

## Biographical sketch: Jay A. Gupta

### Professional Preparation

University of California, Santa Barbara	Physics	Ph.D. (2002)
University of California, Santa Barbara	Physics	M.A. (1999)
University of Illinois Urbana-Champaign	Chemistry	B.S. <i>cum laude</i> (1996)
University of Illinois Urbana-Champaign	Physics	B.S. <i>summa cum laude</i> (1996)

### Appointments

2004-present	Assistant Professor, Department of Physics, Ohio State University
2002-2004	Postdoctoral Fellow, IBM Almaden Research Center, San Jose

### Publications

Total of 16 refereed journal publications, including 3 in *Science*.

Total of 3 publications with 100+ citations each

16. "Tunneling spectroscopy of ultrathin insulating Cu<sub>2</sub>N films, and single Co adatoms", T. Choi, C.D. Ruggiero and J.A. Gupta, *J. Vac. Sci & Technol. B* **27**, 887 (2009).
15. "Incommensurability and atomic structure of c(2x2)N/Cu(100): A scanning tunneling microscopy study", T. Choi, C.D. Ruggiero and J.A. Gupta, *Phys. Rev. B* **78**, 035430 (2008).
14. "Tunneling spectroscopy of ultrathin insulating films: CuN on Cu(100)" C.D. Ruggiero, T. Choi and J.A. Gupta, *Appl. Phys. Lett.* **91**, 253106 (2007).
13. "Strongly coverage-dependent excitations of adsorbed molecular hydrogen" J.A. Gupta, C.P. Lutz, A.J. Heinrich and D.M. Eigler, *Phys. Rev. B* **71**, 115416 (2005).
12. "Single atom spin-flip spectroscopy", A.J. Heinrich, J.A. Gupta, C.P. Lutz and D.M. Eigler, *Science* **306**, 466 (2004).
11. "Molecule cascades", A.J. Heinrich, C.P. Lutz, J.A. Gupta and D.M. Eigler, *Science* **298**, 1381 (2002).
10. "Spin dynamics in semiconductor nanocrystals", J.A. Gupta, D.D. Awschalom, Al. L. Efros and A.V. Rodina, *Phys. Rev. B* **66**, 125307 (2002).
9. "Ultrafast manipulation of electron spin coherence in quantum wells" J.A. Gupta, D.D. Awschalom, R. Knobel and N. Samarth, *International Journal of Modern Physics B* **20-22**, 2930 (2002).
8. "Optical, electrical and magnetic manipulation of spins in semiconductors" D.K. Young, J.A. Gupta, E. Johnston-Halperin, R. Epstein, Y. Kato and D.D. Awschalom, *Semiconductor Science & Technology* **17**, 275 (2002).
7. "Ultrafast manipulation of electron spin coherence", J.A. Gupta, R. Knobel, N. Samarth, and D.D. Awschalom, *Science (cover article)* **292**, 2458 (2001).
6. "Spin precession and the optical Stark effect in a semiconductor-doped glass", J.A. Gupta and D.D. Awschalom, *Phys. Rev. B* **63**, 085303, (2001).
5. "Spin coherence in semiconductors: storage, transport, and reduced dimensionality", J.M. Kikkawa, J.A. Gupta, I. Malajovich, and D.D. Awschalom, *Physica E* **9**, 194 (2001).
4. "Exciton spin polarization in magnetic semiconductor quantum wires", O. Ray, A.A. Sirenko, J.J. Berry, N. Samarth, J.A. Gupta, I. Malajovich, and D.D. Awschalom, *Appl. Phys. Lett.* **76**, 1167 (2000).

3. “Spin coherence in semiconductor quantum dots”, J.A. Gupta, X. Peng, A.P. Alivisatos, and D.D. Awschalom, *Phys. Rev. B Rapid Comm.* **59**, 10421 (1999).
2. “Optical Spectroscopy of II-VI (magnetic) semiconductor quantum dots”, P.A. Crowell, V. Nikitin, J.A. Gupta, D.D. Awschalom, F. Flack, and N. Samarth, *Physica E* **2**, 854 (1998).
1. “Zero-Dimensional Excitonic Confinement in Locally Strained Zn<sub>1-x</sub>Cd<sub>x</sub>Se Quantum Wells”, V. Nikitin, P.A. Crowell, J. A. Gupta, D. D. Awschalom, F. Flack, N. Samarth, *Appl. Phys. Lett.*, **71**, 1213 (1997).

### **Selected Awards and Honors**

- NSF CAREER award, “Electronic and optical properties of nanostructures built with atomic precision”, National Science Foundation \$100k/yr from 2007-2012
- Beckman young investigator award, “Studies of chemical reactivity at the single-molecule level”, Beckman Foundation \$100k/yr from 2007-2010
- IBM Research Division Award: “Spin-flip spectroscopy”, IBM 2007
- Outstanding young physicist prize, American Chapter of the Indian Physics Association, 2007
- IBM Research Division Award: “Molecule Cascades”, IBM 2003

### **Selected synergistic activities**

- Undergraduate curriculum development – Introductory physics (PHY 113). I developed new laboratory activities which serve as a transition to the SCALEUP-model of instruction, developed at NC-State. The new curriculum at OSU integrates traditional recitation and laboratory sections to improve student interactions and retention
- Outreach to high school students – Columbus Science Center’s Electronics Experts lectures (600+ students in 7 states since 2006)
- Panel reviewer: NSF Major Research Instrumentation program (2008)
- Journal reviewer: *J. Physical Chemistry*, *Science*, *Surface Science*, *Physical Review*, *Nature*
- Proposal reviewer: NSF, DOE, ACS Petroleum Research Fund, U.S. Civilian Research and Development Foundation.

### **Collaborators and co-editors**

D.D. Awschalom – University of California, Santa Barbara (*surface conductivity of diamond*)

A.J. Epstein – Ohio State University (*magnetism in organic charge-transfer complexes*)

M. Flatte – University of Iowa (*STM studies of single Mn in GaAs*)

D. Look – Wright Patterson Air Force Base (*characterization of ZnO surfaces*)

A. Rochefort – Polytechnique Montreal (*Charge switching of single TCNE molecules*)

D. Stroud – Ohio State University (*DFT calculations of thin insulating islands*)

*Graduate thesis advisor:* D.D. Awschalom, University of California, Santa Barbara

*Postdoctoral advisor:* D. Eigler, IBM Almaden Research Center

*Graduate students currently advising:* 5 (graduated PhDs: 1)

T. Choi, D. Daughton, D. Gohlke, D. Lee, L. Sanzenbacher

PhD students graduated: C.D. Ruggiero

*Postdoctoral researchers advised:*

N.M. Santagata (current)

X.H. Qiu (Research Scientist, Center for Nanoscience and Technology, Beijing)