

Curriculum Vitae: Ching-Hwa Kiang

Assistant Professor

Department of Physics & Astronomy

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Education

Ph.D., 1995, California Institute of Technology.

B.S., 1987, National Taiwan University.

Research Interests

Single-molecule manipulation of biological molecules. DNA melting and unstacking. Mechanical proteins. Jarzynski's equality and its application to biological systems. Single-walled carbon nanotubes, carbon nanoribbons, and graphene.

Honors and Awards

Hamill Innovation Award, 2008.

Researcher of the Year, *Small Times* Best of Small Tech Award, 2007.

Hamill Innovation Award, 2005.

Cram Teacher-Scholar, University of California, Los Angeles, 1996–1999.

IBM Student Thesis Fellowship, IBM Almaden Research Center, 1992–1995.

Summary of Publications and Presentations

(Total citations: 4416)

(H number: 19)

42 papers, 3 book chapters, 82 invited talks, 7 conference proceedings, 19 technical presentations, 6 poster presentations, 18 student oral presentations, 16 student poster presentations, 3 patents, and 16 grants and contracts.

Professional Experience

Assistant Professor, Physics & Astronomy, Rice University, 2002–present.

Assistant Professor, Bioengineering, Rice University, 2002–present.

Adjunct Assistant Professor, Department of Medicine, Baylor College of Medicine, 2008–present.

Assistant Research Physicist, Physics & Astronomy, UCLA, 2000–2002.

Visiting Assistant Professor, Chemistry & Biochemistry, UCLA, 1996–2000.

Postdoctoral Associate, Physics, MIT, 1995–1996.

Visiting Scientist, IBM Almaden Research Center, 1992–1995.

Research Assistant, Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan, ROC, 1987–1988.

Affiliation

Atherosclerosis and Vascular Biology (AVB) Research Training Program, Baylor College of Medicine.

Alliance for NanoHealth.

Structural and Computational Biology and Molecular Biophysics (SCBMB).

Graduate School of Biomedical Sciences, Baylor College of Medicine.

Houston Area Molecular Biophysics Program.

Center for Biological and Environmental Nanotechnology, Rice University.

Center for Nanoscale Science and Technology, Rice University.

Institute of Biosciences and Bioengineering, Rice University.

Keck Center for Computational and Structural Biology.

Rice Quantum Institute.

Summary of Research Accomplishments

Application of experimental single-molecule manipulation to biomedical systems.

Experimental reconstruction of free energy surfaces using Jarzynski's equality.

Experimental determination of phase transition in DNA-gold nanoparticle systems.

Discovery of single-walled carbon nanotubes.

Teaching Experience

Introduction to Biological Physics (PHYS355), instructor, Spring 2009 (new course).

Advanced Topics (311-430, Baylor College of Medicine), faculty evaluator, Spring 2009.

Biological Physics (PHYS551), instructor, Fall 2008. Enrollment: 10.

Biological Physics (PHYS551), instructor, Spring 2008. Enrollment: 6.

Biological Physics (PHYS551), instructor, Spring 2007. Enrollment: 4.

Molecular Biophysics I (BIOS481/551), guest lecturer, Fall 2006-present. Approximate enrollment per semester: 30.

Biological Physics (PHYS551), instructor, Spring 2006. Enrollment: 6.

Molecular Biophysics (PHYS552), instructor, Fall 2005. Enrollment: 13.

Biological Physics (PHYS551), instructor, Spring 2005. Enrollment: 9.

Advanced Topics in Physics: Biological Physics (PHYS600), instructor, Spring 2004.

Enrollment: 7.

Professional Affiliations

American Physical Society

Biophysical Society

Student Awards

Eric W. Frey, Alliance for NanoHealth Training Fellowship (2009-2011).
 Eric Botello, APS DBP Student Travel Award (2009).
 Nolan C. Harris, Edgar O’Rear Travel Award (2009).
 Nolan C. Harris, Minority Biophysicists Travel Award (2009).
 Eric Botello, Edgar O’Rear Travel Award (2008).
 Eric Botello, Minority Biophysicists Travel Award (2008).
 Eric Botello, Biotechnology Research Training Fellowship (2006–2008).
 Nolan C. Harris, Chuoke Award (best second year graduate student in Physics & Astronomy) (2006).
 Nolan C. Harris, Nanobiology Institutional Training Fellowship (2005–2008).
 Leiming Li, Nanobiology Institutional Training Fellowship (2005–2006).
 Nolan C. Harris, the Keck Center Undergraduate Fellowship (2004).
 Nolan C. Harris, Heaps Prize (best undergraduate senior, selected on the basis of excellence in a senior thesis) (2004).

Publications

1. N. C. Harris, J. M. Cowley, and C.-H. Kiang, “Global and Regional Helicity Distributions of Single-Walled Carbon Nanotubes and Its Implication on the Growth Mechanism,” (2009), *submitted*.
2. C. P. Calderon, N. C. Harris, C.-H. Kiang, and D. D. Cox, “Analyzing Single-Molecule Manipulation Experiments,” *J. Mol. Recognit.* **22** (2009) 356–362.
3. E. Botello, N. C. Harris, J. Sargent, W.-H. Chen, K.-J. Lin, and C.-H. Kiang, “Temperature and Chemical Denaturant Dependence of Forced-Unfolding of Titin I27,” *J. Phys. Chem. B* **113** (2009) 10549–11047. Also appears on the cover page.
4. N. C. Harris and C.-H. Kiang, “Velocity Convergence of Free Energy Surfaces From Single-Molecule Measurements Using Jarzynski’s Equality,” *Phys. Rev. E* **79** (2009) 041912.
5. C. P. Calderon, N. C. Harris, C.-H. Kiang, and D. D. Cox, “Quantifying Multiscale Noise Sources in Single-Molecule Time Series,” *J. Phys. Chem. B* **113** (2009) 138–148.
6. C. P. Calderon, W.-H. Chen, K.-J. Lin, N. C. Harris, and C.-H. Kiang, “Quantifying DNA Melting Transitions using Single-Molecule Force Spectroscopy,” invited paper in special issue on *DNA Melting*, *J. Phys.: Condens. Matter* **21** (2009) 034114.
7. N. C. Harris, Y. Song, and C.-H. Kiang, “Reply to Comment on “Experimental Free Energy Surface Reconstruction From Single-Molecule Force Spectroscopy Using Jarzynski’s Equality,”” *Phys. Rev. Lett.* **100** (2008) 019802. Also in *Virtual Journal of Biological Physics Research* **15**, issue 2 (2008).
8. Y. Sun, N. C. Harris, and C.-H. Kiang, “Phase Transition and Optical Properties of DNA-Gold Nanoparticle Assemblies,” *Plasmonics* **2** (2007) 193–199.

9. N. C. Harris, Y. Song, and C.-H. Kiang, "Experimental Free Energy Surface Reconstruction From Single-Molecule Force Spectroscopy Using Jarzynski's Equality," *Phys. Rev. Lett.* **99** (2007) 068101. Also in *Virtual Journal of Biological Physics Research* **14**, issue 4 (2007). The work is featured in *APS News* and *Science News* [15 citations].
10. N. C. Harris and C.-H. Kiang, "Defects Can Increase the Melting Temperature of DNA-Nanoparticle Assemblies," *J. Phys. Chem. B* **110** (2006) 16393–16396 [8 citations].
11. N. C. Harris and C.-H. Kiang, "Disorder in DNA-Linked Gold Nanoparticle Assemblies," *Phys. Rev. Lett.* **95** (2005) 046101-1–4. Also in *Virtual Journal of Biological Physics Research* **10**, issue 3 (2005), and *Virtual Journal of Nanoscale Science & Technology* **12** issue 5 (2005) [13 citations].
12. Y. Sun, N. C. Harris, and C.-H. Kiang, "The Reversible Phase Transition of DNA-Linked Colloidal Gold Assemblies," *Physica A* **354** (2005) 1–9 [10 citations].
13. Y. Sun and C.-H. Kiang, "DNA-Based Artificial Nanostructures: Fabrication, Properties, and Applications," invited book chapter in *Handbook of Nanostructured Biomaterials and Their Applications in Nanobiotechnology*, Vol. 2, Chapter VII, pp 224–246 (ISBN: 1-58883-033-0), edited by H. S. Nalwa (American Scientific Publishers, Stevenson Ranch, CA, 2005) [3 citations].
14. Y. Sun, N. C. Harris and C.-H. Kiang, "Melting Transition of Directly-Linked Gold Nanoparticle DNA Assembly," *Physica A* **350** (2005) 89–94 [11 citations].
15. C.-H. Kiang, "Phase Transition of DNA-Linked Gold Nanoparticles," *Physica A* **321** (2003) 164–169 [31 citations].
16. C.-H. Kiang, "Single Particle Study of Protein Assembly," *Phys. Rev. E* **64** (2001) 041911-1–041911-3 [1 citation].
17. J. L. O'Loughlin, C. H. Wallace, T. K. Reynolds, C.-H. Kiang, and R. B. Kaner, "Rapid Synthesis of Carbon Nanotubes by Solid-State Metathesis Reactions," *J. Phys. Chem. B* **105** (2001) 1921–1924 [23 citations].
18. C.-H. Kiang, "Carbon Rings and Cages in the Growth of Single-Walled Carbon Nanotubes," *J. Chem. Phys.* **113** (2000) 4763–4766 [17 citations].
19. J. M. Cowley and C.-H. Kiang, "The Structure of Near-Spherical Carbon Nano-Shells," *Carbon* **38** (2000) 1437–1444 [5 citations].
20. C.-H. Kiang, "Electron Irradiation Induced Dimensional Change in Bismuth Filled Carbon Nanotubes," *Carbon* **38** (2000) 1699–1701 [15 citations].
21. C.-H. Kiang, "Growth of Large Diameter Single-Walled Carbon Nanotubes," *J. Phys. Chem. A* **104** (2000) 2454–2456 [29 citations].

22. C.-H. Kiang, J.-S. Choi, T. Tran, and A. D. Bacher, "Molecular Nanowires of 1 nm Diameter from Capillary Filling of Single-Walled Carbon Nanotubes," *J. Phys. Chem. B* **103** (1999) 7449–7451 [75 citations].
23. C.-H. Kiang, M. Endo, P. M. Ajayan, G. Dresselhaus, and M. S. Dresselhaus, "Size Effects in Carbon Nanotubes," *Phys. Rev. Lett.* **81** (1998) 1869–1872 [108 citations].
24. S. Stevenson, P. Burbank, K. Harich, Z. Sun, H. C. Dorn, P. H. M. van Loosdrecht, M. S. de Vries, J. R. Salem, R. D. Johnson, C.-H. Kiang, and D. S. Bethune, "La₂@C₇₂: Metal-Mediated Stabilization of a Carbon Cage," *J. Phys. Chem. A* **102** (1998) 2833–2837 [32 citations].
25. M. Endo, K. Takeuchi, T. Hiraoka, T. Furuta, T. Kasai, X. Sun, C.-H. Kiang, and M. S. Dresselhaus, "Stacking Nature of Graphene Layers in Carbon Nanotubes and Nanofibres," *J. Phys. Chem. Solids* **58** (1997) 1707–1712 [26 citations].
26. A. C. Dillon, K. M. Jones, T. A. Bekkedahl, C.-H. Kiang, D. S. Bethune, and M. J. Heben, "Storage of Hydrogen in Single-Wall Carbon Nanotubes," *Nature* **386** (1997) 377–379 [1767 citations].
27. X. Sun, C.-H. Kiang, M. Endo, K. Takeuchi, T. Furuta, G. Dresselhaus, and M. S. Dresselhaus, "Stacking Characteristics of Graphene Shells in Carbon Nanotubes," *Phys. Rev. B* **54** (1996) 12629–12632 [23 citations].
28. C.-H. Kiang, M. S. Dresselhaus, D. S. Bethune, and W. A. Goddard III, "Vapor Phase Self-Assembly of Carbon Nanomaterials," *Chem. Phys. Lett.* **259** (1996) 41–47 [17 citations].
29. C.-H. Kiang, P. H. M. van Loosdrecht, R. Beyers, J. R. Salem, D. S. Bethune, W. A. Goddard III, H. C. Dorn, P. Burbank, and S. Stevenson, "Novel Structures from Arc-Vaporized Carbon and Metals: Single-Layer Carbon Nanotubes and Metallofullerenes," *Surf. Rev. Lett.* **3** (1996) 765–769 [2 citations].
30. C.-H. Kiang and W. A. Goddard III, "Polyyne Ring Nucleus Growth Model for Single-Layer Carbon Nanotubes," *Phys. Rev. Lett.* **76** (1996) 2515–2518 [91 citations].
31. C.-H. Kiang, W. A. Goddard III, R. Beyers, and D. S. Bethune, "Carbon Nanotubes with Single-Layer Walls," in *Carbon Nanotubes*, book chapter, edited by M. Endo, S. Iijima, and M. S. Dresselhaus (Pergamon, Oxford, UK, 1996) pp. 47–58.
32. C.-H. Kiang, W. A. Goddard III, R. Beyers, and D. S. Bethune, "Structural Modification of Single-Layer Carbon Nanotubes with an Electron Beam," *J. Phys. Chem. B* **100** (1996) 3749–3752 [60 citations].
33. C.-H. Kiang, W. A. Goddard III, R. Beyers, J. R. Salem, and D. S. Bethune, "Catalytic Effects of Heavy Metals on the Growth of Single-Layer Carbon Nanotubes and Nanoparticles," *J. Phys. Chem. Solids* **57** (1996) 35–39 [34 citations].

34. C.-H. Kiang and W. A. Goddard III, "Polarization Effects in the AgBr Interaction Potential," *J. Phys. Chem.* **99** (1995) 14334–14339 [5 citations].
35. C.-H. Kiang, W. A. Goddard III, R. Beyers, and D. S. Bethune, "Carbon Nanotubes with Single-Layer Walls," *Carbon* **33** (1995) 903–914 [59 citations].
36. P. H. M. van Loosdrecht, R. D. Johnson, M. S. de Vries, C.-H. Kiang, D. S. Bethune, H. C. Dorn, P. Burbank, and S. Stevenson, "Orientational Dynamics of the Sc₃ Trimer in Sc₃@C₈₂: An EPR Study," *Phys. Rev. Lett.* **73** (1994) 3415–3418 [36 citations].
37. R. Beyers, C.-H. Kiang, R. D. Johnson, J. R. Salem, M. S. de Vries, C. S. Yannoni, D. S. Bethune, H. C. Dorn, P. Burbank, K. Harich, and S. Stevenson, "Preparation and Structure of Crystals of the Metallofullerene Sc₂@C₈₄," *Nature* **370** (1994) 196–199 [93 citations].
38. S. Stevenson, H. C. Dorn, P. Burbank, K. Harich, Z. Sun, C.-H. Kiang, J. R. Salem, M. S. de Vries, P. H. M. van Loosdrecht, R. D. Johnson, C. S. Yannoni, and D. S. Bethune, "Automated HPLC Separation of Endohedral Metallofullerene Sc@C_{2n} and Y@C_{2n} Fractions," *Anal. Chem.* **66** (1994) 2680–2685 [42 citations].
39. S. Stevenson, H. C. Dorn, P. Burbank, K. Harich, J. Haynes, C.-H. Kiang, J. R. Salem, M. S. de Vries, P. H. M. van Loosdrecht, R. D. Johnson, C. S. Yannoni, and D. S. Bethune, "Isolation and Monitoring of the Endohedral Metallofullerene Y@C₈₂: On-Line Chromatographic Separation with EPR Detection (HPLC-EPR)," *Anal. Chem.* **66** (1994) 2675–2679 [37 citations].
40. C.-H. Kiang, W. A. Goddard III, R. Beyers, J. R. Salem, and D. S. Bethune, "Catalytic Synthesis of Single-Layer Carbon Nanotubes with a Wide Range of Diameters," *J. Phys. Chem.* **98** (1994) 6612–6618 [110 citations].
41. D. S. Bethune, C.-H. Kiang, M. S. de Vries, G. Gorman, R. Savoy, J. Vazquez, and R. Beyers, "Cobalt-Catalyzed Growth of Carbon Nanotubes with Single-Atomic-Layer Walls," *Nature* **363** (1993) 605–607 [1614 citations].
42. C.-H. Kiang and W. A. Goddard III, "Effective Hamiltonians for Motions with Disparate Time Scales: Application to Quantum Shell Model and Classical Statistical Shell Model," *J. Chem. Phys.* **98** (1993) 1451–1457 [4 citations].

Invited Talks

Keynote Speeches

1. "Protein and DNA Interactions Studied Using Single-Molecule Manipulation," In "Session 1-4: Proteins Interacting with DNA and RNA," **keynote speaker** at the international conference *BIT Life Sciences' 3rd annual PepCon-2010*, Beijing, China, 21–23 March 2010.

Other Invited Talks

1. *The first National Conference on Biophysical Chemistry*, Beijing, China, 5–7 July, 2010.
2. “Using Single-Molecule Manipulation to Probe Protein and DNA Properties,” In session: “Part Three: Frontier of Emerging Biotechnologies. Track 2-1: New Proteomic Technologies,” invited talk at: the international conference *BIT Life Sciences’ 3rd Annual World Congress of Gene-2009. Theme: March into New Era of Bio-Economy*, Foshan, China, 1–7 December, 2009.
3. “Single-Molecule Manipulation Studies of Proteins and DNA,” IBT Information Exchange Seminar at the Institute of Biosciences and Technology, Texas A & M Health Science Center, Houston, TX, 17 September 2009.
4. “Observing Biological Interactions Using Nanoparticle Aggregation and Single-Molecule Manipulation,” Physics Colloquium, Washington University in St. Louis, St. Louis, MO, 9 September 2009.
5. “Using Single-Molecule Manipulation to Study Protein and Nucleic Acid Interactions,” invited talk at the *Emerging Technologies for Systems Biology*, MD Anderson Cancer Center, Houston, TX, 12 August 2009.
6. “Protein Interaction Forces Studied with Single-Molecule Manipulation,” In session: “Track 1-2: Proteomics and Medical Implications,” invited talk at the international conference *the 4th Medical Biotech Forum. Theme: Translating Bio-Innovations Into Industrialization*, Dalian, China, 8–10 2009.
7. “Single-Molecule Manipulation of Biological Molecules,” invited talk at the international conference on physics education and frontier physics *OCPA6*, Lanzhou, China, 3–7 August 2009.
8. “Nonequilibrium Experiments on Single Molecules,” 3 invited lectures in *Nonequilibrium Statistical Mechanics: Fundamental Problems and Applications, 2009 Boulder School for Condensed Matter and Materials Physics*, Boulder, CO, 6–24 July 2009.
9. “Using Single-Molecule Manipulation to Probe the Dynamics of Protein and DNA Molecules,” Seminar in Chemistry, University of Cambridge, Cambridge, UK, 15 June 2009.
10. “Probing Protein and DNA Potentials with Single-Molecule Manipulation,” Seminar in Physics, Università di Roma “La Sapienza,” Rome, Italy, 8 June 2009.
11. “Single-Molecule Manipulation of DNA,” invited talk at the international conference *From DNA-inspired Physics to Physics-inspired Biology* International Center for Theoretical Physics (ICTP), Trieste-Miramare, Italy, 1–5 June 2009.

12. “AFM Studies of the Resistance to Unfolding of Titin and von Willebrand Factor (VWF),” In session: “Track 2-2: Biological Significances of Protein Aggregation, Folding/unfolding, and Signaling,” invited talk at the international conference *BIT Life Sciences’ 2nd annual PepCon-2009. Theme: Life, Knowledge & Bio-Economy*, Seoul, South Korea, 2–4 April 2009.
13. “Seeing Biological Interactions at the Nanometer Scale,” seminar in Physics, University of Houston-Clear Lake, Houston, TX, 2 March 2009.
14. “Velocity Convergence of Protein Folding Free Energy Surfaces Using Jarzynski’s Equality,” invited talk at *The 4th Cross Strait Conference on Statistical Physics* National Kaohsiung Normal University, Kaohsiung, Taiwan, 14–17 July 2008.
15. “Free Energy Surfaces of Protein Unfolding Determined Using Jarzynski’s Equality,” invited talk at *The 9th Taiwan International Symposium on Statistical Physics (StatPhys-Taiwan-2008)*, Taipei, Taiwan, 8–12 July 2008.
16. “Phase Behavior of DNA-Linked Gold Nanoparticle Assemblies,” invited talk at *Progress in Electromagnetics Research Symposium (PIERS2008)*, Cambridge, MA, USA, 2–6 July 2008.
17. “DNA Nanoparticle Phase Transitions and Protein Folding Free Energy Reconstruction Using Jarzynski’s Equality,” seminar in Physics, Texas A&M University, College Station, TX, 7 November 2007.
18. “Sequence-Dependent Phase Transition of DNA-Linked Gold Nanoparticle Assemblies,” invited talk at *Progress in Electromagnetics Research Symposium (PIERS2007)*, Prague, Czech Republic, European Union, 27–30 August 2007.
19. “Probing Molecular Biophysics of DNA and Proteins Through Nanobiology,” Seminar in Institute of Physics, Chinese Academy of Sciences, Beijing, China, 16 March 2007.
20. “From DNA Nanoparticle Self-Assembly to Protein Single-Molecule Force Spectroscopy,” Seminar in Chemistry, National Dong Hua University, Hualien, Taiwan, 18 December 2006.
21. “Experimental Determination of Protein Unfolding Free Energy Surfaces,” invited talk at the *2006 NCTS December Workshop on Critical Phenomena and Complex Systems*, Taipei, Taiwan, 15–16 December 2006.
22. “Free Energy Surfaces from Jarzynski’s Equality,” seminar in Institute of Physics, Academia Sinica, Taipei, Taiwan, 13 December 2006.
23. “Nanoscale Molecular Biophysics,” Physics Colloquium, National Taiwan University, Taipei, Taiwan, 11 December 2006.
24. “Observation of Biological Physics at the Nanometer Scale,” Physics Colloquium, Brown University, Providence, RI, 20 November 2006.

25. “Direct Reconstruction of the Free Energy Surface for Mechanical Unfolding of Proteins,” invited talk at *The 2006 Carolina Biophysics Symposium: Biology from Single Molecules: Bridging the Gap between Observation and Mechanism*, Research Triangle Park, NC, 1–3 November 2006.
26. “Direct Reconstruction of the Free Energy Surface From Single-Molecule Mechanical Unfolding of Proteins Using AFM,” invited talk at the *European Centre of Atomic and Molecular Computations (CECAM) workshop: Theory of single molecule force experiments and simulations*, Lyon, France, 26–29 September 2006.
27. “Single-Molecule Studies of Human Cardiac Titin,” seminar in *Atherosclerosis and Vascular Biology (AVB)*, Baylor College of Medicine, Houston, TX, 14 September 2006.
28. “Mechanical Properties of Human Cardiac Titin from Single-Molecule Force Spectroscopy,” invited talk at the *SCBA Texas Chapter Annual Symposium*, Houston, TX, 29 April 2006.
29. “Disorder and Defects in DNA-Linked Nanoparticle Assemblies,” invited talk at *The 3rd Annual Conference on Foundations of Nanoscience: Self-Assembled Architecture and Devices (FNANO06)*, Snowbird, Utah, 23–27 April 2006.
30. “Single-Molecule Studies of Human Cardiac Titin,” seminar in *Graduate Program in Structural and Computational Biology and Molecular Biophysics (SCBMB)*, Baylor College of Medicine, Houston, TX, 12 April 2006.
31. “Biological Physics at The Nanometer Scale: DNA Nanoparticle Assemblies and Protein Single-Molecule Force Spectroscopy,” Physics Colloquium, The University of Houston, Houston, TX, 7 March 2006.
32. “What Do We Learn from Single-Molecule Force Spectroscopy?” invited talk at the *TX-UK-IBB Workshop*, Houston, TX, 16 February 2006.
33. “Single-Molecule Force Spectroscopy,” invited talk at the *2005 CMB/SCBMB Research Conference*, Galveston, TX, 28–29 October 2005.
34. “Nanoscale Manipulation and Spectroscopy of Single Protein Molecules,” invited talk at the *Whitaker Nanobioengineering Symposium, Associated Nanotechnology Congress 2005*, Houston, TX, 10–11 October 2005.
35. “Nanoscale Biological Physics: From DNA Nanoparticle Assemblies to Protein Single-Molecule Force Spectroscopy,” seminar in Physics, Ohio State University Columbus, OH, 5 October 2005.
36. “Protein Unfolding Free Energies From Jarzynski’s Equality,” invited talk at *The 2005 Summer Symposium on Statistical and Nonlinear Physics (StatPhys-Taiwan 2005)*, Taipei, Taiwan, 31 July–6 August 2005.

37. “Protein Folding Pathways Studied with Single-Molecule Atomic Force Microscopy,” invited talk at *The 2005 NCTS July Workshop on Macromolecules and Biological Systems*, Taipei, Taiwan, 27–29 July 2005.
38. “Single-Molecule Dynamic Force Spectroscopy of Protein Unfolding,” Seminar in Physics and National Center of Theoretical Sciences, National Tsing-Hua University, Hsinchu, Taiwan, 26 July 2005.
39. “Single-Molecule Dynamic Force Spectroscopy of Protein Unfolding,” Seminar in Center of Nanoscience and Nanotechnology, National Chung Hsing University, Taichung, Taiwan, 21 July 2005.
40. “Mechanical Properties of Human Cardiac Titin Studied by Single-Molecule Atomic Force Microscopy,” Seminar in Biomedical Engineering, National Yang-Ming University, Taipei, Taiwan, 20 July 2005.
41. “Single-Molecule Dynamic Force Spectroscopy of Protein Unfolding,” Seminar in Physics, National Sun Yat-Sen University, Kaohsiung, Taiwan, 14 July 2005.
42. “Single-Molecule Dynamic Force Spectroscopy of Human Cardiac Titin,” invited talk at the *Institute of Biosciences and Bioengineering Annual Research Colloquium*, Rice University, Houston, TX, 7 July 2005.
43. “Single-Molecule Imaging of Biomolecules,” Seminar in Center for Condensed Matter Sciences, National Taiwan University, Taipei, Taiwan, 14 July 2004.
44. “Disorder in DNA-Linked Colloidal Gold Assemblies,” Seminar in Physics and National Center of Theoretical Sciences, National Tsing Hua University, Hsinchu, Taiwan, 12 July 2004.
45. 3 invited lectures in *International Workshop on Biological and Nanoscale Physics*, Department of Physics and Center of Nanoscience and Nanotechnology, National Chung Hsing University, Taichung, Taiwan, 5–9 July 2004.
46. “Disorder in DNA-Linked Colloidal Gold Self-Assemblies,” invited talk at *The 7th Taiwan International Symposium on Statistical Physics (StatPhys-Taiwan 2004): Biologically Motivated Statistical Physics and Related Problems*, Taipei, Taiwan, 24–26 June 2004.
47. “DNA-Based Nanostructures,” invited talk at *Future Directions in Statistical Physics: Soft Materials and Biological Systems*, Virginia Tech, Blacksburg, VA, 6–7 March 2004.
48. “Phase Transition in the DNA-Gold Nanoparticle System,” Physics Colloquium, Sam Houston State University, Huntsville, TX, 5 November 2003.
49. “The AA and AB Systems of DNA-Coated Nanogold Networks,” Seminar in Physics, FOM Institute for Atomic and Molecular Physics, Amsterdam, The Netherlands, 19 September 2003.

50. “A DNA-Coated Nanogold Network for DNA Detection,” invited talk at *First Annual SPRING Meeting*, Austin, TX, 25–27 August 2003.
51. “Cryo-Electron Microscopy of Protein Structure and DNA-Gold Nanoparticle Assembly for DNA Detection,” Department of Biochemistry and Cell Biology and Howard Hughes Medical Institute Minisymposium on Interdisciplinary Biosciences at Rice University, Houston, TX, 10 January 2003.
52. “The Percolation Transition in the DNA-Gold Nanoparticle System,” Physics Colloquium, National Taiwan University, Taipei, Taiwan, 29 October 2002.
53. “The Percolation Transition in the DNA-Gold Nanoparticle System,” Physics Colloquium, National Chung Hsing University, Taichung, Taiwan, 25 October 2002.
54. “The Percolation Transition in the DNA-Gold Nanoparticle System,” Seminar in Physics, Universita di Roma “La Sapienza,” Rome, Italy, 9 October 2002.
55. “The Percolation Transition in the DNA-Gold Nanoparticle System,” Seminar in Physics, FOM Institute for Atomic and Molecular Physics, Amsterdam, The Netherlands, 7 October 2002.
56. “The Percolation Transition in the DNA-Gold Nanoparticle System,” Seminar in Physics, Technische Universität München, Garching, Germany, 2 October 2002.
57. “Percolation Transition of DNA-Gold Nanoparticles and Single Particle Study of Protein Assembly,” Physics Colloquium, Baylor University, Waco, TX, 27 September 2002.
58. “Phase Transition of DNA-Gold Nanoparticle System,” invited talk at *The 2nd APCTP and 6th Taiwan International Symposium on Statistical Physics, StatPhys-Taiwan-2002: Lattice Models and Complex Systems*, Taipei, Taiwan, 26 May–1 June 2002.
59. “Phase Transition, Self-Assembly, and Interaction of Biological Molecules,” Physics Colloquium, California State University, Northridge, CA, 20 February 2002.
60. “Single-Walled Carbon Nanotubes as Molecular Nanowires,” invited talk at *The AIChE 2001 Annual Meeting*, Reno, NV, 5–9 November 2001.
61. “Protein Structure and DNA Dynamics,” invited talk at *The Korea Institute for Advanced Study—Asia-Pacific Center for Theoretical Physics Winter School on Biocomplexity*, Seoul, Korea, 6–8 February 2001.
62. “Single Molecule Studies of Biological Macromolecular Assemblies,” seminar in Physics, UCLA, 23 January 2001.
63. “Carbon Nanotubes,” seminar at Union Chemical Laboratories, Industrial Technology Research Institute, Taiwan, 5 September 2000.

64. "Single-Walled Carbon Nanotubes," seminar at General Motors, Detroit, MI, 13 April 2000.
65. "Single-Walled Carbon Nanotubes: From Discovery to Application," invited talk at *The Michigan Catalysis Society Meetings*, MI, 12 April 2000.
66. "Single-Walled Carbon Nanotubes: From Discovery to Application," seminar at Ford Motor Company, Detroit, MI, 19 May 1999.
67. "Growth of Single-Walled Carbon Nanotubes," invited talk at the conference *Commercialization Advances in Large-Scale Production of Carbon Nanotubes*, Washington DC, 22–23 April 1999.
68. "Molecular Nanowires of 1 nm Diameter from Capillary Filling of Single-Walled Carbon Nanotubes," invited talk at *Fullerenes '99—A Workshop on Nanotubes and Fullerenes Chemistry*, Castera-Verduzan, France, 29 August–2 September 1999.
69. "Single-Walled Carbon Nanotubes: From Discovery to Application," seminar in Chemical Engineering, UC Davis, CA, 23 November 1998.
70. "Single-Walled Carbon Nanotubes: From Discovery to Application," seminar at The Naval Research Laboratory, Washington DC, 23 October 1998.
71. "Single-Walled Carbon Nanotubes: From Discovery to Application," seminar in Materials Science and Engineering, UCLA, CA, 22 May 1998.
72. "Single-Walled Carbon Nanotubes: From Discovery to Application," seminar at MER Corporation, Tuscan, AZ, 5 March 1998.
73. "Single-Walled Carbon Nanotubes: From Discovery to Application," seminar at NASA, Moffett Field, CA, 3 March 1998.
74. "Single-Walled Carbon Nanotubes: From Discovery to Application," seminar at HRL, Malibu, CA, 9 January 1998.
75. "Single-Walled Carbon Nanotubes: From Discovery to Application," seminar at NEC Corporation, Tsukuba, Japan, 29 September 1997.
76. "Single-Walled Carbon Nanotubes: From Discovery to Application," seminar in Chemistry, National Taiwan University, Taipei, Taiwan, R.O.C., 24 September 1997.
77. "Synthesis and Characterization of Nanotubes and Nanoparticles," seminar at Hyperion Catalysis International, Cambridge, MA, 12 February 1996.

Popular Press

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