

ELISA RIEDO

CURRICULUM VITAE

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Educational Background:

Ph.D., Physics, 2000, University of Milano, Italy
B.S., Physics, 1995, University of Milano, Italy

Employment History:

August 03- present: Tenure-track Assistant Professor position at the School of Physics of Georgia Tech.

Nov. 1999 – Jul. 03: Post Doctoral Fellow at the École Polytechnique Fédérale de Lausanne (EPFL) with Prof. H. Brune. Research activities: Nano-Tribology and Nano-Catalysis Studies

Sept. 1998 - Oct. 1999: Research activity in the group of Dr. Comin and Prof. Chevrier at the European Synchrotron Research Facility (ESRF) in Grenoble on the growth and the characterization of carbon based thin films.

Feb. 1998 – Sept. 1998: Research activity in the group of Prof. M. Sancrotti at TASC – INFM laboratories in Trieste on the structural and electronic properties of nanostructured carbon thin films.

June 1998: Invited researcher in the group of Dr C. Carbone at the Forschungszentrum of Jülich (Germany).

March 1996 - Jan. 1998: Employment as consultant at CoreCom (Consortium between the Politecnico of Milan and Pirelli for the research on optical switching).

March – August 1995: Research stage at CERN of Geneva.

Honors and Awards:

- * May 2006: GT College of Science Cutting Edge Research Award
- * November 2005: Selected as *Highly Creative Researcher in Nanoscience and*

Nanotechnology for the “Project on Creativity Capabilities and the Promotion of Highly Innovative Research” (CREA), a joint USA/European endeavor.

- * August 2002: Best Poster, Gordon International Conference Tribology 2002.
- * June 1999: Best Students Grant Award 1998-99 from ESRF, Grenoble.
- * Nov. 1995: Physics Degree *Summa cum Laude*.

Current Fields of Interest:

- * Nano-confined Liquids: Physics and chemistry of liquids when confined in nano-spaces. Origin of hydrophobic forces.
- * Nanotribology: Friction and adhesion forces at the nanoscale.
- * NanoBioMechanics: Elasticity, plasticity and mechanical properties of nano-objects from nanotubes to DNA.
- * Nano-patterning of chemical modified surfaces

Professional Activities:

Meeting organization:

- * Co-Organizer of the *Focused Topic* on "Friction, Fracture, and Deformation" of the Division of Materials Physics for the 2007 March Meeting of the American Physical Society (APS).
- * Co-chair of the symposium on *Nanotechnology and MEMS: Experiments and Modeling*, 12th International Conference on Experimental Mechanics (ICEM12), 2004.

Proposal review:

Reviewer for:

- * The National Science Foundation, The ACS Petroleum Foundation, The Department of Energy, The Swedish National Science Foundation.
- * Physical Review Letters, Physical Review B, Journal of Physical Chemistry B, Journal of Chemical Physics, Tribology Letters, Applied Surface Science, Langmuir, Nano letters, Science (News)

Professional Societies:

Member of:

- * American Physical Society, American Chemical Society, +Material Research Society

Grant Proposal Activity:

Funded

- * Renewal (just accepted) of NSF – STC “Materials and Devices for Information Technology Research”. Multi-Investigators (34), co-PI. 5 years. \$17,976,000.
- * DOE, “Nanomechanics: elasticity and friction in nano-objects”. Single Investigator. 4 years. \$535,809.
- * College of Science Cutting Edge Research Award. Single Investigator. \$50,000.
- * NSF-STC International Research Experience Program. Multi-Investigators, PI. \$138,000
- * Seed Project in NSF–STC “Materials and Devices for Information Technology Research”. Single Investigator. 4 years. \$150,000.
- * President’s Undergraduate Research Award, fall semester 2004. \$1,500 (Expired)
- * ACS Petroleum Research Foundation, “Short and Long Range Hydrophobic Forces at the nanoscale: role of roughness and chemistry” Single Investigator. 2 Years. \$80,000 (Expired)
- * NSF-DMR, “Interaction Forces in Water at the Nanoscale”. Single Investigator. 3 Years. \$151,000
- * Swiss NSF grant, visiting researcher for 6 months. (Expired)

Pending

- * Renewal NSF-DMR, “Liquid dynamics in nano-confined geometries: Nano-hydrodynamics”. Single-Investigator. 3 years. \$300,000.
- * Sloan Fellowship

Patents:

- * Invention Disclosure: “Thermally-Activated Chemical Nanopatterning”. GTRC-ID-3973 (9/13/2006)

LIST OF PUBLICATIONS

Chapters in Books:

1. R. Szoszkiewicz and E. Riedo, “Applied Scanning Probe Methods V”. Springer, Heidelberg Publications, NanoScience and Technology Series 2007.
2. L. Merchan, R. Szoszkiewicz and E. Riedo, “Fundamentals of Friction and Wear on the nanoscale”. Springer, Heidelberg Publications, 2007.

Refereed Publications:

1. R. Szoszkiewicz, T. Okada, S. C. Jones, T.-D. Li, W. P. King, S. R. Marder and E. Riedo “High-speed, thermochemical nanolithography with sub-15 nm feature size”, **Nano Letters** 7, 1064 (2007).
2. M. Lucas, W. Mai, J.H. Song, Z.L. Wang and E. Riedo “Aspect ratio dependence of the elastic properties of ZnO nanobelts”, **Nano Letters** 7, 1314 (2007).
3. T.-D. Li, J. Gao, R. Szoszkiewicz, U. Landman and E. Riedo “Structured and viscous water in subnanometer gaps”, **Phys. Rev. B** 75, 115415 (2007).
4. M. Lucas, W. Mai, J.H. Song, Z.L. Wang and E. Riedo “Size dependence of the mechanical properties of ZnO nanobelts”, **Philos. Mag.** accepted.
5. L. Sirghi, R. Szoszkiewicz and E. Riedo, “Volume of Nanoscopic Menisci”, **Langmuir** 22, 1093 (2006).
6. R. Szoszkiewicz and E. Riedo, “Nucleation time of nanoscale water bridges”, **Phys. Rev. Lett.** 85, 135502 (2005).
7. J.H. Song and X.D. Wang and E. Riedo and Z.L. Wang, “Elastic Property of Vertically Aligned Nanowires/Nanotubes”, **Nano Letters** 12, 1954 (2005).
8. R. Szoszkiewicz and E. Riedo, “Friction forces as a local probe of Phase transitions”, **App. Phys. Lett.** 87, 033105 (2005). (Highlighted by Virtual Journal of Nanoscale Science & Technology, 2005).
9. J.H. Song and X.D. Wang and E. Riedo and Z.L. Wang, “Systematic study on experimental conditions for large-scale growth of aligned ZnO nanowires on nitrides”, **J. Phys. Chem. B** 109, 9869 (2005).
10. I. Palaci, S. Fedrigo, H. Brune, C. Klinke, M. Chen and E. Riedo, “Radial Elasticity of Multiwalled Carbon Nanotubes”, **Phys. Rev. Lett.** 94, 175502, (2005). (Highlighted by Virtual Journal of Nanoscale Science & Technology, 2005).
11. E. Gnecco and E. Riedo, accepted for publication in **TriboTest**.
12. E. Riedo and E. Gnecco, “Thermally activated effects in Nanofriction”, **Nanotechnology** 15 S288 (2004).
13. E. Riedo, I. Palaci, C. Boragno, H. Brune, “ $2/3$ power law dependence of Capillary Force in Nanoscopic Friction”, **J. Phys. Chem. B** 108, 5324 (2004).

14. E. Riedo, H. Brune, "Nano-Friction and Young Modulus in Hard Coatings", **Appl. Phys. Lett.** 83, 1986 (2003).
15. E. Riedo, E. Gnecco, R. Bennewitz, E. Meyer, H. Brune, "Interaction Potential and Attempt Frequency Governing Sliding Friction", **Phys. Rev. Lett.** 91, 084502, (2003). (Highlighted by Virtual Journal of Nanoscale Science & Technology, 2003).
16. E. Riedo, F. Levy, H. Brune, "Kinetics of capillary condensation in nanoscopic sliding friction", **Phys. Rev. Lett.** 88, 185505-4, (2002). (Highlighted by Nature Material May 2002 and Virtual Journal of Nanoscale Science & Technology April 29, 2002).
17. R. Haerle, E. Riedo, A. Pasquarello, A. Baldereschi "sp²/sp³ hybridization ratio in amorphous carbon from C1s core-level shifts: X-ray photoelectron spectroscopy and first-principles calculation", **Phys. Rev. B.** 65, 045101, (2002).
18. S. Abbet, E. Riedo, H. Brune, U. Heiz, A. M. Ferrari, L. Giordano, G. Pacchioni, "Identification of defect sites on MgO(100) thin films by decoration with Pd atoms and studying CO adsorption properties", **J. Am. Chem. Soc.** 123(25), 6172, (2001).
19. E. Riedo, J. Chevrier, F. Comin, H. Brune, "Nanotribology of carbon based thin films: the influence of film structure and surface morphology", **Surf. Sci.** 477/1, 25, (2001).
20. C. Aruta, J. Zegenhagen, B. Cowie, D. Luebbert, T. Baumbach, G. Pasquini, G. Balestrino, P. G. Medaglia, F. Ricci, E. Riedo, L. Ortega, "Structure of superconducting [BaCuO_x]₂/[CaCuO₂]_n superlattices on SrTiO₃(0001) investigated by X-ray scattering", **Phys. Stat. Sol. (A)** 183, 353, (2001).
21. E. Riedo, F. Comin, J. Chevrier, A. M. Bonnot, "Composition and chemical bonding of pulsed laser deposited carbon nitride thin films", **J. Appl. Phys.** 88, 4365, (2000).
22. E. Riedo, F. Comin, J. Chevrier, F. Schmithusen, S. Decossas, M. Sancrotti, "Structural properties and surface morphology of amorphous Carbon and Carbon Nitride films," **Surf. Coat. Technol.** 125, 124, (2000).
23. E. Riedo, E. Magnano, S. Rubini, M. Sancrotti, E. Barborini, P. Piseri, P. Milani, "EELS and XPS analysis of carbon films grown by cluster beam deposition with different nanostructures", **Solid State Comm.** 116, 287, (2000).
24. G. Ghislotti, E. Riedo, D. Ielmini, M. Martinelli, "Intersubband relaxation time for InGaAs/AlAs quantum wells with a large transition energy", **Appl. Phys. Lett.** 75, 3626 (1999).
25. G. Ghislotti, D. Ielmini, E. Riedo, M. Martinelli, "Picosecond time-resolved photoluminescence studies of recombination processes in CdTe", **Solid State Comm.** 111, 211, (1999).

Invited Talks at International Conferences:

1. March 2007: “Nano and Giga Challenges in Electronics and Photonics,” Phoenix, Arizona (USA).
2. October 2006: Workshop on “Frontiers of Scanning Probe Microscopy,” Purdue University, West Lafayette, Indiana, (USA)
3. September 2006: 5th ESF-Nanotribology Workshop, Antalya (Turkey).
4. March 2006: American Chemical Society Meeting, Atlanta, Georgia (USA).
5. Fall 2004: GT Materials Council Nano-materials Forum, (USA).
6. June 2005: 4rd ESF-Nanotribology Workshop, Porcherolles (France).
7. September 2003: International Conference, “TNT03: Trends in NanoTechnology, 2003,” Salamanca (Spain).
8. February 2003: International Conference, “From elasticity to plastic flow in condensed media,” Les Houches (France).

Invited Seminars and Colloquia at Universities:

9. June 2006: University of Maryland (USA).
10. April 2006: University of South Florida (USA).
11. January 2006: Emory University (USA).
12. January 2006: University of Maryland (USA).
13. September 2005: North Carolina State University (USA).
14. Spring 2005: Invited lecture in MSE, Georgia Tech, (USA).
15. Fall 2004: COPE seminar series, Georgia Tech, (USA).
16. Summer 2004: School of Physics, REU seminar series, Georgia Tech, (USA).
17. Spring 2004: Center for Process Systems Engineering series, Georgia Tech (USA).
18. January 2003: Georgia Institute of Technology (USA).
19. November 2002: CNRS Grenoble (France).
20. October 2002: University of Basel (Switzerland).
21. September 2002: PCSM-ESPCI, Paris (France).

- 22. May 2002: University of Paris VII (France).
- 23. April 2002: University of Cambridge (England).
- 24. September 2000: EPFL Lausanne (Switzerland).

Contributed Presentations at International Conferences:

- 25. November 2005: Material Research Society Meeting, Boston (USA).
- 26. March 2005: American Physical Society Meeting, Los Angeles, California (USA).
- 27. March 2004: Frontiers in Tribology 2004, Oak Ridge, Tennessee (USA).
- 28. October 2002: 1st ESF-Nanotribology Workshop, Porto Venere (Italy).
- 29. August 2002: Gordon Conference, Tribology, Boston (USA).
- 30. April 2002: European Physical Society (EPS), 2002, Brighton, (UK).
- 31. Feb 2002: SPS 2002, EPFL, Lausanne (Switzerland).
- 32. January 2002: SAOG-GSSI 18th Annual Meeting, Hard Coatings-Recent developments of various processes and applications, University of Fribourg (Switzerland).
- 33. June 1999: European Material Research Society (E-MRS) 1999 Spring Meeting, Congress Center – Palais de la Musique et des Congres - Strasbourg (France).
- 34. September 1998: 5th International Conference on Nanometer-scale Science and technology (NANO 5), International Convention Center, Birmingham, (UK).
- 35. April 1998: International School of Solid State Physics, Erice, (Italy).
- 36. July 1997: International School of Ultrafast Spectroscopy, Erice, (Italy).

Teaching Experience:

			Enrollment
Fall 2003	Phys 2211E	Introductory Physics 1	108
Spring 2004	Phys 8803A	Special Topics (with Chem & Mech. Eng)	6
Fall 2005	Phys 4142	Statistical Mechanics	37
Spring 2006	Phys 6107	Statistical Mechanics (Graduate)	35

Responsibility for students/scientists:

- * **Undergraduate Students:** 8 students so far.
- * **Graduate Students:** 3 Ph. D students are working at present in my group.
- * **Postdoctoral associates:** Dr. R. Szoszkiewicz. Starting Jan. 2004. Dr. M. Lucas. Starting Jan. 2006
- * **Visiting researchers:** I. Palaci (EPFL, Switzerland). Fall 2003-Spring 2004. Prof. L.Sirghi, Fulbright Fellow (Al. I. Cuza" University, Romania). Fall 2004-Spring 2005.

Committees - Georgia Tech:

Physics Chair Advisory Committee (elected in 2007)
Physics Graduate Students Committee (2007)
Physics Special Topics Seminar, Organizer (2007)
Physics Chair Faculty Search Committee (2005)
Material Science Engineering Ph.D. Thesis Committee (2006)
Georgia Tech Sigma-Xi best PhD thesis Committee (2006)
Physics Society of Physics advisor (2004-2005)
Physics Undergraduate Committee (2005)
Physics Colloquium Committee (2004, 2005)
Physics Graduate Exam Committee (2004-2005)