Neurosciences, 2004.
 Young Investigator Award, Beckman Foundation, 2004.
 Young Investigator Award, Office of Naval Research, Cognitive & Neural Division, 2004.
 Member of TR100, World's Top 100 Innovators under age 35, Technology Review Magazine, Oct. 2003.
 Cutting Edge Basic Research Award (CEBRA), National Institutes of Health, 2003.
 Young Investigator Award (with #1 world ranking), Human Frontiers in Science Program, 2002
 McKnight Technological Innovations in Neuroscience Award, 2000.
 Burroughs Wellcome Fellowship, Program in Mathematics and Molecular Biology, 1998-1999.
 Charlotte Elizabeth Procter Honorific Fellowship, Princeton University, 1997-1998.
 American Heart Association Predoctoral Fellow, 1996-1998.
 NSF Predoctoral Fellow, 1993-1996.
 Winston Churchill Fellowship, Winston Churchill Foundation of the United States, 1992-1993.
 Junior *Phi Beta Kappa*, for top 12 Junior men, Harvard University, 1991.
 Barry Goldwater Fellowship for Excellence in Science, United States, 1990.
 Detur Scholar, Harvard University, 1989.
 United States Physics Team, International Physics Olympiad, Bad Ischl, Austria, 1988.

Industrial Consulting:

2003 Prospect Venture Partners, Palo Alto, CA.
2004 Kleiner Perkins Caufield & Byers, Palo Alto, CA.
2004-2005 Affymetrix, Santa Clara, CA.
2005 Alza, Mountain View CA.
2005-2007 Mauna Kea Technologies, Paris, France.
2005 SRI International, Menlo Park, CA; Sumitomo, Japan.
2007 Affymetrix, Santa Clara, CA.
2008-present Fairchild Imaging, Milpitas, CA.

Professional Service:

Photonics West, Conference Program Committee, SPIE, 2006-2008 Annual Meetings.
Biomedical Optics, Conference Program Committee, Optical Society of America, 2006 Annual Meeting.
Symposium chair and organizer, "*Opto-Genetics: Next-Generation Optical Technologies for Illuminating Genetically Targeted Brain Circuits*". Mini-Symposium, Society for Neuroscience 36th Annual Meeting, Atlanta, GA, Oct 15, 2006.
Course Lecturer, *Imaging Structure & Function in the Nervous System*, Cold Spring Harbor Laboratory, 2006.
Microscopy NIH study section, ad hoc reviewer, Feb. 2007.
Issue Editor, Current Opinion in Neurobiology, *New Technologies*, Dec. 2007.
Session Chair, "*Imaging and controlling cellular dynamics using light*". Joint Meeting of the Biophysical Society, 52nd Annual Meeting, and the 16th International Biophysics Congress, Feb. 2008.
NIH Blueprint Workshop on Non-invasive Brain Imaging. Sept. 23, 2008. Bethesda, MD.

Invited Presentations:

Invited Conference Symposia: 73 **Academic Seminars:** 61 **Scientific Industry:** 16

United States Patents and Patent Applications:

Reed, W.A. and Schnitzer, M.J. (2003) "GRIN fiber lenses." **U.S. Patent** 6,542,665.
Schnitzer, M.J. (2003). "Graded-index lens microscopes", **U.S. Patent** 6,643,071.
Reed, W.A. and Schnitzer, M.J. (2004) "Grin-fiber lens based optical endoscopes". **U.S. Patent** 6,760,112.
Reed, W.A. and Schnitzer, M.J. (2004) "Method of fabricating a GRIN fiber". **U.S. Patent** 6,802,190.
Reed, W.A. and Schnitzer, M.J. (2005) "Fiber devices using GRIN fiber lenses". **U.S. Patent** 6,839,483.
Fee, M. and Schnitzer, M.J. (2006). "Acousto-optic monitoring and imaging in a depth selective manner." **U.S. Patent** 7,023,558
Schnitzer, M.J. (2006). Multi-photon endoscopic imaging system. **U.S. Patent** 7,091,500.
Schnitzer, M.J. (2003). "Multi-photon endoscopy", **U.S. Patent Application** 20030031410.
Schnitzer, M.J. (2004), "Mapping neural and muscular electrical activity", **U.S. Patent Application** 20040143190.
Fee, M. and Schnitzer, M.J. (2005). "Acousto-optic monitoring and imaging in a depth selective manner." **U.S. Patent Application** 20050105096
Jung, J.C. and Schnitzer, M.J. (2006). "Capillary-based optical analysis system and approach", *submitted to the USPTO*.
Anderson, E.P., Cocker, E.D., Flusberg, B.A., Jung, J.C. and Schnitzer, M.J. (2006). "Optical analysis systems and approaches", *submitted to the USPTO*.
Anderson, E.P., Cocker, E.D., Flusberg, B.A., Jung, J.C. and Schnitzer, M.J. (2006). "Live being optical analysis system and approach", *submitted to the USPTO*.
Blevins, N., Cheung, E.L.M. Jung, J.C., Monfared, A., and Schnitzer, M.J. (2006). "Cochlear optical analysis system and approach therefor", *submitted to the USPTO*.

B. Selected peer-reviewed publications

- Wilt, B.A., Burns, L.D., Ho, E.T.W., Ghosh, K.K., Mukamel, E.A., and Schnitzer, M.J. (2009). "Advances in Light Microscopy for Neuroscience". **Ann Rev of Neuroscience**, *in press*.
- Piyawattanametha, W., Cocker, E.D. Burns, L.D., Jung, J.C., Barretto, R.P.J., Flusberg B.A., Ra, H., Lee, D., Solgaard, O., and Schnitzer, M.J. (2009). "*In vivo* brain imaging of cerebral microcirculation using a 2.9 gram two-photon microscope based on a microelectromechanical systems (MEMS) scanning mirror", **Optics Letters**. *in press, to appear in the July 1, 2009 issue*.
- Barretto, R.P.J., Messerschmidt, B. and Schnitzer, M.J. (2009). "High-resolution *in vivo* imaging with microoptics", **Nature Methods**, *published online* 14 June 2009; DOI:10.1038/NMETH.1339.
- Nimmerjahn, A., Mukamel, E.A., and Schnitzer, M.J. (2009). "Motor behavior activates Bergmann glial networks", **Neuron**, 62: 400-412.
- Flusberg, B.A, Nimmerjahn, A., Cocker, E.D., Mukamel, E.A., Barretto, R.P.J., Ko, T.H., Burns, L.D., Jung, J.C., and Schnitzer, M.J. (2008). "High-speed, miniaturized fluorescence microscopy in freely moving mice", **Nature Methods**, 5: 935-8. *See also accompanying News and Views in the same issue*.
- Llewellyn, M.E., Barretto, R.P.J., Delp, S.L. & Schnitzer, M.J. (2008). "Minimally invasive high-speed imaging of sarcomere contractile dynamics in mice and humans", **Nature**, 454: 784-8.
- Wetmore D.Z. Mukamel E.A., and Schnitzer M.J. (2007). "Lock-and-key mechanisms of cerebellar memory recall based on rebound currents", **Journal of Neurophysiology**, 100(4):2328-47.
- Deisseroth K., Feng G., Majewska A.K., Miesenböck G., Ting A., and Schnitzer M.J. (2006) "Next-generation optical technologies for illuminating genetically targeted brain circuits", **Journal of Neuroscience**, 26:10380-6.
- Piyawattanametha, W., Barretto, R.P.J., Ko, T.H, Flusberg B.A., Cocker, E.D. Ra, H., Lee, D., Solgaard, O., and Schnitzer, M.J. (2006) "Fast-scanning two-photon fluorescence imaging based on a microelectromechanical systems two-dimensional scanning mirror", **Optics Letters**. 31: 2018-20.
- Monfared, A., Blevins, N.H., Cheung, E.L.M., Jung, J.C., Popelka, G.R., and Schnitzer, M.J. (2006) "*In vivo* imaging of mammalian cochlear blood flow using fluorescence microendoscopy", **Otology & Neurotology**. 27: 144-152.
- Flusberg, B.A., Cocker, E.D., Piyawattanametha, W., Jung, J.C., Cheung, E.L.M. and Schnitzer, M.J. (2005). "Fiber-optic fluorescence imaging". **Nature Methods**. 2: 941-950.
- Flusberg, B.A., Jung, J.C., Cocker, E.D., Anderson, E.P, and Schnitzer, M.J. (2005). "*In vivo* brain imaging using a portable 3.9 gram two-photon fluorescence microendoscope". **Optics Letters**. 30: 2272-2274.
- Shaevitz, J.W., Block, S.M. and Schnitzer, M.J. (2005). "Statistical kinetics of macromolecular dynamics." **Biophysical Journal**. 89: 2277-2285.
- Mukamel, E.A. and Schnitzer, M.J. (2005). "Retinal coding of visual scenes – repetitive and redundant too?". **Neuron**, 46: 357-359.
- Mehta, A.D., Jung, J.C., Flusberg, B.A. and Schnitzer, M.J. (2004). "Fiber optic *in vivo* imaging in the mammalian nervous system", **Current Opinion in Neurobiology**, 14: 617-28.
- Jung, J.C., Mehta, A.D., Aksay, E., Stepnoski, R. and Schnitzer, M.J. (2004). "*In vivo* mammalian brain imaging using one- and two-photon fluorescence microendoscopy." **Journal of Neurophysiology**, 92: 3121-33.
- Jung, J.C., and Schnitzer, M.J. (2003). "Multiphoton endoscopy". **Optics Letters**, 28: 902-905.
- Schnitzer, M.J. and Meister, M. (2003). "Multineuronal firing patterns in the signal from eye to brain." **Neuron** 37: 499-511.
- Reed, W.A., Yan, M.F. and Schnitzer, M.J. (2002). "Gradient-index fiber-optic microprobes for minimally invasive *in vivo* low coherence interferometry", **Optics Letters** 27: 1794-1796.
- Schnitzer, M.J. (2002). "Biological computation: Amazing algorithms." **Nature** 416: 683.
- Schnitzer, M.J. (2001). "Molecular motors: Doing a rotary two-step." **Nature** 410: 878-881.
- Schnitzer, M.J., Visscher, K., and Block, S.M. (2000). "Force production by single kinesin motors". **Nature Cell Biol.** 2: 718-723.

- Visscher, K*, Schnitzer, M.J*, and Block, S.M. (1999). "Single kinesin molecules studied with a molecular force clamp." **Nature**. 400: 184-189. *Authors contributed equally.
- Wang, M.D., Schnitzer, M.J., Yin, H., Landick, R., Gelles, J., and Block, S.M. (1998). "Force and velocity measured for single molecules of RNA polymerase." **Science**. 282: 902-907.
- Schnitzer, M.J. and Block, S.M. (1997). "Kinesin hydrolyses one ATP per 8-nm step." **Nature**. 388: 386-390.
- Schnitzer, M.J. and Block, S.M. (1995). "Statistical kinetics of processive enzymes." **Cold Spring Harbor Symp. Quant. Biol.** 60: 793-802.
- Schnitzer, M.J. (1993). "Theory of continuum random walks and application to chemotaxis." **Phys. Rev. E**. 48: 2553-2568.
- Schnitzer, M.J., Block, S.M., Berg, H.C., and Purcell, E.M. (1990). "Strategies for chemotaxis." **Symp. Soc. Gen. Microbiol.** 46: 15-33.
- Wen, X., Schnitzer, M.J., and Meyer, R.B. (1990). "An automated light scattering system scanning in two spherical dimensions." **Rev. Sci. Instrum.** 61: 2069-2072.