

Gerardo Carlos Callegari

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EDUCATION

◆ Ph D Physics, Engineering School, University of Buenos Aires, 2003.

Advisor: Prof. A Calvo, Co-Advisor Prof J. P. Hulin, FAST, Orsay, France

Thesis: "Liquid Film Dewetting Dynamics in simple geometry", Porous Material Group, Engineering School, University of Buenos Aires, Argentina.

I experimentally studied the relation between dewetting velocity of liquid planar and annular films and its thickness. I also augmented the study with a theoretical explanation with numerical calculations performed to explain the experimental results. The work resulted in 4 publications and more than 10 presentations.

◆ BS. in Physics, University of Buenos Aires, 1996.

GPA 3.6/4.0

Bs. Thesis: "Displacement in Immiscible Liquids".

Behavior of Dynamic contact angle in partially wetting systems was addressed. During this period I acquired skills in preparing and manipulating experimental devices to visualize moving interfaces and in developing tools for image analysis.

APPOINTMENTS AND RESEARCH EXPERIENCE

• **Research Scientist, TRI/Princeton, Princeton, NJ, 2009-2011**

Lead functional composite fiber fabrication and characterization to be used as neural-implantable electrodes for NIH project.

Designed experimental protocols and identified measurable parameters to quantify consumer perception for product characterization focused on performance assessment for companies in personal care industry.

Managed and executed research projects, wrote and presented reports to clients in personal care industry.

• **Staff Scientist, TRI/Princeton, Princeton, NJ, 2006-2009**

Optimized mechanic-transport properties of Polymer-Carbon Nanotube fibers for implantable electrodes.

Developed and validate physical model to predict thickness of the film left after wiping.

Applied physical model on wiping process to engineering more efficient wipes.

Designed a technique to characterize transport/mechanical properties of deformable complex materials. Method was applied to diaper core characterization

Characterized mechanical and wetting properties of natural fibers.

• **Postdoctoral Fellow (Adviser: Prof. A.V. Neimark), TRI/Princeton, Princeton, NJ, 2003-2006**

Studied and controlled electrospinning conditions to get optimized electrospun nano-webs of diverse polymers.

Developed technique to characterize absorption and structural properties of nanofibrous substrates.

Designed experimental setup and conducted study on dynamics of absorption of single droplets of visco-elastic bio-fluids in single pores of different diameter. Discovery applied in bio-microfluid devices for the discovery of an optimized absorption rate for minute amount of biofluids.

Designed and operated device for fiber fabrication through wet coagulation spinning process.

Contributed in writing reports and application for NIH and NTC grants.

- **Research Associate, University of Buenos Aires, Phys Dept, Eng School, Buenos Aires, Argentina, 1997-2003.**

Studied dewetting velocity of liquid planar and annular films in function of its thickness.
Designed setup for producing planar and cylindrical liquid coatings on partial wetting substrate.
Developed image analysis tools to track film front.
Developed tools and experimental protocol to measure thickness and velocity of the dewetting film.
Modeled dewetting dynamics on cylindrical geometry.
Performed numerical calculations to fit model to the experimental results.

- **Research Internship, Fluides Automatiques et Systemes Thermiques, University of Paris Sud, Orsay, France 1999.**

Studied dynamics of desiccation of droplets of polymeric solution, under the supervision of Dr C. Allain.

- **Research Internship, Ecole Superieure Physique et Chimie Industrielles de la Ville de Paris, Paris, France, 1997.**

Studied pattern formation of a liquid film falling through an inclined plane in the presence of a wetting discontinuity, under the supervision of Dr L. Limat.

TEACHING EXPERIENCE

- ◆ **Course Chair and Lecturer, TRI/Princeton Continuing Education Program, Princeton, NJ, 2007-2009.**

Delivered 3 days courses (total of 15hs) for industrial scientists “Characterization of Fluid Interactions with Porous Materials” and “Hair Science Design and deliver lectures; demonstrate experimental tools, measuring and testing techniques.

- ◆ **Teacher Assistant in Chief, University of Buenos Aires, Engineering School, Phys. Dep., Buenos Aires, Argentina, 2000-2003.**

Developed, implemented and gave problem solving classes. Electromagnetism, circuits and Thermodynamics for Engineer students.
Designed, administered and evaluated problem solving tests.
Guided and evaluated laboratory work.

- ◆ **Teacher Assistant, University of Buenos Aires, Phys Dept, Eng Sch. Buenos Aires, Argentina, 1995-2000.**

Assisted in developing, implementing and giving problem solving classes for Engineer students in Electro-Magnetism, Circuits and Thermodynamics.
Assisted in designing, administering and evaluating problem solving tests and guide and evaluate laboratory work.

AWARDS

Research Fellowship “Dynamics of drying of polymeric droplets”, supported by ALAMED ERBCI1/CT940141/95, European Economic Community (EEC), 1999.

Advanced Graduate Student Research Award, Buenos Aires University, Argentina, 1998.

Research Fellowship, “Problem of dewetting relevant to water-sea desalination of plants”, supported by ALAMED ERBCI1/CT940141/95, EEC, 1997.

Graduate Student Research Award. Buenos Aires University, Argentina, 1996.

Undergraduate Student Research Award, Buenos Aires University, Argentina, 1993.

PUBLICATIONS

Author or co-author of a total of twenty seven (27) publications: one (1) book chapter, seventeen (15) peer reviewed articles two (2) in submission process, (9) internal research communications

Chapter book (1)

1 "Capillarity" G. Callegari, A. Calvo, chapter book in "Functional Properties of Bio-Inspired Surfaces: Characterization and Technological Applications", Ed Favret and Fuentes, World Scientific Books, Dec 2009, ISBN: 978-981-283-701-1.

Peer Reviewed Articles (15)

2 "Absorption and Transport Properties of Ultra-Fine Cellulose Webs", Callegari, G., Tyomkin, I., Kornev, K.G., Neimark, A.V., Hsieh, Y.-L., Journal of Colloid and Interface Science, 353 (1) (2011) 290-293.

3 "Biohybrid Carbon Nanotube/Agarose Fibers for Neural Tissue Engineering", D. Lewitus, J. Landers, J. Branch, K. Smith, G. Callegari, J. Kohn, A. V. Neimark, Advanced Functional Materials, 2011, DOI: 10.1002/adfm.201002429

4 "Thickness of the liquid film left behind a moving wet wipe: theoretical and experimental study", G. Callegari, A. Baker, K. Zwick, P. Kaplan, A. Neimark, I. Tyomkin, Journal of Cosmetic Science, 60, 5, 562, 2009.

5 "Carbon Nanotube Fibers are compatible with mammalian cells and neurons", R. Dubin, G. Callegari, J Kohn, A. Neimark, IEEE TRANSACTIONS ON NANOBIOSCIENCE, 7, 1, 11-14, 2008.

6 " Ribbon-to-fiber transformation in the process of spinning of carbon nanotube fibers", K. Kornev, G. Callegari, J Kuppler, S. Ruetsch, A. Neimark, Physical Review Letters, 97, 18, 188303, 2006..

7 "Contact line motion: hydrodynamical or molecular process?", G Callegari, A Calvo and J P Hulin, in: Contact Angle, Wettability and Adhesion, , Vol. 4, K. L. Mittal (Ed.), VSP, Leiden, 2006.

8 "Dewetting processes in a cylindrical geometry", G. Callegari, A. Calvo, J. P. Hulin. European Journal of Physics E: Soft matter, 16, 283-290 (2005).

9 "Capillary microfluidics for recognition of DNA hybrids", Kornev K, Callegari G, Amosova O, Neimark AV, American Chemical Society 228: U495-U495 274-coll Part 1, 2004.

10 "Capillary Microfluidics for viscoelastic fluids", Kornev K, Callegari G, Neimark A., XXI ICTAM, FM4L_10140, 2004, Edited by: W. Gutkowski, T. A. Kowalewski, Warsaw, Poland (ISBN 83-89687-01-

11 "Mechanical instability induced by desiccation of sessile drops", Gorand Y., Pauchard L., Callegari G., Hulin J.P., Allain C., Langmuir 20, 5138 (2004).

12 "Dewetting versus Rayleigh instability inside capillaries", G. Callegari, A. Calvo, J. P. Hulin, F. Brochard-Wyart, Langmuir, 18, 12, 4795-4798 (2002).

13 "Experimental results of dewetting in the visco-gravitational regime", G. Callegari, A. Calvo, J. P. Hulin. Colloids and Surfaces A: Physicochemical and Engineering aspects, 203, 167-177 (2002).

14 "Dewetting of flowing films", T.Podgorski, L.Limat, J.M.Flesselles, G.Callegari, P.Jenffer. Proceedings of the 2nd. European Coating Symposium (ECS'97) Euromech 367 "Fluid Mechanics of Coating Processes", 22-25 July 1997, Université Louis Pasteur, Strasbourg, France.

15 "Hydrodynamical dispersion in propagative Taylor-Couette cells". M.Piva, A.Calvo, A.Aguirre, G. Callegari, S.Gabbanelli, M.Rosen, J.E.Wesfreid.J. Phys. III France ,7, 895-908 (1997).

16 "Dependencia del ángulo de contacto con la velocidad de la interfase en un sistema líquido-líquido-sólido", G. Callegari, A. Calvo, R. Chertcoff, M. Rosen, J. P. Hulin, Anales Asociación Física Argentina (1995).

Manuscripts in preparation or submitted (2)

17 "Wipe Coating", G. Callegari, A. Baker, K. Zwick, P. Kaplan, A. Neimark, I. Tyomkin, accepted for publication in Physical Review E.

18 "Morphology of CNT macroscopic fibers" G. Callegari, A Ribaudó, J J. Landers, A. V. Neimark, to be submitted to Advanced Functional Materials.

Internal Publications (TRI/Princeton) (9):

19 Notes on Research # 548, "wipe coating", G Callegari, I Tyomkin, May 2009

20 Interaction of Fluids with Fibrous Materials #65, 2008.

21 Notes on Research # 545, "Absorption & Spreading of a Single Droplet By Porous Materials", G. Callegari, May 2007.

22 Interaction of Fluids with Fibrous Materials #64, 2007.

- 23 Notes on Research # 543, "Characterization of Pore Structure of Carbon Nanotube Fibers", Callegari, Ravikovitch, Nov 2006
- 24 Interaction of Fluids with Fibrous Materials #63, 2006.
- 25 Interaction of Fluids with Fibrous Materials #62, 2005.
- 26 Notes on Research #536, "Racing of DNA Molecules through Microfluidic Devices", Callegari, Kornev, Feb 2005.
- 27 Interaction of Fluids with Fibrous Materials #61, 2004.

INVITED LECTURES, SEMINARS, CONFERENCE TALKS AND POSTERS (54).

Gave a total of thirteen (13) invited talks or seminars, twenty six (26) conference talks and fifteen (15) poster presentations.

Invited seminars and talks (13)

- 1- "Recubrimiento de superficies mediante el uso de medios porosos parcialmente saturados: toallitas húmedas", G Callegari, invited seminar, Physics Department, Engineering School, Buenos Aires University, Argentina, September 2010.
- 2- "Spontaneous absorption of droplets into single pores and fibrous porous materials", G Callegari, invited seminar, Fiber and Polymer Department, Auburn University, Auburn, AL, June 2009.
- 3- "Film Thickness Left Behind a Wet Wipe after Wiping a Solid Surface", Callegari, Invited lecture at World of Wipes (WOW), Atlanta, GA, June 2009.
- 4- Thickness of the liquid film left behind a moving wet wipe: theoretical and experimental study", .G. Callegari, I. Tyomkin, A. Baker, K. Zwick, P. Kaplan, A. Neimark, SCC annual meeting, Chicago, June 2009.
- 5- "Nanofibrous Materials", Invited lecture, SCA, Goteborg, Sweden, November 2008.
- 6- "Wipe Coating", Invited lecture, SCA, Goteborg, Sweden, November 2008.
- 7- "Review of Recent Research at TRI/Princeton", invited lecture, SCA, Goteborg, Sweden, November 2008.
- 8- "Spontaneous absorption of droplets into single pores and fibrous porous materials", G Callegari, New Jersey Institute T, Newark, NJ, invited seminar, March 2007.
- 9- "How molecular dissipation near Triple Contact Line affects dewetting of liquid films in viscous regime", Textil Research Institute Princeton, Princeton, USA, September 27th 2003.
- 10 - "Dewetting in cylindrical geometry". Phys Dt, F.I.U.B.A Argentina May 2nd 1997.
- 11- "Study of the behavior of an interface in a capillary". 15 de septiembre de 1995, Dto. De Física, F.I.U.B.A.
- 12 - "Liquid-liquid interaction influences on an advancing interface", Expobeca UBA, October 1995.
- 13- "Liquid-liquid interaction influences on an advancing interface", Expobeca UBA, October 1994.

Conference talks (26)

- 14- "Wipe Coating from a Partially Saturated Porous Material", G. Callegari, I. Tyomkin, A. Baker, K. Zwick, P. Kaplan, A. Neimark, APS, Division of Fluid Mechanics Annual meeting,, San Antonio, TX, November 2008.
- 15- "Coating with a wipe: a predictive model based on dip coating and in porous materials", Callegari, SCC NY regional meeting 2008, Stamford, CT, (October 17 2008).
- 16- "Spontaneous absorption of droplets into single pores of different radii", Callegari, Kornev, Neimark, Pan-American Advanced Studies Institute (PASI) on Interfacial Fluid Dynamics: From Theory to Applications held from August 6th to 17th 2007 in Mar del Plata, Argentina
- 17 - "Formation and Characterization of Pore Structure in Carbon Nanotube Fiber", G. C. Callegari*, K. G. Kornev, J. Kuppler, S. B. Ruetsch, A. V. Neimark, 4th International Workshop on Characterization of Porous Materials: from Angstrom to Millimeters, Princeton, NJ, USA, June 21-23, 2006.
- 18 - Konstantin Kornev*, Gerardo Callegari, Peter Ravikovitch, Sigrid Ruetsch, V. Rajendran, P. Atanassov, and Alexander Neimark. "Carbon Nanotube Substrates for Biomedical Sensors." *Fiber Society Annual Conference*. Cornell University, Ithaca, New York (October 11-13 2004).
- 19 - Konstantin Kornev*, Gerardo Callegari, Peter Ravikovitch, Sigrid Ruetsch, P. Atanassov, and B. Rajendran. "Carbon Nanotube Substrates for Electrochemical Biomedical Sensors." *78th ACS Colloid and Surface Science Symposium*. New Haven, Connecticut (June 20-23, 2004).
- 20 - Konstantin Kornev*, Gerardo Callegari, and Alexander Neimark. "Capillary Microfluidics for Polymer Solutions." *78th ACS Colloid and Surface Science Symposium*. New Haven, Connecticut (June 20-23, 2004).

21 Gerardo Callegari*, A. Calvo, and J. P. Hulin. "Moving of the Triple Contact Line: A Hydrodynamical or a Molecular Issue?" *Fourth International Symposium on Contact Angle, Wettability, and Adhesion*. Philadelphia, Pennsylvania (June 14-16, 2004).

22 - Konstantin Kornev*, Gerardo Callegari, and Alexander Neimark. "Spontaneous Absorption of Polymer and Biopolymer Solutions by Capillaries: Meniscus Behavior." *Fourth International Symposium on Contact Angle, Wettability, and Adhesion*. Philadelphia, Pennsylvania (June 14-16, 2004).

23 - Konstantin Kornev*, Gerardo Callegari, O. Amosova, and Alexander Neimark. "Capillary Microfluidics for Recognition of DNA Hybrids." *228th ACS National Meeting*. Philadelphia, Pennsylvania (August 22-26, 2004).

24 - Konstantin Kornev*, Gerardo Callegari, and Alexander Neimark. "Interfacial Flows of Viscoelastic Fluids in Micro and Nanofluidics." *XXI International Congress of Theoretical and Applied Mechanics*. Warsaw, Poland (August 15-21, 2004).

25 - Alexander Neimark*, P. Atanassov, Konstantin Kornev, and Gerardo Callegari. "Nanofibrous Supports for Biomedical Sensors." *NIH NIBIB Grantees Meeting*. Bethesda, Maryland (October 28-29, 2004).

26 Konstantin Kornev*, Gerardo Callegari, O. Amosova, and Alexander Neimark. "Capillarity Driven Flows for Recognition of DNA Hybrids." *AICHE Annual Meeting*. Austin, Texas (November 7-12, 2004).

27 Peter Ravikovitch*, Gerardo Callegari, Konstantin Kornev, Alexander Neimark, M. Pasquali, and Sigrid Ruetsch. "Adsorption and Wetting Properties of Carbon Nanotube Fibers and Membranes." *AICHE Annual Meeting*. Austin, Texas (November 7-12, 2004).

28 - Konstantin Kornev*, Gerardo Callegari, V. Rajendran, P. Atanassov, and Alexander Neimark. "Biomedical Sensors Based on Nano-Fibrous Carbonaceous Materials." *AICHE Annual Meeting*. Austin, Texas (November 7-12, 2004).

29 - Alexander Neimark*, Konstantin Kornev, Gerardo Callegari, Peter Ravikovitch, Sigrid Ruetsch, P. Atanassov, and B. Rajendran. "Carbon Nanotube Substrates for Electrochemical Biomedical Sensors." *Materials Research Society Fall Meeting*, Boston, Massachusetts (November 29-December 2, 2004).

30 - "Moving of the Triple Contact Line: a hydrodynamical or a molecular issue?", G. Callegari, A. Calvo, J. P. Hulin, VIII International Seminar on Recent Advances in Fluid Mechanics, Physics of Fluids and Associated Complex Systems, Tandil, Argentine, November 2003

31 - "Comparison between Visco-Gravitational and Inertio-Gravitational Dewetting of Liquid Films", VII International Seminar on Recent Advances in Fluid Mechanics, Physics of Fluids and Associated Complex Systems, Buenos Aires, Argentine, Octubre 2001.

32 - "Experimental study on the dynamic of the dewetting of liquid films", G. Callegari, A. Calvo, Statphys 2001 (Statistical Physics 2001), Cancún, México, 15-21 julio de 2001.

33 - "A simple method for measuring the wetting properties of a system", Callegari, Calvo, Workshop on Surface Science and Porous Media, San Luis, Argentina, noviembre de 2000.

34 - "Modelo semi-empírico que explica la variación de la velocidad de demojado de una película con su espesor", Callegari, Zabala, Calvo, Chertcoff, Hulin, I Congreso de Físicoquímica del Mercosur, Santa Fé, Argentina, abril de 1999.

35 - "Transición de régimen de columnas al de cobertura total", G. Callegari, L. Limat, T. Podgorsky, V Simposio Internacional sobre recientes avances en Mecánica y Física de Fluidos, Tunuyán (Mendoza), noviembre 1997.

36 - "Estudio experimental del demojado en el régimen viscoso", Callegari, Calvo, Chertcoff, Hulin, V Simposio Internacional sobre recientes avances en Mecánica y Física de Fluidos, Tunuyán (Mendoza), noviembre 1997.

37 - "Experimental Study of Dewetting Processes in Capillary Tubes for Finite Viscosity Contrasts", G. Callegari, A. Calvo, R. Chertcoff, C. Wessel, J.P. Hulin, International Workshop on Instabilities and Dewetting of Thin Films, Mulhouse, Francia, diciembre 1996.

38 - "Dispersion Capacity of propagating vortex", S. Gabbanelli, M. Piva, A. Aguirre, G. Callegari, A. Calvo, M. Rosen, J. E. Wesfreid, 5th International Workshop on Instabilities and Non-Equilibrium Structures, Santiago de Chile, Chile, diciembre 1993.

39 - "Mixing Capacity of an axial flow in a cellular structure", M. Piva, S. Gabbanelli, A. Pérez, A. Aguirre, G. Callegari, J. Wesfreid, III Latin-American Workshop on Non-Linear Phenomena, Buenos Aires, Argentina, agosto 1993.

Poster presentations (15)

40 - Gerardo Callegari. "Spontaneous and Electro-Assisted Capillary Flows: A New Route in Microfluidics." *Pan-American Advanced Studies Institutes on Micro Electro Mechanical Systems (MEMS)*, San Carlos de Bariloche, Patagonia, Argentina (June 21-30, 2004).

41 - "Explicación del notable aumento de la velocidad de demojado con el espesor, en películas anulares". Callegari, Calvo, Hulin, 88^a Reunión de la Asociación Física Argentina, S. C. Bariloche – Río Negro, Septiembre 2003.

42 - "Explicación del notable aumento de la velocidad de demojado con el espesor, en películas anulares". Callegari, Calvo, Hulin, 87^a Reunión de la Asociación Física Argentina, Huerta Grande - Córdoba, Octubre 2002.

43 - "Experimental results of dewetting in the visco-gravitational regime", Workshop on Nanocapillarity: Wetting of Heterogeneous Surfaces and Porous Solids, Princeton, NJ, USA, junio de 2001.

44 - "Comparación de la dinámica de demojado de películas líquidas en distintas geometrías simples " XII Congreso Argentino de Fisicoquímica y Química Inorgánica, 23 – 27 abril 2001, San Martín, Neuquén, Argentina.

45 - "Inestabilidad de doblado en el secado de gotas poliméricas", Callegari, Calvo, Allain, Pauchard, 85^a Reunión de la Asociación Física Argentina, Buenos Aires, octubre de 2000.

46 - "Formación y demojado de películas líquidas en geometría plana", G. Callegari, S. Zabala, A. Calvo, R. Chertcoff, J. P. Hulin, 84^a Reunión de la Asociación Física Argentina, Tucumán, octubre 1999.

47 - "Estudio experimental de la influencia del espesor medio en la retracción de películas líquidas", G. Callegari, S. Zabala, A. Calvo, R. Chertcoff, J. P. Hulin, 83^a Reunión de la Asociación Física Argentina, La Plata, octubre 1998.

48 - "Velocidad de demojado de películas en presencia de un líquido en un amplio rango en la relación entre viscosidades". G. Callegari, A. Calvo, R. Chertcoff, J. P. Hulin, 82^a Reunión de la Asociación Física Argentina, San Luis, septiembre 1997.

49 - "Retracción de películas líquidas en geometría cilíndrica", Callegari G, Calvo A, Chertcoff R, Wessel C, Hulin J P, X Congreso Argentino de Fisicoquímica, Tucumán, abril 1997.

50 - "Estudio experimental de la dinámica de demojado en tubos capilares", C. Wessel, G. Callegari, A. Calvo, R. Chertcoff, 81^a Reunión de la Asociación Física Argentina, Tandil, Buenos Aires, septiembre 1996.

51 - "Dependencia del ángulo de contacto con la velocidad de la interfase en un sistema líquido-líquido-sólido", G. Callegari, A. Calvo, R. Chertcoff, M. Rosen, 80^a Reunión de la Asociación Física Argentina, Bariloche, Río Negro, octubre 1995.

52 - "Problemas de interacción fluido-pared en desplazamientos de meniscos en capilares", G. Callegari, C. Wessel, M. Cachile, R. Chertcoff, A. Calvo, IX Congreso Argentino de Fisicoquímica, San Luis, noviembre 1994.

53 - "Desplazamiento de una interfase líquido-líquido en un sistema de mojabilidad parcial", G. Callegari, A. Calvo, R. Chertcoff, M. Rosen, J. P. Hulin, 79^a Reunión de la Asociación Física Argentina, V. Giardino, Córdoba, octubre 1994.

54 - "Dispersión másica en una inestabilidad de Taylor-Couette con flujo axial", M. Piva, S. Gabbanelli, A. Pérez, A. Aguirre, G. Callegari, J. E. Wesfreid, 78^a Reunión de la Asociación Física Argentina, Rosario, Santa Fé, octubre 1993.

STUDENT MENTORING AND SUPERVISION:

- Catherine Qi and Anthony Ribaudó for some projects in TRI/Princeton, 2009-2011.
- John Landers, Graduate student Chemical Engineering, Rutgers University, NJ, 2008-2009.
- Eric Harper, undergraduate student Mechanical Engineering, Lehigh University, PA. Summer internship 2008
- John Kuppler, Undergraduated student from Rutgers University, NJ, June 2005 to Aug. 2006
- Jamar Tyndall, Undergraduated student from Rutgers University, NJ, Feb. to Aug. 2004.
- Chen-Ming Hsu and Shin-Chien Chen, TTRI, China, Sept. 2004 (1 month stay).
- Dr Armando Dominguez, Visiting Scientist Professor UNM, Mexico, Sept. to Dec. 2004.
- Co-Advisor Sandra Zavalla, undergraduate student Buenos Aires University, 1998.

RESEARCH SUPPORT:

During the last 5 years I contributed (here, I'm counting only my part and not the total size of each project) with a total of about \$350,000 in grants from national agencies and about \$500,000 in research and contract work projects obtained from companies. Before that, I worked in several projects including both national agency grants and company sponsored projects.

◆ **Grants from National Agencies:**

- National Institute of Health: "Carbon Nanotube Fibers as Implantable Neural Electrodes", NIH Award 1R01 EB 007467-01, (2007-2010). Extended to 2011. As a scientist, Group Leader.
- National Institute of Health: "Nanofibrous Support for Biomedical Sensors", NIH Award R21 EB 002889-01 (2003-2005). Extended to 2006. As a scientist.
- National Textile Center: "Liquid wetting and flow in Nano-Fibrous Systems", NTC Project M04-CD01 (2004-2007), as a scientist.

◆ **Research Projects, Contract Work and Instrument Projects:**

- Fluid Flow Core Project on "Interaction of fluids with porous materials", 2003 – 2008.
Companies: Procter and Gamble, Kimberly Clark, Svenska Cellulosa Aktiebolaget (SCA, Sweden), Church and Dwight.
 - Model product behavior, development of measuring techniques, assessment of product performance, 2004, 2006, 2010-2011.
Companies: Kimberley Clark, Church and Dwight, Beiersdorf.
 - Electrospinning and characterization of Bombyx muri nanofibers, 2003-2005.
Company: Taiwan Textile Research Institute (TTRI).
 - Mechanical, transport, wetting characterization of materials (liquids in porous material, tissues, products on fibers).
Companies: Johnson and Johnson, Procter and Gamble, Schering-Plough, Energizer, Beiersdorf, Alberto Culver, Freudenberg, Novacomp, SCA, Fluid Dynamic Inc.
 - Equipment manufacture, calibration, installation and troubleshooting, 2010-2011.
Companies: SCA, Procter and Gamble.
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COMPLIMENTARY SKILLS:

Language: Fluent in Spanish (native language) and English. Some knowledge of French.

Software: Proficient in Image Treatment Software like Image J and Optimas. Programming in Matlab, Mathematica, Basic and Fortran. Fluent in MS office applications.

Interpersonal: Natural team player. Trustable and flexible. Positive attitude with people. Facilitate convergence within team.

Training: Supervised students and industrial trainees with a mentor-like attitude.