

CURRICULUM VITAE
LATHA VENKATARAMAN

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EDUCATION

Ph.D. Physics, Harvard University	1999
M.S. Physics, Harvard University	1997
B.S. Physics, Massachusetts Institute of Technology	1993
Doctoral Thesis: Electronic Properties of One Dimensional Conductors Advisor: Prof. Charles M. Lieber	1999

PROFESSIONAL EMPLOYMENT

Associate Professor	Department of Applied Physics and Applied Mathematics, Columbia University	2011
Assistant Professor	Department of Applied Physics and Applied Mathematics, Columbia University	2007
Research Scientist	Department of Physics and Center for Electron Transport in Molecular Nanostructures, Columbia University	2003
Research Scientist	Vytran Corporation	1999

AWARDS AND PATENTS

Alfred P. Sloan Research Fellowship	2011
Kim Award for Faculty Involvement, Columbia University	2010
Packard Fellowship in Science and Engineering	2008
NSF Career	2008
Professional Schools Research Fellowship Award, Columbia University	2007
Method of Splicing Specialty Fibers with Low Loss, Vytran Corporation	2004
White Prize for Excellence in Teaching, Harvard University	1999
Applied Physics Fellowship, Harvard University	1993

SYNERGISTIC ACTIVITIES

1. Currently mentoring six graduate students, three undergraduate and two post-doctoral researchers.
2. Mentored four undergraduate summer students and two post-doctoral researchers.
3. Served on NSF Review Panel and reviewed proposals for the NSF.
4. Co-Organizer of the DMP focus session Fundamental Challenges in Transport Properties of Nanostructures for the 2010 March APS Meeting in Portland.

5. Associate Director of the Nanoscale Science and Engineering Center at Columbia University.
6. Member of the Outreach/Education Committee for the Nanoscale Science and Engineering Center at Columbia University.
7. Referee for: Nature, Nature Nanotechnology, J. American Chemical Society, Physical Review Letters, Physical Review B, J. Phys. Chemistry, Nano Letters, J. Chemical Physics, Chemical Reviews, Progress in Surface Science.

TEACHING

Spring 2008, Spring 2009, Spring 2010, Spring 2011: Applied Electromagnetism – for Junior Applied Physics Majors

Fall 2008, Fall 2009, Fall 2010, Fall 2011: Quantum Physics of Matter – for Seniors and 1st year Graduate Students

Fall 2009: Junior and Senior Seminar for Applied Physics Majors

INVITED PRESENTATIONS

1. AVS 58th Annual International Symposium and Exhibition Nashville, TN, October 2011
2. European Theoretical Spectroscopy Facility (ETSF), Torino, Italy, September 2011
3. 11th European Conference of Molecular Electronics (ECME 2011), Barcelona, September 2011.
4. Physical Organic Chemistry Gordon Research Conference, June 2011
5. Pan American Advanced Studies Institute, Cartagena, Colombia, June 2011
6. Marquette University, Chemistry Colloquium, March 2011
7. Indian Institute of Science, Chemistry Colloquium, October 2010
8. University of Pennsylvania, Physics Colloquium, October 2010
9. Massachusetts Institute of Technology, Physical Chemistry Seminar, October 2010
10. Yale University Applied Physics Seminar, September 2010
11. Spring College on Computational Nanoscience, Trieste, Italy, May 2010
12. The Russell Berrie Nanotechnology Institute at Technion, Winter School, Israel Feb 2010
13. New York University Nanoscience Discussion Group, New York, Feb 2010
14. Institute for Nanotechnology, Karlsruhe, Germany, Jan 2010
15. International Conference on Molecular Electronics, Emmetten, Switzerland, Jan 2010
16. Tata Institute of Fundamental Research, Mumbai, India, Dec 2009
17. Kavli Institute for Theoretical Physics at the University of California, Santa Barbara, Nov 2009
18. Packard Fellows meeting, September 2009
19. Invited Talk at the Contractor's Meeting organized by the Basic Energy Sciences Division of the U.S. Department of Energy, June 2009
20. Physics Colloquium, Rutgers University, April 2009
21. Invited talk at MRS Symposium B, April 2009
22. Invited talk at MRS Symposium Z, April 2009
23. Colloquium, Physical Review, March 2009
24. IWEPM2009, Kirchberg/Tirol, Austria, March 2009 (declined)
25. Physics@FOM, Veldhoven, Netherlands, January 2009

26. Emergent Nanoscience Workshop, Columbia University, December 2008
27. University of Massachusetts, Amherst, November 2008
28. Department of Applied Physics, Columbia University, October 2008
29. Yeshiva University Physics Colloquium, September 2008
30. Gordon Conference, Electron Donor-Acceptor Interactions, August 2008
31. French – American Young Engineering Scientists Symposium, July 2008
32. IMEC, Belgium, July 2008
33. ESPMI IV Workshop, Princeton University, June 2008
34. Fundamentals of Electronic Nanosystems, St. Petersburg, June 2008 (declined)
35. HOT NANO TOPICS 2008, Slovenia, May 2008 (declined)
36. NSLS-CFN Workshop, Brookhaven National Labs, May 2008
37. VSLI-TSA Conference, Taiwan, April 2008
38. Chemistry Department, City College of New York, March 2008.
39. Chemistry Department, University of Maryland, November 2007.
40. Molecular Foundry, Lawrence Berkeley National Labs, October 2007.
41. Applied Physics, Columbia University, September 2007.
42. ELETTRA Synchrotron Light Laboratory, Trieste, Italy, July 2007.
43. Brookhaven National Labs, Undergraduate Outreach, June 2007
44. Building Electronic Function into Nanoscale Molecular Architectures, NSF-sponsored Workshop, June 2007
45. New York Academy of Sciences, May 2007
46. Chemistry Department, Princeton University, March 2007
47. American Physical Society March Meeting, March 2007
48. Barnard College Chemistry Department, February 2007
49. Physics Department Colloquium, University of Toronto, February 2007
50. Condensed Matter Seminar, New York University Department of Physics, February 2007
51. Mesilla Chemistry Workshop 'Electron Transfer and Molecular Devices', February 2007
52. Department of Applied Physics, Columbia University, February 2007
53. Department of Applied and Engineering Physics, Cornell University, January 2007
54. Brookhaven National Laboratories, January 2007
55. Canadian Institute of Advanced Research meeting, November 2006
56. Nanoscale Functional Materials, Cornell University, October 2006
57. Duke University, October 2006
58. 4th Annual Molecular Conduction and Sensor Workshop, July 2006
59. Chemistry and Physics of Nanostructure Fabrication Gordon Research Conference, July 2006
60. NNIN Synergy conference, Harvard University, May 2006

LIST OF PUBLICATIONS

Students/Post-docs are underlined, corresponding authors have *

- [1] M.Kamenetska, M. Dell'Angela, J.R. Widawsky, G. Kladnik, A. Verdini, A. Cossaro, D. Cvetko, A. Morgante, **L. Venkataraman***, 'Structure and Energy Level Alignment of Tetramethyl Benzenediamine on Au(111)', In Press, J. Phys. Chem. C.

- [2] B.M. Boardman, J.R. Widawsky, Y.S. Park, **L. Venkataraman***, M.L. Steigerwald and C. Nuckolls, 'Conductance of Single-Cobalt Chalcogenide Cluster Junctions', **J. Am. Chem. Soc.** 133, 8455–8457, (2011).
- [3] Z-L Cheng, R. Skouta, H. Vazquez, J. R. Widawsky, S. Schneebeli, W. Chen, M.S.Hybertsen*, R.Breslow*, **L.Venkataraman***, 'In situ Formation of Highly Conducting, Covalent Au-C Contacts for Single Molecule Transport', **Nature Nanotechnology**, 6, 353-357, (2011).
- [4] V. Fatemi, M. Kamenetska, J. B. Neaton*, **L. Venkataraman***, 'Environmental Control of Molecular Scale Transport', **Nano Letters**, 11, 1988-1992, (2011).
- [5] J. S. Meisner, M. Kamenetska, M. Krikorian, D. F. Sedbrook, M.L. Steigerwald, **L. Venkataraman***, C. Nuckolls*, 'A Single-molecule Potentiometer', **Nano Letters** ASAP, 2011.
- [6] M. Frej, S. V. Aradhya, M. Koentopp, M. S. Hybertsen*, **L. Venkataraman***, 'Bond Rupture Force Measurements in Single Molecule Junctions', **Nano Letters**, 11, 1575-1579 (2011).
- [7] S. Schneebeli, M. Kamenetska, Z. Cheng, R. Skouta, R.A. Friesner, **L. Venkataraman***, R. Breslow*, 'Single molecule conductance through multiple π - π stacked benzene rings determined with direct electrode to benzene ring connections', **J. Am. Chem. Soc.**, 133, 2136–2139 (2011) (Cover)
- [8] S. Schneebeli, M. Kamenetska, F. Foss, H. Vazquez, R. Skouta, M. S. Hybertsen*, **L. Venkataraman***, R. Breslow*, 'Electrical Properties of Biphenylenes', **Organic Letters** 12, 4114-4117, (2010).
- [9] R. Parameswaran, J. R. Widawsky, H. Vázquez, Y. S. Park, B.M. Boardman, C. Nuckolls, M.L. Steigerwald, M.S. Hybertsen*, **L. Venkataraman***, 'Conductance of Single Molecule Junctions with Diphenylphosphine Linkers', **J. Phys. Chem. Lett.**, 1, 2114-2119 (2010).
- [10] M. Dell'Angela, G. Kladnik, A. Cossaro, A. Verdini, M. Kamenetska, I. Tamblyn, S.Y. Quek, J.B. Neaton*, D. Cvetko, A. Morgante*, **L. Venkataraman***, 'Relating Energy Level Alignment and Amine-Linked Molecular Junction Conductance', **Nano Letters**, 10, 2470-2474 (2010).
- [11] M. Kamenetska, Su Ying Quek, A. C. Whalley, M. L. Steigerwald, H.J. Choi, Steven G. Louie, C. Nuckolls, M.S. Hybertsen, J. B. Neaton*, **L. Venkataraman***, 'Conductance and Geometry of Pyridine-Linked Single Molecule Junctions', **J. Am. Chem. Soc.**, 132, 6817–6821 (2010).
- [12] J. R. Widawsky, M. Kamenetska, J. Klare, C. Nuckolls, M.L. Steigerwald, M.S. Hybertsen, **L. Venkataraman***, 'Electronic Transport Across Single Molecular Wire Junctions: Voltage Dependence of Conductance', **Nanotechnology**, vol 20, 434009 (2009).

- [13] Y. S. Park, J. R. Widawsky, M. Kamenetska, M. L. Steigerwald, M.S. Hybertsen, C. Nuckolls, **L. Venkataraman***, 'Frustrated Rotations in Single Molecule Junction', J. Am. Chem. Soc. 2009, 131, 10820-10821.
- [14] M. Kamenetska, M. Koentopp, A. C. Whalley, Y. S. Park, M. L. Steigerwald, C. Nuckolls, M.S. Hybertsen*, **L. Venkataraman***, 'Formation and Evolution of Single Molecule Junctions' Physical Review Letters, 102, 126803 (2009).
- [15] S. Y. Quek, M. Kamenetska, M.L. Steigerwald, H. J. Choi, S. G. Louie, M.S. Hybertsen, J.B. Neaton*, **L. Venkataraman***, 'Mechanically-Controlled Binary Conductance Switching of a Single-Molecule Junction', Nature Nanotechnology, vol. 4, 230 (2009)
- [16] **L. Venkataraman***, 'Benzene provides the missing link in molecular junctions', Invited Physics Viewpoint, 2008, 1, 5.
- [17] M. S. Hybertsen*, **L. Venkataraman***, J. E. Klare, A. C. Whalley, M. L. Steigerwald and C. Nuckolls, Amine-linked single-molecule circuits: systematic trends across molecular families', Invited Review, J. Phys.: Condensed Matter 20 (2008) 374115.
- [18] **L. Venkataraman***, "Molecular Junctions: Seeing is Believing", Nature Nanotechnology, 2008, 3, 187-188.
- [19] Y. S. Park, A. C. Whalley, M. Kamenetska, M.L. Steigerwald, M. S. Hybertsen, C. Nuckolls, **L. Venkataraman***, 'Single Molecule Conductance and Link Chemistry: A Comparison of Phosphines, Methyl Thiols and Amines', J. Am. Chem. Soc. 2007, 129, 15768-15769.
- [20] D. Millar, **L. Venkataraman** and L. H. Doerr*, 'Efficacy of Au-Au Contacts for Molecular Conductance Measurement', J. Phys. Chem. C., 2007, 111, 17635-17639.
- [21] S. Y. Quek, **L. Venkataraman**, C. H. Choi, S. G. Louie, M. S. Hybertsen, J. B. Neaton*, 'Amine-Gold Linked Single-Molecule Circuits: Experiment and Theory', Nano Letters, Vol 7, p 3477-3482, 2007.
- [22] Jordan R. Quinn, Frank W. Foss Jr., **L. Venkataraman*** and Ronald Breslow*, 'Oxidation Potentials Correlate with Conductivities of Aromatic Molecular Wires' J. Am. Chem. Soc. 2007, 129, 12376-12377.
- [23] J. R. Quinn, F. Foss, **L. Venkataraman***, M. S. Hybertsen, R. Breslow, 'Single-Molecule Junction Conductance through Diaminoacene', J. Am. Chem. Soc. 2007, 129, (21), 6714-6715.
- [24] **L. Venkataraman***, Y. S. Park, A. C. Whalley, C. Nuckolls, M. S. Hybertsen, and M. L. Steigerwald, 'Electronics and Chemistry: Varying Single Molecule Junction Conductance with Chemical Substituent', Nano Letters, Vol 7, p502-506, 2007.

[25] **L. Venkataraman***, J.E. Klare, C. Nuckolls, M.S. Hybertsen* and M. L. Steigerwald, 'Dependence of Single Molecule Junction Conductance on Molecular Conformation', *Nature*, vol. 442, p904-907, 2006.

[26] **L. Venkataraman***, J.E. Klare, I.W. Tam, C. Nuckolls, M.S Hybertsen and M. Steigerwald, 'Single-Molecule Circuits with Well-Defined Molecular Conductance', *Nano Letters*, vol. 6, pp. 458-462, 2006.

[27] **L. Venkataraman***, Yeon Suk Hong, and P. Kim, 'Electron Transport in a Multi-Channel One-Dimensional Conductor: Molybdenum Selenide Nanowires' *Phys. Rev. Lett.* 96, 076601 (2006).

[28] J. Ulrich, D. Esrail, W. Pontius, **L. Venkataraman***, D. Millar, and L. H. Doerrer, 'Variability of Conductance in Molecular Junctions', *J. Phys. Chem B*, vol 110, p 2462-2466, 2006.

Pre-Columbia Publications:

[29] L. Venkataraman, C. M. Lieber, 'Molybdenum Selenide Molecular Wires as One Dimensional Conductors', *Phys. Rev. Lett.* 83, 5334-5337 (1999).

[30] F. Silvera, J. Bonalde, T. M. Brill, K. Penanen, L. Venkataraman, 'Experiments Designed to Achieve BEC in Spin-Polarized Hydrogen', *Condensed Matter Theories*, Vol. 12, edited by J. W. Clark and P. V. Panat (Nova Science Publishers, NY, 1997.)

[31] M. F. Chang, L. Venkataraman, I. F. Silvera, 'Monte Carlo Simulation of Energy Dissipation of Recombining Hydrogen in a Maze', *J. Low Temp. Phys.*, 101, 739, 1995.

[32] R. A. Jishi, L. Venkataraman, M.S. Dresselhaus, G. Dresselhaus, 'Symmetry Properties of Chiral Carbon Nanotubules', *Phys. Rev. B* 51, 11176, 1995.

[33] R. A. Jishi, L. Venkataraman, M.S. Dresselhaus, G. Dresselhaus, 'Phonon Modes in Carbon Nanotubules', *Chem. Phys. Lett.*, 209, 77, 1993.