

## CURRICULUM VITAE

**NAME:**                **Stephen J Smith**

### **EDUCATION:**

- 1977-1980 Miller Postdoctoral Research Fellow  
Department of Physiology-Anatomy  
University of California, Berkeley  
Supervisor: Robert S. Zucker, Ph.D.
- 1977        Ph.D. in Physiology and Psychology  
University of Washington, Seattle  
Supervisors: Charles F. Stevens, M.D., Ph.D.; Wolfhard Almers, Ph.D.
- 1970        B.A. in Psychology  
Reed College, Portland

### **ACADEMIC EMPLOYMENT:**

- 1995-       Professor  
1989-1994 Associate Professor  
Department of Molecular and Cellular Physiology  
Stanford University School of Medicine
- 1987-1989 Associate Investigator  
1984-1987 Assistant Investigator  
Howard Hughes Medical Institute  
Yale University School of Medicine
- 1987-1989 Associate Professor  
1984-1987 Assistant Professor  
Section of Molecular Neurobiology  
Yale University School of Medicine
- 1981-1984 Assistant Professor  
Department of Physiology  
Yale University School of Medicine

## **STANFORD TEACHING AND SERVICE:**

1991-2007 MCP 201, Endocrine Physiology (Lectures)  
1992-2003 MCP 215, Synaptic Transmission (Organizer)  
1992-Present MCP 222, Imaging: Biological Light Microscopy (Organizer)  
2005-Present MCP 232, Advanced Biophysical Imaging Laboratory (Organizer)  
1990-Present Doctoral Committee Service (22x)  
1991-Present Founder and Principal Faculty Advisor, Beckman CSIF  
1998-1999 Member, Medical School Appointments and Promotions Committee  
1999-2001 Chair, Medical School Appointments and Promotions Committee  
2001-2002 Member, Committee on the Professoriate  
2003-Present Member, Medical School Associate Dean's Review Committee  
2005-Present Stanford Comprehensive Cancer Center Shared Resource Leadership  
2010-Present SINTN Neuroscience Microscopy Service Steering Committee  
2009-Present Center for Biomedical Imaging at Stanford Steering Committee

## **NATIONAL AND INTERNATIONAL ACADEMIC AND SCIENTIFIC SERVICE:**

1994-2004 External Advisor, National Center for Microscopy & Imaging Research, La Jolla, CA  
1994-1995 Course Director, *Imaging Neuronal Structure and Function*, Cold Spring Harbor, NY  
1996-1999 Director, Section on Imaging, *Neurobiology* Course, Woods Hole, MA  
1999-2004 Board of Scientific Counselors, NICHD, NIH  
2000-2004 Scientific Advisory Board, Max Planck Institute, Heidelberg, Germany  
2001-Present Resident Faculty, Section on Imaging, *Neurobiology* Course, Woods Hole, MA  
2011-Present Member, NIH Study Section ZRG1 NT-L

## **INDUSTRIAL CONSULTING AND BOARDS:**

1989-1991 Consultant on Optical Imaging Technologies, BioRad, Inc.  
1990-1992 Consultant on Fluorescence Detection, Affymax Research Institute, Inc.  
1990-1992 Consultant on Advanced Microscopy Technologies, Newport Corp.  
1991-1996 Consultant on Imaging Technologies and IP Litigation, Molecular Dynamics, Inc.  
1995-2004 Consultant of Microarray and Microscopy Technologies, Axon Instruments, Inc.  
2004-2005 Consultant on Microscopy Technologies, Molecular Devices, Inc.  
2000-2004 Board of Scientific Advisors, Cytokinetics, Inc.  
2004-Present Board of Directors, Nanometrics, Inc. (Nano)  
2011-Present Chair, Scientific Advisory Board, Nanometrics, Inc.  
2011-Present Board of Directors, Aratome, LLC  
2011-Present Chair, Scientific Advisory Board, Aratome Research, LLC

## **PUBLICATIONS:**

122. O'Rourke, N.A., Weiler, N.C., Micheva, K.D. and Smith, S.J (2012) Deep molecular diversity of mammalian synapses: Why it matters and how to measure it. *Nature Reviews Neuroscience* (in press).

121. Allen, N.J., Howe, M.L., Foo, L.C., Wang, G.X., Chakraborty, C., Smith, S.J and Barres, B.A. (2012) Astrocyte-derived glypicans 4 and 6 promote the formation of excitatory synapses containing GluA1 AMPA glutamate receptors. *Nature* (in press).
120. Saatchi S, Azuma J, Wanchoo N, Smith SJ, Yock PG, Taylor CA, Tsao PS. (2012) Three-dimensional microstructural changes in murine abdominal aortic aneurysms quantified using immunofluorescent array tomography. *J Histochem Cytochem.* 60:97-109.
119. Tapia, J.C., Kasthuri, N., Hayworth, K., Schalek, R., Lichtman, J.W., Smith, S.J and Buchanan, J. (2012) High contrast *en bloc* staining of neuronal tissue for field emission scanning electron microscopy. *Nature Protocols* 7:193-206.
118. Kleinfeld, D., Bharioke, A., Blinder, P., Bock, D.D., Briggman, K.L., Chklovskii, D.B., Denk, W., Helmstaedter, M., Kaufhold, J.P., Lee, W.C., Meyer, H.S., Micheva, K.D., Oberlaender, M., Prohaska, S., Reid, R.C., Smith, S.J, Takemura, S., Tsai, P.S. and Sakmann, B. (2011) Large-scale automated histology in the pursuit of connectomes. *J Neurosci.* 31:16125-38. PubMed PMID: 22072665.
117. Lee, H.Y., Ge, W.P., Huang, W., He, Y., Wang, G.X., Rowson-Baldwin, A., Smith, S.J, Jan, Y.N. and Jan, L.Y. (2011) Bidirectional regulation of dendritic voltage-gated potassium channels by the fragile X mental retardation protein. *Neuron* 72:630-42. PubMed PMID: 22099464.
116. Robles, E., Smith, S.J and Baier H. (2011) Characterization of genetically targeted neuron types in the zebrafish optic tectum. *Frontiers Neural Circuits* 5:1-14.
115. Micheva, K.D., Busse, B.L., Weiler, N.C., O'Rourke, N. and Smith, S.J (2010) Single-synapse analysis of a diverse synapse population: Proteomic imaging methods and markers. *Neuron* 68:639-653.
114. Appelbaum, L., Wang, G., Yokogawa, T., Skariah, G.M., Smith, S.J, Mourrain, P. and Mignot, E. (2010) Circadian and homeostatic regulation of structural synaptic plasticity in hypocretin neurons. *Neuron* 68:87-98.
113. Micheva, K.D., O'Rourke, N., Busse, B., and Smith, S.J (2010) Array Tomography: High-Resolution Three-Dimensional Immunofluorescence. In: *Imaging: A Laboratory Manual, 3rd Ed.* Cold Spring Harbor Press, Ch. 45, pp. 697-719.
112. Li, L., Tasic, B., Micheva, K.D., Ivanov, V.M., Spletter, M.L., Smith, S.J, Luo, L. (2010) Visualizing the distribution of synapses from individual neurons in the mouse brain. *PLoS One* 5(7):e11503.
111. Appelbaum, L., Wang, G.X., Maro, G.S., Mori, R., Tovin, A., Marin, W., Yokogawa, T., Kawakami, K., Smith, S.J., Gothilf, Y., Mignot, E. and Mourrain, P. (2009) Sleep-wake regulation and hypocretin-melatonin interaction in zebrafish. *Proc Natl Acad Sci U S A* 106(51):21942-7.
110. Datwani, A., McConnell, M.J., Kanold, P.O., Micheva, K.D., Busse, B., Shamloo, M., Smith, S.J and Shatz, C.J. (2009) Classical MHCI molecules regulate retinogeniculate refinement and limit ocular dominance plasticity. *Neuron* 64:463-70.
109. Eroglu, C., Allen, N.J., Susman, MW, O'Rourke, N.A., Park, C.Y., Ozkan, E., Chakraborty, C., Mulinyawe, S.B., Annis, D.S., Huberman, A.D., Green, E.M., Lawler, J., Dolmetsch, R., Garcia, K.C., Smith, S.J, Luo, Z.D., Rosenthal, A., Mosher, D.F. and Barres, B.A. (2009) Gabapentin receptor alpha2delta-1 is a neuronal thrombospondin receptor responsible for excitatory CNS synaptogenesis. *Cell* 139:380-92.
108. Isacoff, E. and Smith, S.J (2009) New Technologies. *Curr. Opin. Neurobiol.* 19:511-2.

107. Koffie, R.M., Meyer-Luehmann, M., Hashimoto, T., Adams, K.W., Mielke, M.L., Garcia-Alloza, M., Micheva, K.D., Smith, S.J, Kim, M.L., Lee, V.M., Hyman, B.T., and Spires-Jones, T.L. (2009) Oligomeric amyloid beta associates with postsynaptic densities and correlates with excitatory synapse loss near senile plaques. *Proc. Natl. Acad. Sci., USA* 106: 4012-7.
106. Lichtman, J.W. and Smith, S.J (2008) Seeing Circuits Assemble. *Neuron* 60:441-448.
105. Robles, E., Smith, S.J and Meyer, M.P (2008) Synapse Formation and Elimination: Synaptic Precursors: Filopodia. In Larry R. Squire, Editor-in-Chief, *Encyclopedia of Neuroscience*, pp. 779-786, Academic Press, Oxford.
104. Smith, S.J (2007) Circuit Reconstruction Tools Today. *Curr. Opin. In Neurobiol.* 17:601-608.
103. Stevens, B., Allen, N.J., Vazquez, L.E., Howell, G.R., Christopherson, K.S., Nouri, N., Micheva, K.D., Mehalow, A., Huberman, A.D., Stafford, B., Sher, A., Litke, A.M., Lambris, J.D., Smith, S.J., John, S.W.M., & Barres, B.A. (2007) The classical complement cascade mediates CNS synapse elimination. *Cell* 131:1164-78.
102. Micheva, K.D., and Smith, S.J (2007) Array tomography: A new tool for imaging the molecular architecture and ultrastructure of neural circuits. *Neuron* 55:25-36.
101. Levi, O., Lee, T.L., Lee, M.M., Smith, S.J, and Harris, J.S. (2007) Integrated semiconductor optical sensors for cellular and neural imaging. *Applied Optics* 46:1881-1889.
100. Lee, T.L., Levi, O., Cang, J., Kaneko, M., Stryker, M.P., Smith, S.J., Shenoy, K.V., and Harris, J.S. (2006) Integrated Semiconductor Optical Sensors for Chronic, Minimally-Invasive Imaging of Brain Function. *Proceedings of IEEE Engineering in Medicine and Biology Conference*. pp. 1025 -1028.
99. Micheva, K.D., Taylor, C.P. & Smith, S.J (2006) Pregabalin reduces the release of synaptic vesicles from cultured hippocampal neurons. *Mol. Pharm.* 70: 467-76.
98. Meyer, M.P. & Smith, S.J (2006) Evidence from in vivo imaging that synaptogenesis guides the growth and branching of axonal arbors by two distinct mechanisms. *J. Neurosci.* 26:3604-14.
97. Micheva, K.D. and Smith, S.J (2005) Strong effects of sub-physiological temperature on the function and plasticity of mammalian presynaptic terminals. *J. Neurosci.* 25: 7481-7488.
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94. Meyer, M.P., Trimmer, J.S., Gilthorpe, J.D., and Smith, S.J (2005) Characterization of Zebrafish PSD-95 Gene Family Members. *J. Neurobiol.* 63:91-105.
93. Hua, Y., Smear, M.C., Baier, H. and Smith, S.J (2005) Activity-Based Competition Regulates Axon Growth in Vivo. *Nature* 434: 1022-1026.
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91. Thrush E., Levi O., Cook L.J., Smith S.J. and Harris J.S., Jr. (2004) Greater than 106 optical isolation in integrated optoelectronic fluorescence sensor. *IEEE-EMBS Special Topic Conference on Microtechnologies in Medicine & Biology*, 2080-2081.
90. Thrush, E., Levi, O., Ha, W., Carey, G., Cook, L.J., Deich, J., Smith, S.J, Moerner W.E. and Harris J.S., Jr. (2004) Integrated semiconductor vertical-cavity surface-emitting lasers and PIN photodetectors for bio-medical fluorescence sensing." *Journal of Quantum Electronics*, 40: 491-499.
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88. Hua, Y and Smith, S.J (2004) Neural activity and the dynamics of central nervous system development. *Nature Neurosci.* 7:327-32.
87. Thrush, E., Levi, O., Cook, L.J., Deich, J., Smith, S.J, Moerner W.E. and Harris J.S., Jr. (2004) Laser background characterization in a monolithically integrated biofluorescence sensor. *Proc. SPIE*, 5318, 59-65.
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85. Niell, C.M., Meyer, M.P and Smith, S.J (2004) *In vivo* imaging of synapse formation on a growing dendritic arbor. *Nature Neurosci.* 7: 254-260.
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83. Thrush E, Levi O, Ha W, Wang K, Smith SJ and Harris JS, Jr. (2003) Integrated bio-fluorescence sensor. *J. Chromatography A*, 1013: 103-110.
82. Thrush E, Levi O, Wang K, Wistey MA, Harris JS, Smith SJ. (2003) High throughput integration of optoelectronics devices for biochip fluorescent detection. *Proc. SPIE*, 4982: 162-169.
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80. Meyer, M.P., Niell, C.M, and Smith, S.J (2003) Brain Imaging: How stable are synaptic connections? *Curr. Biol.*, 13(5):R180-2.
79. Thrush E, Levi O, Wang K, Wistey M, Harris JS, Smith SJ. (2002) Integrated semiconductor fluorescent detection system for biochip and biomedical applications. *Proc. SPIE*, 4626: 289-297.
78. Waters, J. and Smith, S.J (2002) Vesicle pool partitioning influences presynaptic diversity and weighting in rat hippocampal synapses. *J. Physiol.*, 541(Pt 3):811-23.
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75. Barres, B.A. and Smith, S.J (2001) Cholesterol--making or breaking the synapse. *Science*, 294(5545):1296-7.
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71. Jontes, J.D. and Smith, S.J (2000) Filopodia, spines and the generation of synaptic diversity. *Neuron* **27**, 11-14.
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69. Jontes, J.D., Buchanan, J. and Smith, S.J (2000) Growth cone and dendrite dynamics in zebrafish embryos: in vivo imaging of early events in synaptogenesis. *Nature Neuroscience* **3**: 231-237.
68. Smith, S.J (1999) Dissecting dendrite dynamics. *Science* **19**: 1860-1861.
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66. Smith, S.J (1998) Glia help synapses form and function. *Current Biology* **8**: R158-160.
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64. Adams, C.L., Nelson, W.J. and Smith, S.J (1996) Quantitative analysis of cadherin-catenin-actin reorganization during development of cell-cell adhesion. *J Cell Biol.* **135**: 1899-1911.
63. Ryan, T.A., Li, L., Chin, L.-S., Greengard, P. and Smith, S.J (1996) Synaptic vesicle recycling in synapsin I knock-out mice. *J. Cell Biol.* **134**: 1219-1227.
62. Ziv, N.E. and Smith, S.J (1996) Evidence for a role of dendritic filopodia in synaptogenesis and spine formation. *Neuron* **17**: 91-102.
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60. Shalon, D., Smith, S. J and Brown, P.O. (1996) A DNA micro-array system for analyzing complex DNA samples using two-color fluorescent probe hybridization. *Genome Research* **6**:639-645.
59. Ryan, T.A., Smith, S.J and Reuter, H. (1996) The timing of synaptic vesicle endocytosis. *Proc. Natl. Acad. Sci., USA*, **93**: 5567-5571.
58. Dailey, M.E. and Smith, S.J (1996) The dynamics of dendritic structure in developing hippocampal slices. *J. Neurosci.*, **16**: 2983-2994.
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56. Wong, R. O. L., Chernjavsky, A., Smith, S.J and Shatz, C.J. (1995) Early functional neural networks in the developing retina. *Nature*, **374**: 716-718.
55. Ryan, T.A., and Smith, S.J. (1995) Vesicle pool mobilization during action potential firing at hippocampal synapses. *Neuron*, **14**: 983-989.
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