

Dr. FRANCO DINELLI

Name: Franco Last Name: Dinelli
Position: Assegnista di ricerca (equivalent to a postdoctoral position)
Direct Phone: +39-051-639-8523
Email: F.Dinelli@ism.bo.cnr.it



CURRICULUM VITAE

Personal

Place and Date of birth: Viareggio, 30th April 1966
Nationality: Italian
Languages: English (fluent), French (reading)

Education

- Doctorate of Philosophy, Feb 1995 - Feb 1998
Department of Materials Science, University of Oxford, United Kingdom
Thesis: 'Ultrasonic Force Microscopy: surface elastic properties mapping and stiffness evaluation at a nanoscale level'
- Laurea, Nov 1985 - Nov 1991 (equivalent to M. Sc. Degree)
Department of Physics, University of Pisa, Italy
Tesi di Laurea: 'Microscopie a risoluzione atomica: Microscopio a Forza Atomica'

Professional Experience

- Assegno di Ricerca (June 2001 - present)
Istituto di Spettroscopia Molecolare, CNR, Bologna, Italy
Charge transport properties of organic semiconductor thin films. Study of film growth via fractal analysis. Development of Scanning Probe Field Effect Transistor.
- Research associate (May 2000 - May 2001)
Department of Chemistry, UMIST, Manchester, UK
Investigation of surface mechanical properties of polyesters and amorphous polymers.
- Research associate (Mar 1999 - Mar 2000)
Department of Chemical Engineering, University of Washington, USA
Investigation of glass transition of thin polymeric films (homopolymers, blends and copolymers) using Lateral Force and Shear Modulation. Focus was centred on matter in a confined state, for instance, the dynamics of viscoelastic contacts. Investigated the magnetic domains and Curie temperature of Ni/Fe plated alloy films using Magnetic Force Microscopy. Involved in another project for the study of non-fouling plasma polymer based materials.
- Postdoctoral position (Mar 1998 - Feb 1999)
Department of Materials Science, University of Oxford, UK
Studied elastic and adhesive properties of PET bi-axially drawn films and barrier coatings. The major results of the project were the characterisation of surface morphology of PET bi-axially drawn films, early stage growth of aluminium and silicon oxide films on PET,

crack formation induced by thermal and mechanical stress. (in collaboration with Toppan Co.)

- Student in Doctorate of Philosophy (Feb 1995-Feb 1998)
Department of Materials Science, University of Oxford
Development and understanding of Ultrasonic Force Microscopy. Mapping of elastic properties, as well as, quantitative evaluation of the Young's modulus of stiff materials. Supervised by Prof. G.A.D. Briggs and Dr. O.V. Kolosov
- Research assistant (Nov 1991- Feb 1993)
BioPhysics Institute, CNR, Pisa, Italy
Applied Lateral Force Microscopy (LFM) and Atomic Force Microscopy (AFM) to materials of bio-electronic interest. Examined polymeric and biological samples to determine crystallinity and the structures of flagella and cilia. In addition, studies of photochromic Langmuir-Blodgett films (Azobenzene) were also carried out. This work was performed in collaboration with the University of Glasgow in the frame of a European Community project.
- Laurea student (equivalent to M. Sc. student) (Jun 1990- Nov 1991)
BioPhysics Institute, CNR, Pisa, Italy
Constructed a Scanning Tunnelling/Atomic Force Microscope (STM/AFM) under the supervision of Dr. C. Frediani and Dr. C. Ascoli. This work focussed on the study of mechanical and thermal effects on AFM cantilevers induced by laser absorption and reflection.

Scientific Interests

- Scanning probe microscopies.
- Study of organic semiconductor film growth.
- Fractal analysis.
- Charge transport properties of organic semiconductor thin films.
- Development of Scanning Probe Field Effect Transistor.

Publications

Look up in the Search Engine ---> [Go](#)

1. F. Dinelli, G. J. Leggett, P. H. Shipway, and M. R. Alexander, 'Scanning Force Microscopy of plasma polymerised hexane: information on in-plasma and downstream-plasma deposition regimes from nanowear analysis', to be published on Journal of Applied Physics, 2002
2. F. Dinelli, C. K. Buenviaje, R. M. Overney, 'Glass transition measurements on heterogeneous surfaces', Thin Solid Films, 396 (1-2) 138-44, 2001
3. F. Dinelli, C. K. Buenviaje, R. M. Overney, 'Glass transition of thin polymeric films: Speed and load dependence in lateral force microscopy', Journal of Chemical Physics, 113 (5), 2043-8, 2000
4. C. K. Buenviaje, F. Dinelli, R. M. Overney, 'Investigations of heterogeneous ultrathin blends using lateral force microscopy', Macromolecular Symposia, 167, 201-12, 2001
5. C. K. Buenviaje, F. Dinelli, R. M. Overney, 'Glass transition measurements of ultrathin polymer films', J. Frommer and R.M. Overney (Editors), in Interfacial Properties on the Submicron Scale, American Chemical Society (ACS) Books, 2000
6. C. K. Buenviaje, F. Dinelli, R. M. Overney, 'Investigations of heterogeneous ultrathin blends

- using lateral force microscopy', in *Scanning Probe Microscopy of Polymers: The Next Generation*, ACS 2000 Fall Meeting, Washington, D.C., US, 2000
7. R. M. Overney, C. V. Buenviaje, R. Luginbühl, F. Dinelli, 'Glass and structural transition measured at polymer surfaces on the nanoscale', *Journal of Thermal Analysis and Calorimetry*, 59 (1-2), 205-25, 2000
 8. C. S. Deng, H. E. Assender, F. Dinelli, O. V. Kolosov, G. A. D. Briggs, T. Miyamoto, Y. Tsukahara, 'Nucleation and growth of gas barrier aluminium oxide on surfaces of poly(ethylene terephthalate) and polypropylene: Effects of the polymer surface properties', *Journal of Polymer Science Part B-Polymer Physics*, 38: (23) 3151-62, 2000
 9. F. Craciun, P. Verardi, M. Dinescu, L. Mirengi, F. Dinelli, "Correlated compositional, morphological and electrical characterization of PLD thin films", C. Galassi et al. (Editors), in *Piezoelectric Materials: Advances in Science, Technology and Applications*, 76, 273-84, Kluwer Academic Publisher, NATO, Science Series 3 High Technology, 2000
 10. F. Dinelli, M. R. Castell, N. J. Mason, G. A. D. Briggs, and O. V. Kolosov, 'Mapping surface elastic properties of stiff and compliant materials on the nanoscale using ultrasonic force microscopy (UFM)', *Philosophical Magazine A*, 80 (10), 2299-323, 2000
 11. F. Dinelli, S. K. Biswas, G. A. D. Briggs, and O. V. Kolosov, 'Measurements of stiff material compliance on the nanoscale with ultrasonic force microscopy', *Physical Review B*, 61 (20), 13995-14006, 2000
 12. F. Dinelli, H. E. Assender, K. Kirov, and O. V. Kolosov, 'Surface morphology and crystallinity of biaxially stretched PET films on the nanoscale', *Polymer*, 41 (11), 4285-9, 2000
 13. F. Dinelli, 'Application notes for ultrasonic force microscopy', Isis Innovation, Oxford, UK, 1999
 14. B. M. Henry, H. Norenberg, F. Dinelli, C. R. M. Grovenor, G. A. D. Briggs, Y. Tsukahara, T. Miyamoto, 'The effect of thermal cycling damage on the permeability and structure of transparent gas barrier films', *Chemical Engineering & Technology*, 22 (12), 1010-1, 1999
 15. B. M. Henry, F. Dinelli, K.-Y. Zhao, C. R. M. Grovenor, O. V. Kolosov, G. A. D. Briggs, A. P. Roberts, R. S. Kumar and R. P. Howson, 'A microstructural study of transparent metal oxide gas barrier films', *Thin Solid Films*, 355-356 (12), 500-5, 1999
 16. H. Norenberg, F. Dinelli and G. A. D. Briggs, 'The surface structure of TiO₂ (001) after high temperature annealing studied by AFM, STM, and optical microscopy', *Surface Science Letters*, 446 (1-2), L83-8, 2000
 17. H. Norenberg, F. Dinelli, G. A. D. Briggs, 'Network-like $(7\sqrt{2} \times 7\sqrt{2})R45$ degrees surface reconstruction on rutile TiO₂ (001) by non-equilibrium self-organisation', *Surface Science Letters*, 436 (1-3), L635-40, 1999
 18. F. Dinelli, H. E. Assender, N. Takeda, G. A. D. Briggs, and O. V. Kolosov, 'Elastic mapping of heterogeneous nano-structures with ultrasonic force microscopy (UFM)', *Surface and Interface Analysis* 27 (5-6), 562-7, 1999
 19. F. Crauciun, P. Verardi, M. Dinescu, F. Dinelli, O. V. Kolosov, 'Early stages of growth and nanostructures of Pb(Zr,Ti)O₃ thin films observed by atomic force microscopy', *Thin Solid Films*, 336 (1-2), 281-5, 1998
 20. F. Dinelli, S. K. Biswas, G. A. D. Briggs, and O. V. Kolosov, 'Ultrasonically induced lubricity in microscopic contact', *Applied Physics Letters*, 71 (9), 1177-9, 1997
 21. C. Ascoli, F. Dinelli, C. Frediani, D. Petracchi, M. Salerno, M. Labardi, M. Allegrini, F. Fuso, 'Normal and lateral forces in scanning force microscopy', *Journal of Vacuum Science and Technology B*, 12 (3) 1642-5, 1994
 22. M. Allegrini, E. Arpa, C. Ascoli, P. Baschieri, F. Dinelli, C. Frediani, M. Labardi, A. Lio, T. Mariani, L. Vanni, 'Scanning probe microscope with interchangeable AFM-FFM and STM heads', *Nuovo Cimento*, 15D (2-3), 27-292, 1993
 23. M. Allegrini, F. Fuso, M. Labardi, C. Ascoli, F. Dinelli, C. Frediani, 'Atomic and friction force microscopy of laser ablated thin films', in *Laser deposition of advanced materials*, eds. M. Allegrini, A. Giardini and A. Morone, 114-21, ETS, Pisa, 1992

24. M. Allegrini, C. Ascoli, P. Baschieri, F. Dinelli, C. Frediani, A. Lio, T. Mariani, 'Laser thermal effects on atomic force microscope cantilevers', *Ultramicroscopy*, 42-44, 371-8, 1992

25. F. Dinelli, P. H. Shipway, G. J. Leggett, 'Nanowear of polystyrene surfaces: entanglement and bundle formation', submitted to *Macromolecules*, 2001

26. F. Dinelli, P. H. Shipway, G. J. Leggett, 'Molecular entanglement at polymer surfaces: effects due to sample preparation', submitted to *Macromolecules*, 2001

27. F. Dinelli, P. H. Shipway, G. J. Leggett, 'Nanowear of polymer surfaces', submitted to *Langmuir*, 2001

Oral Communications to Conferences

1. F. Dinelli, F. Biscarini, 1st Phantoms Meeting, Grenoble, September 2001

2. F. Dinelli, P. H. Shipway, G. J. Leggett, 'Nanowear of polymeric surfaces: roles of entanglement, crosslinking, topography and crystallinity', Sikkim International Tribology Symposium, Sikkim, India, 16-24 May 2001

3. F. Dinelli, C. K. Buenviaje, R. M. Overney, 'Glass transition of thin polymeric films: Time?dependent effects studied by atomic force microscopy', ACS meeting, San Francisco, US, Mar 2000

4. F. Dinelli, M. Rafailovich, J. Sokolov, R. M. Overney, 'Glass transition temperature measured with nanometre resolution on polymeric blend films', AVS meeting, Seattle, US, Oct 1999

5. O. V. Kolosov, F. Dinelli, H. Yanaka, Y. Tsukahara, and G.A.D. Briggs, 'Ultrasonic nano-NDT by ultrasonic force microscopy. Observing inclusions, interfaces, and delaminations in composite materials with the near-atomic resolution', Ultrasonic International '99, Jul 1999

6. O. V. Kolosov, F. Dinelli, G. A. D. Briggs, ' Ultrasonic force microscopy - Mapping local physical properties with nanoscale spatial and nanosecond time resolution', Centennial of APS, Atlanta, Mar 1999

7. F. Dinelli, S. K. Biswas, G. A. D. Briggs, and O. V. Kolosov, 'Mapping and measuring surface elastic properties using ultrasonic vibration of the sample', IVC14 and NANO5, Birmingham, UK, 31 Aug ? 4 Sep, 1998

8. F. Dinelli, S. K. Biswas, G. A. D. Briggs, O. V. Kolosov, 'Superlubricity effect in contact mode AFM due to ultrasonic vibration of the sample', Ist World Tribology Congress, London, UK, 8?12 Sep, 1997

9. O. V. Kolosov, F. Dinelli, N. J. Mason, M. R. Castell, C. D. Marsh, G. A. D. Briggs, T. J. Kamins, and R. S. Williams, 'Elastic imaging of quantum nanostructures by ultrasonic force microscopy', STM '97, 9th International Conference on Scanning Tunneling Microscopy/Spectroscopy and Related Techniques, Hamburg, Germany, 20-25 Jul, 1997

10. F. Dinelli, S. K. Biswas, G. A. D. Briggs, O. V. Kolosov, 'Anomalous friction reduction in AFM with ultrasonic vibration', Ultrasonic International '97, Delft, The Netherlands, 2-4 Jul, 1997

11. F. Dinelli, S. K. Biswas, J. B. Pethica, G. A. D. Briggs, O. V. Kolosov, 'Quantitative evaluation of elastic constants in UFM - is it possible?', Ultrasonic International '97, Delft, The Netherlands, 2-4 Jul, 1997