

**ELISA RIEDO**  
**CURRICULUM VITAE**

Assistant Professor, School of Physics  
Adjunct Professor, School of Chemistry and Biochemistry

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**Personal Data:**

Born: 09/23/1971, Cantu' (Como), Italy



**Educational Background:**

B.S., Physics, 1995, *Summa cum Laude*, University of Milano, Italy

Ph.D., Physics, 2000, University of Milano, Italy

**Employment History:**

Aug. 2003- present: Tenure-track Assistant Professor, School of Physics, Georgia Tech

2006-present: Adjunct Professor, School of Chemistry and Biochemistry, Georgia Tech

1999 – 2003: Post Doctoral Fellow, École Polytechnique Fédérale Lausanne (EPFL)

1998 - 1999: Research Assistant, European Synchrotron Research Facility (ESRF)  
France

1998 – 1998: Research Assistant, TASC – INFM labs, Trieste (Italy)

June 1998: Visiting Research Assistant, Forschungszentrum of Jülich (Germany)

1996 - 1998: Research Assistant, CoreCom (Politecnico of Milan and Pirelli)

1995: Research stage at CERN, Geneva.

**Current Fields of Interest:**

- \* Nano-confined Liquids: Physics and chemistry of liquids when confined in nano-spaces. Structural properties and nano-rheology.
- \* NanoBioMechanics: Elasticity, plasticity and mechanical properties of nano-objects from oxides nanowires to DNA.
- \* Chemical Nano-patterning of surfaces for Biological and Electronics Applications.
- \* Nanotribology: Friction and adhesion forces at the nanoscale.

<b>Teaching Experience:</b>			<b>Enrollment</b>
Spring 2008	Phys 3141A	Thermodynamics	47
Fall 2007	Phys 4142A	Statistical Mechanics	37
Spring 2007	Phys 3141A	Thermodynamics	41
Fall 2006	Phys 4142A	Statistical Mechanics	26
Spring 2006	Phys 6107	Statistical Mechanics (Graduate)	31
Fall 2005	Phys 4142A	Statistical Mechanics	35
Spring 2004	Phys 8803A	Special Topics (with Chem & Mech. Eng)	15
Fall 2003	Phys 2211E	Introductory Physics 1	

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**Refereed Publications (work done at Georgia Tech):**

1. M. Lucas **Phys. Rev. B**
2. T.-D. Li, and E. Riedo “Nonlinear viscoelastic dynamics of nanoconfined wetting liquids”, **Phys. Rev. Lett.** 100, 106102 (2008).
3. D. B. Wang, M. Lucas, R. Szoszkiewicz, E. Riedo, T. Okada, S. C. Jones, S. R. Marder, Lee, W. P. King, and “Local wettability modification by thermochemical nanolithography with write-read-overwrite capability”, **Appl. Phys. Lett.** 91, 243104 (2007) (Highlighted by Virtual Journal of Nanoscale Science & Technology).
4. 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) (Highlighted by Scientific American and UPI).
5. 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).

6. 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). (Highlighted by Virtual Journal of Nanoscale Science & Technology, and by Virtual Journal of Biological Physics Research).
7. S. Yoo, W. J. Potscavage Jr., B. Domercq, S.-H. Han, T.-D. Li, S. C. Jones, R. Szoszkiewicz, D. Levi, E. Riedo, S. R. Marder, B. Kippelen, “Analysis of improved photovoltaic properties of pentacene/C60 organic solar cells: Effects of excitons blocking layer thickness and thermal annealing”, **Solid-State Electronics** 51, 1367 (2007).
8. M. Lucas, W. Mai, J.H. Song, Z.L. Wang and E. Riedo “Size dependence of the mechanical properties of ZnO nanobelts”, **Philos. Mag.** 87, 2135 (2007).
9. L. Sirghi, R. Szoszkiewicz and E. Riedo, “Volume of Nanoscopic Menisci”, **Langmuir** 22, 1093 (2006).
10. R. Szoszkiewicz and E. Riedo, “Nucleation time of nanoscale water bridges”, **Phys. Rev. Lett.** 85, 135502 (2005).
11. 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).
12. 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).
13. 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).
14. 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).

#### **Refereed Publications (prior to Georgia Tech):**

15. E. Gnecco, E. Riedo, R. Bennewitz, E. Meyer, H. Brune, “Thermally activated phenomena in nanoscopic sliding friction” **TriboTest** 12, 2169 (2006).
16. E. Riedo and E. Gnecco, “Thermally activated effects in Nanofriction”, **Nanotechnology** 15 S288 (2004).

17. 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).
18. E. Riedo, H. Brune, "Nano-Friction and Young Modulus in Hard Coatings", **Appl. Phys. Lett.** 83, 1986 (2003).
19. 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).
20. 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).
21. R. Haerle, E. Riedo, A. Pasquarello, A. Baldereschi "sp<sup>2</sup>/sp<sup>3</sup> hybridization ratio in amorphous carbon from C1s core-level shifts: X-ray photoelectron spectroscopy and first-principles calculation", **Phys. Rev. B.** 65, 045101, (2002).
22. 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).
23. 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).
24. 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<sub>x</sub>]<sub>2</sub>/[CaCuO<sub>2</sub>]<sub>n</sub> superlattices on SrTiO<sub>3</sub>(0001) investigated by X-ray scattering", **Phys. Stat. Sol. (A)** 183, 353, (2001).
25. 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).
26. 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).
27. 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).

28. 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).
29. G. Ghislotti, D. Ielmini, E. Riedo, M. Martinelli, "Picosecond time-resolved photoluminescence studies of recombination processes in CdTe", **Solid State Comm.** 111, 211, (1999).

### **Chapters in Books (work done at Georgia Tech):**

1. M. Lucas, T.-D. Li, E. Riedo, "Nanomechanics: Fundamentals and NEMS," book chapter in *Nanoelectronics and Photonics, From Atoms to Materials, Devices, and Architectures*, in the Nanostructure Science and Technology series, Springer (2008).
2. R. Szoszkiewicz, E. Riedo, "New AFM Developments to Study Elasticity and Adhesion at the Nanoscale," book chapter in *Applied Scanning Probe Methods V*, in the NanoScience and Technology series, Springer (2007).
3. L. Merchan, R. Szoszkiewicz, E. Riedo, "NanoMechanics: Elasticity in Nano-Objects," book chapter in *Fundamentals of Friction and Wear on the nanoscale*, in the NanoScience and Technology series, Springer (2007).

### **Grant Proposal Activity:**

#### **Funded (Total External Funding Secured: \$1,835,009)**

- \* Renewal of NSF – STC “Materials and Devices for Information Technology Research”. Multi-Investigators (34), co-PI. 08/2007 – 07/2012. 5 years. \$17,976,000.  
Money to Riedo’s Lab about **\$350,000** over 5 years.
- \* DOE, “Nanomechanics: elasticity and friction in nano-objects”. Single Investigator, PI. 08/2006 – 07/2010. 4 years. **\$535,809**.
- \* Renewal NSF-DMR, “Liquid dynamics in nano-confined geometries: Nano-hydrodynamics”. Single Investigator, PI. 09/2007 – 08/2010. 3 years. **\$300,000**.
- \* College of Science Cutting Edge Research Award. Single Investigator, PI. 01/2006 – 03/2008. **\$50,000**.
- \* NSF-STC International Research Experience Program. Multi-Investigators (2), PI. 01/2006 – 03/2008. **\$138,000**.

- \* Seed Project in NSF–STC “Materials and Devices for Information Technology Research”.  
Single Investigator, PI. 02/2005 – 08/2008. 3 years. **\$228,700**.
- \* ACS Petroleum Research Foundation, “Short and Long Range Hydrophobic Forces at the nanoscale: role of roughness and chemistry”.  
Single Investigator, PI. 09/2004 – 08/2008. 2 Years (extended). **\$80,000** (Expired).
- \* NSF-DMR, “Interaction Forces in Water at the Nanoscale”.  
Single Investigator, PI. 06/2004 – 06/2007. **\$151,000** (Expired).
- \* President’s Undergraduate Research Award, fall semester 2004. **\$1,500** (Expired).
- \* Swiss NSF grant, visiting researcher for 6 months. (Expired).

### **Patents:**

- \* Provisional Patent: “High Resolution Force Curves in Atomic Force Microscopy”. GTRC-ID-4523 (4/15/2008)
- \* Provisional Patent: “Thermally-Activated Chemical Nanopatterning”. GTRC-ID-3973 (9/13/2006)

### **Invited Talks at International Conferences (based on work done at Georgia Tech):**

1. August 2009: “Nano and Giga Challenges in Electronics, Photonics and Renewable Energy,” Ontario (Canada). (upcoming)
2. October 2008: “Conference on the Physics, Chemistry, and Biology of Water 2007”, Vermont (USA). (upcoming)
3. June 2008: “Physics of Micro- and NanoFluids”, Lorentz Center , Leiden (NL)
4. April 2008: “Behavior of Defects in Materials - Contractors Meeting 2008”, Warrenton, VA (USA)
5. October 2007: “Conference on the Physics, Chemistry, and Biology of Water 2007”, Vermont (USA).
6. March 2007: “Nano and Giga Challenges in Electronics and Photonics,” Phoenix, Arizona (USA).
7. October 2006: Workshop on “Frontiers of Scanning Probe Microscopy,” Purdue University, West Lafayette, Indiana, (USA)
8. September 2006: 5th ESF-Nanotribology Workshop, Antalya (Turkey).

9. March 2006: American Chemical Society Meeting, Atlanta, Georgia (USA).
10. Fall 2004: GT Materials Council Nano-materials Forum, (USA).
11. June 2005: 4rd ESF-Nanotribology Workshop, Porcherolles (France).

**Invited Talks at International Conferences (2003 and earlier):**

12. September 2003: International Conference, “TNT03: Trends in NanoTechnology, 2003,” Salamanca (Spain).
13. February 2003: International Conference, “From elasticity to plastic flow in condensed media,” Les Houches (France).

**Invited Seminars and Colloquia at Universities (after 2003):**

1. April 2008: Colloid & Soft Matter Bag Lunch Seminar series, Georgia Tech, (USA).
2. April 2007: University of South Florida (USA).
3. July 2006: Solvay Workshop, Georgia Tech, (USA).
4. June 2006: University of Maryland (USA).
5. May 2006: School of Chemistry and Biochemistry, Georgia Tech, (USA).
6. April 2006: University of South Florida (USA).
7. January 2006: Emory University (USA).
8. January 2006: University of Maryland (USA).
9. September 2005: North Carolina State University (USA).
10. Spring 2005: Invited lecture in MSE, Georgia Tech, (USA).
11. Fall 2004: COPE seminar series, Georgia Tech, (USA).
12. Summer 2004: School of Physics, REU seminar series, Georgia Tech, (USA).
13. Spring 2004: Center for Process Systems Engineering series, Georgia Tech, (USA).

**Invited Seminars and Colloquia at Universities (2003 and earlier):**

14. January 2003: Georgia Institute of Technology (USA).
15. November 2002: CNRS Grenoble (France).
16. October 2002: University of Basel (Switzerland).
17. September 2002: PCSM-ESPCI, Paris (France).
18. May 2002: University of Paris VII (France).

19. April 2002: University of Cambridge (England).
20. September 2000: EPFL Lausanne (Switzerland).

### **Contributed Presentations at International Conferences:**

#### **After 2003**

1. March 2008: American Physical Society Meeting, New Orleans, Louisiana (USA).
2. November 2005: Material Research Society Meeting, Boston (USA).
3. March 2005: American Physical Society Meeting, Los Angeles, California (USA).
4. March 2004: Frontiers in Tribology 2004, Oak Ridge, Tennessee (USA).

Students and Post Docs in Riedo's Lab presented x posters and y talks since 2003

#### **Before 2003**

5. October 2002: 1st ESF-Nanotribology Workshop, Porto Venere (Italy).
6. August 2002: Gordon Conference, Tribology, Boston (USA).
7. April 2002: European Physical Society (EPS), 2002, Brighton, (UK).
8. Feb 2002: SPS 2002, EPFL, Lausanne (Switzerland).
9. January 2002: SAOG-GSSI 18th Annual Meeting, Hard Coatings-Recent developments of various processes and applications, University of Fribourg (Switzerland).
10. June 1999: European Material Research Society (E-MRS) 1999 Spring Meeting, Congress Center – Palais de la Musique et des Congres - Strasbourg (France).
11. September 1998: 5th International Conference on Nanometer-scale Science and technology (NANO 5), International Convention Center, Birmingham, (UK).
12. April 1998: International School of Solid State Physics, Erice, (Italy).
13. July 1997: International School of Ultrafast Spectroscopy, Erice, (Italy).

### **Committees - Georgia Tech:**

- 2 School of Physics Ph.D. Thesis Committees (2007 and 2008)
- 2 School of Chemistry and Biochemistry OP-Ph.D. Thesis Committees (2006 and 2008)
- 2 Material Science Engineering Ph.D. Thesis Committee (2006 and 2007)
- 1 Mechanical Engineering Ph.D. Thesis Committee (2007)
- Biophysics Search Committee, Physics (2007-08)
- Strategic Planning Committee: Physics (2007-08)

Physics Faculty Advisory Committee (elected in 2007)  
Undergraduate physics major advisement (2004-2007)  
Physics Graduate Students Committee (2007)  
Physics Special Topics Seminar, Chair (2007)  
Physics Chair Faculty Search Committee (2005)  
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)

### **Honors and Awards:**

2006: GT College of Science Cutting Edge Research Award  
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.  
2002: Best Poster, Gordon International Conference Tribology 2002.  
1999: Best ESRF Graduate Student Grant Award, ESRF, Grenoble.  
1995: Physics Degree *Summa cum Laude*.

### **Editorial Boards and Meeting Organization:**

- \* Member of the Editorial Board of “Review of Scientific Instruments” (2008-2010).
- \* Organizer of the Workshop “1<sup>st</sup> Southeast Workshop on Soft Materials”, GeorgiaTech Campus, May 9, 2008.
- \* Co-Organizer of the Conference “Nano and Giga Challenges in Electronics, Photonics and Renewable Energy”, Hamilton, Ontario, Canada, August 10-14, 2009
- \* Co-Organizer and Chair of the *Focus Topic* "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*, 12<sup>th</sup> International Conference on Experimental Mechanics (ICEM12), 2004.

**Review Activities:**

Reviewer for:

- \* The National Science Foundation (NSF) and NSF-Panel Reviewer (March 2007 and January 2008))
- \* The ACS Petroleum Foundation
- \* The Department of Energy (DOE)
- \* The Swedish National Science Foundation
- \* The European Science Foundation (ESF)
- \* 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:**

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

**Outreach Activities:**

- \* Presentation for a Career Panel at the 2008 NSF-STC retreat in Atlanta, Spring 2008.
- \* Organization of the Women in Science Film Festival on Georgia Tech campus, March 2005.

**Undergraduate Students Supervised:**

<i>Student</i>	<i>Term</i>	<i>Title</i>	<i>New Position/Awards</i>
Nicki Reishus	Summer 2008	REU student	
Odion Okojie	Summer 2007	REU student	
John Kickhofel	2006-2008	Student Assistant	M.S. student, EPFL/ETHZ (CH)
Andrew Dunnells	2007-2008	Student Assistant	
Ajay Patel	2007-2008	Student Assistant	M.D. student, Univ. of Minnesota
Guy Harris	2007	Student Assistant	
Steve Medina		Student Assistant	
E. Henderson	Summer 2006	REU Student	
Kristin Beck	Summer 2006	REU Student	Goldwater Scholarship
Jonathan Diaz	2006	Research Assistant	Goldwater Scholarship
Scott Eric Toupin	Summer 2005	REU Student	
Ariel Bedford	Summer 2005	REU Student	
Diane Crenshaw	Summer 2004	REU Student	

Michael Chen	2004-2005	Research Assistant	Ph.D. student, Amherst College
Anna Pavlova	2004-2006	Research Assistant and PURA fellow	Ph.D. student, UC Santa Barbara

**Graduate Students Supervised:**

<i>Student</i>	<i>Degree</i>	<i>Year</i>	<i>New Position/Awards</i>
Tai-De Li	Ph.D.	2008 (successful defense 6/4/2008)	Amelio Award
Debin Wang	Ph.D.	Qualified in 2005	
Deborah Ortiz	Ph.D.	Qualified in 2008	
Brian Kocher	M.S.		

**Special Problem Pre-qualifier Ph.D. Students Supervised:**

7 SP students worked so far in Riedo's Lab for 1 or 2 semesters.

**Postdoctoral Fellows Supervised:**

<i>Name</i>	<i>Term</i>	<i>New Position/Awards</i>
Soo-Young Kim	2007- present	
Marcel Lucas	2006- present	
Robert Szoszkiewicz	2004-2005-2006	Assistant Professor, Kansas State Univ.

**Visiting researchers:**

<i>Name</i>	<i>Term</i>	<i>Fellowship/Institution</i>
Lucel Sirghi	Fall 2004-Spring 2005	Fulbright Fellow (Al. I. Cuza University, Romania)
Ismael Palaci	Fall 2003-Spring 2004	EPFL, Switzerland