BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Jay T. Groves	Professor of Chemistry HHMI Investigator
eRA COMMONS USER NAME (credential, e.g., agency login) jaygroves	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
Tufts University	B.S.	1992	Physics & Chemistry
Stanford University	Ph.D.	1998	Biophysics

A. Personal Statement

Dr. Groves has had a long-standing interest in the physical and biological aspects of cell membranes. His group combines aspects of cellular biophysics, physical chemistry, and materials science to study key aspects of signal transduction processes in cell membranes.

B. Positions, Honors, Service and Patents.

Positions and Employment

1998 – 1999 Visiting Scholar, Academia Sinica, Taipei, Taiwan
1999 – 2001 Division Director's Fellow, Lawrence Berkeley National Laboratory, Berkeley, CA
2001 – 2007 Assistant Professor, Dept. Chemistry, University of California, Berkeley, CA
2001 – Faculty Scientist, Lawrence Berkeley National Laboratory, Berkeley, CA
2007 – 2010 Associate Professor, Dept. Chemistry, University of California, Berkeley, CA
2008 – Howard Hughes Medical Institute Investigator
2010 -- Professor, Dept. Chemistry, University of California, Berkeley, CA

Honors and Awards

Knig N. Hobbs Knight Prize Scholarship in Physics, Tufts University (1991)
Elected Phi Beta Kappa, Tufts University (1992)
Amos Emerson Dolbear Scholarship for Physics, Tufts University (1992)
Highest Honors in Thesis, Tufts University (1992)
Merrill Lynch Innovation Grants Forum Entrepreneurship Award (1998)
Burroughs Wellcome Career Award in the Biomedical Sciences (2000)
Searle Scholars Award (2002)
MIT TR100 (2003)
Hellman Family Faculty Award (2004)
Beckman Young Investigator Award (2004)
NSF CAREER Award (2005)
ACS Langmuir Lecture Award (2005)
LBNL Award for Excellence in Technology Transfer (2007)
Nature Biotechnology Award for Outstanding Research Achievement (2008)
University Lecture, Cornell University (2011)

Service

Guest Editor, Langmuir, Special Issue on the Biomolecular Interface, March 2004
Co-Organizer, QB3 Symposium on Cell Membrane Systems and Technology, May 2005
Co-Organizer, MRS Spring Meeting, Mechanotransduction and Engineered Cell-Surface Interactions Symposium, April 17 - 21, 2006, San Francisco, CA

Guest Editor, Materials Research Bulletin, Materials Sci. of Supported Lipid Membranes, July 2006
Guest Editor, J. Struct. Biol., Special Issue on Supported Membranes, October 2009
Editorial Board, Current Opinion in Chemical Biology, 2006 –
Associate Editor, Annual Review of Physical Chemistry, 2006 –

Patents

US 8,114,602 “Detection of molecular interactions” (Issued February 14, 2012)
US 6,699,719 “Biosensor arrays and methods” (Issued March 2, 2004)
US 6,228,326 “Arrays of independently-addressable supported fluid bilayer membranes and methods of use thereof” (Issued May 8, 2001)

C. Publications

46. Science 2005, 310, 1191-1193: “Altered TCR signaling from geometrically repatterned immunological synapses”, Kaspar D. Mossman, Gabriele Campi, Jay T. Groves and Michael L. Dustin. PMID: 16293763
47. Anal. Chem. 2006, 78, 174-180: "Surface binding affinity measurements from order transitions of lipid membrane-coated colloidal particles", Esther M. Winter, and Jay T. Groves. PMID: 16383325
48. ChemBioChem 2006, 7, 436-440: "A Fluid Membrane-Based Soluble Ligand Display System for Live Cell Assays", Jwa-Min Nam, Pradeep M. Nair, Richard M. Neve, Joe W. Gray, and Jay T. Groves. PMID: 16456901
49. Phys. Rev. Lett. 2006, 96, 118101: "Hydrodynamic damping of membrane thermal fluctuations near surfaces imaged by fluorescence interference microscopy", Yoshihisa Kaizuka and Jay T. Groves. PMID: 16605875
50. J. Phys. Chem. B 2006, 110, 8513-8516: "Coupled membrane fluctuations and protein mobility in supported inter-membrane junctions", Raghuveer Parthasarathy and Jay T. Groves. PMID: 16623539
51. Langmuir, 2006, 22, 5095-5099: “Curvature modulated phase separation in lipid bilayer membranes", Raghuveer Parthasarathy and Jay T. Groves. PMID: 16700599
52. Langmuir, 2006, 22, 12, 5384-5384: “Nonequilibrium patterns of cholesterol-rich chemical heterogeneities within single fluid supported phospholipids bilayer membranes”, Annapoorna R. Sapuri-Butti, Qijian Li, Jay T. Groves, and Atul N. Parikh. PMID: 16732666
53. Curr. Op. Chem. Biol., 2006, 10, 544-550: “Spatial mutation of the T cell immunological synapse”, Jay T. Groves. PMID: 17070724
54. J. Am. Chem. Soc., 2006, 128, 15221-15227: “Lipid lateral mobility and membrane phase structure modulation by protein binding”, Martin B. Forstner, Chanel K. Lee, Atul N. Parikh, and Jay T. Groves. PMID: 17117874
55. Science, 2006, 313, 1901-1902: “Unveiling the membrane domains”, Jay T. Groves. PMCID: 17008517
56. Biophys. J., 2006, 91, 3600-3606: “Analysis of shape, fluctuations, and dynamics in intermembrane junctions”, Lawrence C.-L. Lin, Jay T. Groves, and Frank L. H. Brown. PMID: 16920837
57. J. Am. Chem. Soc., 2006, 128, 15354-25355: “Control of antigen presentation with a photoreleasable agonist peptide”, Andrew L. DeMond and Jay T. Groves. PMID: 17131984
58. Soft Matt., 2007, 1, 24-33: “Curvature and spatial organization in biological membranes”, Raghuveer Parthasarathy and Jay T. Groves. PMID: PMC Journal – In Process
59. Chem. Soc. Rev., 2007, 35, 46-54: “Micropatterned supported membranes as tools for quantitative studies of the immunological synapse”, Kaspar Mossman and Jay T. Groves. PMID: PMC Journal – In Process
60. Langmuir, 2007, 23, 4, 2052-2057: “Hybrid protein-lipid patterns from aluminum templates”, Bryan L. Jackson and Jay T. Groves. PMID: 17279694
61. Nature Prot. 2007, 2, 1438 - 1444: "Detection of proteins using a colorimetric bio-barcode assay", Jwa-Min Nam, Kyung-Jin Jang, and Jay T. Groves. PMID: 17545980
62. J. Am. Chem. Soc. 2007, 129, 5462 - 5471: "Hierarchical assembly of model cell surfaces: Synthesis of mucin mimetic polymers and their display on supported bilayers", David Rabuka, Raghuveer Parthasarathy, Goo Soo Lee, Xing Chen, Jay T. Groves, and Carolyn R. Bertozzi. PMID: 17425309
63. Annu. Rev. Phys. Chem. 2007, 58, 697 - 717: "Bending mechanics and molecular organization in biological membranes", Jay T. Groves. PMID: 17430092
64. J. Am. Chem. Soc. 2007, 129, 11543-11550: "Synthetic analogues of glycosylphosphatidylinositol anchored proteins and their behavior in supported lipid bilayers", Margot G. Paulick, Amber R. Wise, Martin

B. Forstner, Jay T. Groves, and Carolyn R. Bertozzi. PMID: 17715922
65. J. Phys. Chem. B 2007, 111, 12133-12135: "Molecular orientation of membrane-anchored mucin glycoprotein mimics", Raghuveer Parthasarathy, David Rabuka, Carolyn R. Bertozzi, and Jay T. Groves. PMID: 17915910
66. Proc. Natl. Acad. Sci. USA, 2007, 104, 51, 20332 - 20337: "A chemical approach to unraveling the biological function of the glycosylphosphatidylinositol anchor", Margot G. Paulick, Martin B. Forstner, Jay T. Groves and Carolyn R. Bertozzi. PMID: 18077333
67. Current Opinion in Immunology, 2007, 19, 6, 722 - 727: "Interrogating the T cell synapse with patterned surfaces and photoactivated proteins", Andrew L. DeMond and Jay T. Groves. PMID: 17703931
68. Biophys. J. 2008, 94, 3286-3292: “T cell receptor microcluster transport through molecular mazes reveals mechanism of translocation”, Andrew L. DeMond, Kaspar D. Mossman, Toby Starr, Michael L. Dustin, and Jay T. Groves. PMID: 18199675
69. Langmuir, 2008, 24, 8, 4145 - 4149: "Kinetic control of histidine-tagged protein surface density on supported lipid bilayers", Jeffrey A. Nye and Jay T. Groves. PMID: 18303929
70. J. Am. Chem. Soc., 2008, 130, 18, 5947-5953: "Non-covalent cell surface engineering: incorporation of bioactive synthetic glycopolymers into cellular membranes", David Rabuka, Martin B. Forstner, Jay T. Groves and Carolyn R. Bertozzi. PMID: 18402449
71. Langmuir, 2008, 24, 10, 6189-6193: "Electrical manipulation of supported lipid membranes by embedded electrodes", Bryan L. Jackson, Jeffrey A. Nye and Jay T. Groves. PMID: 18491927
72. Nat. Struct. Mol. Biol., 2008, 15, 452-461: "Membrane-dependent signal integration by the Ras activator Son of sevenless", Jodi Gureasko, William J. Galush, Sean Boykevisch, Holger Sondermann, Dafna Bar-Sagi, Jay T. Groves and John Kuriyan. PMID: 18454158
73. Biophys. J., 2008, 95, 2512-2519: "Quantitative fluorescence microscopy using supported lipid bilayer standards", William J. Galush, Jeffrey A. Nye and Jay T. Groves. PMID: 18515392
74. Annu. Rev. Biomed. Eng., 2008, 10, 311-338: "Fluorescence Imaging of Membrane Dynamics", Jay T. Groves, Raghuveer Parthasarathy, Martin B. Forstner. PMID: 18429702
75. Nat. Biotech., 2008, 26, 7, 825-830: "Electrostatic readout of DNA microarrays with charged microspheres", Nathan G. Clack, Khalid Salaita and Jay T. Groves. PMID: 18587384
76. ChemPhysChem,2008, 9, 12, 1688-1692: "Discrete Arrays of Liquid Crystal-Supported Proteolipid Monolayers as Phantom Cell Surfaces", Amber R. Wise, Jeffrey A. Nye, Jay T. Groves. PMCID: 18651693
77. Soft Matter,2009, 5, 1931-1936: "Like-charge interactions between colloidal particles are asymmetric with respect to sign", Esther W. Gomez, Nathan G. Clack, Hung-Jen Wu and Jay T. Groves. PMID: PMC Journal – In Process
78. Langmuir,2009, 25, 6, 3713-3717: "Effect of support corrugation on silica xerogel-supported phase separated lipid bilayers", Emel I. Goksu, Barbara A. Nellis, Wan-Chen Lin, Joe H. Satcher, Jr., Jay T. Groves, Subhash H. Risbud, Marjorie L. Longo. PMID: 19209917
79. Nano Lett, 2009, 5, 2077-2082: "A nanocube plasmonic sensor for molecular binding on membrane surfaces", William J. Galush, Sarah A. Shelby, Martin J. Mulvihill, Andrea Tao, Peidong Yang, Jay T. Groves. PMID: 19385625
80. Proc. Natl. Acad. Sci. USA, 2009, 106, 31, 12729-12734: “Cluster size regulates protein sorting in the immunological synapse”, Niña C. Hartman, Jeffrey A. Nye, Jay T. Groves. PMID: 19622735
81. J. Struct. Biol. 2009, 168, 1-2: “Supported membranes in structural biology”, Lukas K. Tamm and Jay T. Groves. PMID: 19628042
82. Nat. Chem. Biol. 2009, 5, 11, 783-784: “Physical chemistry of membrane curvature”, Jay T. Groves. PMID: 19841625
83. Nat. Immunol. 2010, 11(1), 90-96: “TCR and LAT occur in separate domains on T cell membranes, which concatenate during activation”, Björn F. Lillemeier, Manuel A. Mörtelmaier, Martin B. Forstner, Johannes B. Huppa, Jay T. Groves, Mark M. Davis. PMID: 20010844
84. Science 2010, 327, 1380-1385: “Restriction of receptor movement alters cellular response: Physical force sensing by EphA2”, Khalid Salaita, Pradeep M.Nair, Rebecca S. Petit, Richard M. Neve, Debopriya Das, Joe W. Gray, Jay T. Groves. PMC: 2895569
85. Nat. Rev. Mol. Cell Biol., 2010, 11(5), 342-352: “Spatial organization and signal transduction at intercellular junctions”, Boryana N. Manz and Jay T. Groves. PMID: 2035436

86. Nat. Struct. Mol. Biol., 2010, 17, 659-665: "Molecular mechanisms in signal transduction at the membrane", Jay T. Groves and John Kuriyan. PMID: 20495561
87. PLoS ONE, 2010, 5(7): "Altered Actin Centripetal Retrograde Flow in Physically Restricted Immunological Synapses.", Cheng-han Yu, Hung-Jen Wu, Yoshihisa Kaizuka, Ronald D. Vale, Jay T. Groves. PMC: 2912367
88. New J. Phys., 2010, 12 095001: "Bending-mediated superstructural organizations in phase-separated lipid membranes.", Yoshihisa Kaizuka, Jay T. Groves. (PMC in progress)
89. Med. Biol. Eng. Comput., 2010, 48(10): "Engineering supported membranes for cell biology.", Cheng-Han Yu, Jay T. Groves. PMC: 2944960
90. Proc. Natl. Acad. Sci. USA, 2010, 107(45): "Engineering of a synthetic electron conduit in living cells.", M. Jensen, Aaron E. Albers, Konstantin R. Malley, Yuri Y. Londer, Bruce E. Cohen, Brett A. Helms, Peter Weigele, Jay T. Groves, Caroline M. Ajo-Franklin. PMC: 2984186
91. Communicative & Integrative Biology, 2010, 3:5, 454-457: "Roles of the cytoskeleton in regulating EphA2 signals.", Khalid Salaita and Jay T. Groves. PMC: 2974079
92. Current Protocols in Chemical Biology, 2010, 2:235-269: "Supported Membrane Formation, Characterization, Functionalization, and Patterning for Application in Biological Science and Technology.", Wan-Chen Lin, Cheng-Han Yu, Sara Triffo, Jay T. Groves. (PMC in progress)
93. J. Phys. Chem. A, 2011, 115(16), 3867-3875: “Patterned Two-Photon Photoactivation Illuminates Spatial Reorganization in Live Cells”, Adam W. Smith, Alexander A. Smoligovets and Jay T. Groves. PMID: 21391691
94. Nat. Protoc., 2011, 6, 523-539: "Using patterned supported lipid membranes to investigate the role of receptor organization in intercellular signaling.", Pradeep M. Nair, Khalid Salaita, Rebecca S. Petit and Jay T. Groves. PMID: 21455188
95. Proc. Natl. Acad. Sci. USA, 2011, 108(22), 9089-909: "T-cell triggering thresholds are modulated by the number of antigen within individual T-cell receptor clusters.", Boryana N. Manz, Bryan L. Jackson, Rebecca S. Petit, Michael L. Dustin and Jay Groves. PMC: 3107331
96. Curr. Opin. Cell Biol., 2011, 23(4), 370-376: "Signaling clusters in the cell membrane.", Niña C Hartman, Jay T Groves. PMID: 21665455
97. Cell, 2011, 146(5), 732-745: "A Mechanism for Tunable Autoinhibition in the Structure of a Human Ca2+/Calmodulin- Dependent Kinase II Holoenzyme.", Luke H. Chao, Margaret M. Stratton, Il-Hyung Lee, Oren S. Rosenberg, Joshua Levitz, Daniel J. Mandell, Tanja Kortemme, Jay T. Groves, Howard Schulman and John Kuriyan. PMC: 3184253
98. Nano Lett., 2011, 11(11), 4912-4918,"Supported Membranes Embedded with Fixed Arrays of Gold Nanoparticles.", Theobald Lohmüller, Sara Triffo, Geoff P. O'Donoghue, Qian Xu, Michael P. Coyle, and Jay T. Groves. PMC: 3212849
99. Biophys. J., 2011, 101(11), 2731-2739,"EphA2 Receptor Activation by Monomeric Ephrin-A1 on Supported Membranes.", Qian Xu, Wan-Chen Lin, Rebecca S. Petit, and Jay T. Groves. PMC: 3297811
100. PLoS ONE, 2012, 7(2), e30704: "Myosin IIA Modulates T Cell Receptor Transport and CasL Phosphorylation during Early Immunological Synapse Formation.", Yan Yu, Nicole C. Fay, Alexander A. Smoligovets, Hung-Jen Wu, Jay T. Groves. PMC: 3275606
101. J. Cell Sci., 2012, 125(3), 735-42: "Characterization of dynamic actin associations with T-cell receptor microclusters in primary T cells.", Alexander A. Smoligovets, Adam W. Smith, Hung-Jen Wu, Rebecca S. Petit, Jay T. Groves. PMID: 22389407
102. Nano Lett., 2012, 12(3), 1717-1721: "Single molecule tracking on supported membranes with arrays of optical nanoantennas.", T. Lohmüller, L. Iversen, M. Schmidt, C. Rhodes, H.-L. Tu, W.-C. Lin, and J. T. Groves. PMID: 22352856
103. J. Phys. Chem. B, 2012, 116(11), 3630-3640: "The membrane environment can promote or suppress bistability in cell signaling networks.", Steven M. Abel, Jeroen P. Roose, Jay T. Groves, Arthur Weiss, and Arup K. Chakraborty. PMID: 22332778
104. Annu. Rev. Biophys., 2012, 41, 543-56:"Receptor signaling clusters in the immune synapse.", Michael L. Dustin and Jay T. Groves. (PMD in progress)
105. J. Phys. Chem. B, 2012, 116(17), 5122-5131: "Single molecule kinetics of ENTH binding to lipid membranes.", Sharon Tozovsky, Martin B. Forstner, Holger Sondermann, Jay T. Groves. PMID: 22471245

106.J. Phys. Chem Soc., 2012, 134(23), 9549-9552: "Investigating cell surface galectin-mediated cross-linking on glycoengineering cells", Brian Belardi, Geoff P. O'Donoghue, Adam W. Smith, Jay T. Groves, Carolyn R. Bertozzi. PMC: 3374418
107. J. Am. Chem. Soc. 2012, 134(26), 10833-10842: "Monitoring Lipid-Anchor Organization in Cell Membranes by PIE-FCCS", Sara B. Triffo, Hector H. Huang, Adam W. Smith, Eldon T. Chou, and Jay T. Groves. PMID: 22631607
108. Nature Methods, 2012, 9, 1189-1191: "Membrane-protein binding measured with solution-phase plasmonic nanocube sensors", Hung-Jen Wu, Joel Henzie, Wan-Chen Lin, Christopher Rhodes, Zhu Li, Elodie Sartorel, Jeremy Thorner, Peidong Yang, Jay T. Groves. (PMID 23085614)
109. Cell, 2013, 152(3), 543-556: "Conformational coupling across the plasma membrane in activation of the EGF receptor", Nicholas F. Endres, Rahul Das, Adam Smith, Anton Arkhipov, Erika Kovacs, Yongjian Huang, Jeffrey G. Pelton, Yibing Shan, David E. Shaw, David E. Wemmer, Jay T. Groves and John Kuriyan. (PMID in progress)
110. Nature Materials, 2013, 12, 96-97: "Glycan's Imprints", Jay T. Groves PMID: 23340469.