

JUAN PAULO HINESTROZA, Ph.D.

Department of Fiber Science and Apparel Design

College of Human Ecology

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<http://www.human.cornell.edu/bio/jhinstroza>

EDUCATION

- 2002 **Ph.D. Chemical and Biomolecular Engineering** Tulane University
New Orleans, LA.
- Advisor: Daniel De Kee
Dissertation: Mass Transfer Through Elongated Membranes. Effect of Mechanical deformation on the barrier properties of polymeric materials.
Research funded by the US Department of Defense and Department of Energy
- 1995 **B.Sc. Chemical Engineering** Universidad Industrial de Santander,
Bucaramanga- Colombia
- Honor Thesis: Optimization of the cooling fluids and process water systems of Dow Chemical's polystyrene production units at Cartagena, Colombia.
Thesis funded by The Dow Chemical Company

HONORS

- 2007 SHPE Educator of the Year Award in Higher Education
- 2007 National Science Foundation Early CAREER Development Award
- 2006 National Textile Center Humanitarian Award
- 2005 James D. Watson Young Investigator Award from NYSTAR
- 2001 Omega Chi Epsilon Award- Honor Society Chemical Engineering
- 2001 Tulane University Outstanding Teaching Assistant of the Year.
- 1999 Tulane University Outstanding Teaching Assistant of the Year.
- 1998 Tulane University Outstanding Teaching Assistant of the Year.
- 1998 Graduate Studies Scholarship. Tulane University.
- 1995 Outstanding Honors Thesis of the Year. Universidad Industrial de Santander
- 1994 Undergraduate Thesis Scholarship- The Dow Chemical Company

ACCREDITATION AND MEMBERSHIPS TO PROFESSIONAL SOCIETES

- Member of the American Chemical Society (Since 1999)
 - Symposium Organizer for ACS National Meeting- Cellulose Division 2006 and 2007
- Member of the Society of Rheology (Since 1998)
- Member of the American Institute of Chemical Engineers (Since 1998)
- Member of the Society of Hispanic Professional Engineers (Since 2000)
- Member of the Fiber Society (Since 2003)
- E.I.T. Registered with the Board of Professional Engineers (Since 1997)
- Alpha Gamma Sigma Honor Society (Since 1997)
- Omega Chi Epsilon Honor Society (Since 1998)

PROFESSIONAL EMPLOYMENT

2005-Present	Assistant Professor	Cornell University
2003-2005	Assistant Professor	North Carolina State University
2002-2003	Postdoctoral Fellow	Tulane Institute for Macromolecular Eng. & Sci.
1998-2002	Teaching and Research Assistant	Tulane University
1994-1997	Process Control Engineer	The Dow Chemical Company

INDUSTRIAL EXPERIENCE

- 1994-1997 **THE DOW CHEMICAL COMPANY**
Project and Process Control Engineer
- Programmed process control computers for two polystyrene production units (100,000 tons per year).
 - Represented Latin America as a member of a global team for improvement in areas of polymerization, competitive analysis, and advanced process control strategies for the Polystyrene business.
 - Managed improvement projects for US\$1,250,000 per year at a Polystyrene Production Unit.

ACADEMIC EXPERIENCE

- 2005- Present **CORNELL UNIVERSITY**
Assistant Professor
- **Recipient of the NSF Early CAREER Development Award**
 - **Recipient of the SHPE Educator of the Year Award**
 - **Recipient of the James D. Watson Young Investigator Award from NYSTAR**
 - Awarded over 2.5 MM in external financial support for research in smart textiles and nanotechnology
 - Developed a graduate course on Rheology of Solids
 - Actively involved in interdisciplinary undergraduate research
 - Member of the CCMR Cornell Center for Materials Research
- 2003- 2005 **NORTH CAROLINA STATE UNIVERSITY**
Assistant Professor
- Awarded 2.2MM in external financial support for research in smart textiles and nanotechnology
 - Taught Polymer Engineering (TE/BME 463) and Fiber Science Courses and Labs (TE201/TE201L).
 - Developed web-based interactive learning platforms for TE 463 and TE201 courses using Palm Pilots®.
 - Research advisor for graduate students (5 MS and 3 Ph.D. students)
 - Faculty Advisor for NC State Chapter of the Society of Hispanic Professional Engineers
- 2002- 2003 **TULANE INSTITUTE FOR MACROMOLECULAR ENGINEERING AND SCIENCE**
Postdoctoral Fellow
- Performed research work and applied knowledge of polymer rheology (shear, capillary and optical rheometry) and thermo-mechanical analysis in the characterization of novel macromolecules and nanostructures.

- Planned and supervised graduate students research work in the area of polymer rheology.
- Purchased, installed and operated customized research grade polymer processing equipment.

1998-2001

TULANE UNIVERSITY

Teaching Assistant

- **3-times recipient of the Omega Chi Epsilon Outstanding Teaching Assistant**
- Assisted with teaching activities for three undergraduate courses
- Lectured on the use of process simulation software (ASPEN and HYSIS)
- Managed course information using web based learning platforms.
- Coached undergraduate students for the AIChE Design Competition

1998-2002

TULANE UNIVERSITY

Research Assistant

- **Recipient of the Omega Chi Epsilon Award for Excellence in Academic and Leadership skills in Chemical Engineering**
- Designed, built and tested an apparatus to perform permeation experiments of organic chemicals through elongated polymeric materials.
- Developed a data acquisition algorithm to resolve FTIR spectra in real time.
- Worked in the development of a mathematical model for the permeation of organic compounds through polymeric materials.
- Assisted in the preparation of grant proposals for NSF, DOD, and DOE.

TEACHING EXPERIENCE

2007	FSAD 639	Mechanics of Fibrous Systems
2007	FSAD 616	Rheology of Solids
2007	FSAD 466	Textiles Apparel and Innovation
2006	TXA766	Innovation and Technology in Textiles
2005	BME 463	Polymer Engineering and Science
2004	TE201/201L	Fiber Science and Engineering
2003	TE/BME 463	Polymer Engineering
1998	CENG 431	Process Control For Chemical Engineers
1999	CENG 435	Process Design and Economics
2001	CENG 231	Unit Operations III.

RELATED SKILLS

- Languages: Fluent in English and Spanish
- Programming languages: C++, Java, Fortran, HTML
- Scientific Computing: Mathematica, Mathcad, Matlab, Femlab, GRAMS, LabVIEW, Abaqus- Patran (Finite Element Analysis), HYSYS and Fluent®
- Advanced operation, method development for AFM, Dielectric Spectrometers, FTIR, GC, Rheometers and thermo-mechanical analysis instrumentation (DSC, TGA, TMA, DMA)
- Advanced operation and troubleshooting of polymer processing equipment such extrusion, injection molding, microcellular foam extrusion and compression molding.

Scientific Publications

Selected Refereed Journal Publications

1. Wang, D., Sun, G., Chiou, B-S, Hinestroza, J., Controllable Fabrication and Properties of Polypropylene Nanofibers, *Polymer Eng. & Sci.*, 47,11, 1865-1872 (2007)
2. Bellan, L., Craighead, H., Hinestroza, J.P., Direct measurement of fluid velocity in an electrospinning jet using particle image velocimetry, *Journal of Applied Physics*, 102, 10, 1-6 (2007)
3. Hyde, G. K.; Park, K. J.; Stewart, S. M.; Hinestroza, J. P.; Parsons, G. N., Atomic Layer Deposition of Conformal Inorganic Nanoscale Coatings on Three-Dimensional Natural Fiber Systems: Effect of Surface Topology on Film Growth Characteristics (2007) *Langmuir*, 23, 9844 - 9849
4. Jasper, W., Mohan, A., Hinestroza, J., Barker, R., Degradation Processes in Corona-Charged Electret Filter-Media with Exposure to Ethyl Benzene (2007) *Journal of Engineered Fibers and Fabrics*, 2,4, 19-24
5. Hyde, K. Dong, H., Hinestroza, J. Effect of surface cationization on the conformal deposition of polyelectrolytes over cotton fibers, (2007), *Cellulose*, 14, 6, 615-623
6. Kim, J., Jasper, W., Hinestroza, J. (2007) Probing Solvent-Induced Charge Degradation in Electret Fibers via Electrostatic Force Microscopy, *Journal of Microscopy*, 20,1-8
7. Kim, J., Jasper, W. Hinestroza, J. (2006) Charge Characterization Of An Electrically Charged Fiber Via Electrostatic Force Microscopy. *Journal of Engineered Fibers and Fabrics*, 1,2, 30-46
8. Jasper, W., Hinestroza, J., Mohan, A., Kim, J., Shiels, B., Gunay, M., Thompson, D., & Barker, R. (2006). Effect of xylene exposure on the performance of electret filter media. *Journal of aerosol science*, 37(7), 903-911.
9. Jasper, W., Hinestroza, J., Mohan, A., Thompson, D., Barker, R. (2005). Effect of phase of toluene on filtration performance of electret filter media against di-octyl-phthalate aerosols. *Journal of the International Society for Respiratory Protection* ,22, 97-105
10. Hyde, K., Rusa, M., Hinestroza, J.P. Electrostatic Self-assembly of polyelectrolytes on natural fibers: Cotton. *Nanotechnology*, 16 S422-S428 (2005)
11. Puri, P. Hinestroza, J.P. De Kee, D. Transport of small molecules through mechanically elongated polymeric membranes. *Journal of Applied Polymer Science*, 96 ,1200-1203 (2005).
12. Hinestroza, J. P., De Kee, D. "Barrier properties of LLDPE geomembranes under mechanical deformation", *Journal of Environmental Engineering* , 12, 1468-1474(2004)
13. Qian, L., Hinestroza, J.P. Application of nanotechnology for high performance textiles. *Journal of Textile and Apparel, Technology and Management* , 4 (4), (2004)
14. Hinestroza, J. P., Papadopoulos, K.D. "Using Spreadsheets and Visual Basic Applications as Teaching Aids for a Unit Operations Course", *Chemical Engineering Education*,37,316-320 (2003)
15. Hinestroza, J.P., De Kee, Daniel; Pintauro, Peter N. Apparatus for Studying the Effect of Mechanical Deformation on the Permeation of Organics through Polymeric Films. *Industrial & Engineering Chemistry Research* (2001), 40(9), 2183-2187.
16. De Kee, D., Fong, C. F. Chan Man, Pintauro, P., Hinestroza, J.P., Yuan, G. Burczyk, A., Effect of temperature and elongation on the liquid diffusion and permeation characteristics of natural rubber, nitrile rubber, and bromobutyl rubber. *Journal of Applied Polymer Science* (2000), 78(6), 1250-1255.
17. Lambert, C., Vincent, M., Hinestroza, J.P., Sun, N., Gonzalez, R. Activity and selectivity of a Pd/g-Al₂O₃ catalytic membrane in the partial hydrogenation of acetylene. *Studies in Surface Science and Catalysis* (2000), 130C, 2687-2692.

Chapters in books

1. Hyde, G.K., Hinestroza, J. (2006) Multilayered films via Electrostatic Self-Assembly: A novel approach to fiber functionalization. In P. Brown(Ed), Handbook of nanofiber and nanotechnology in textiles. (2007); Woodhead Publishing
2. Barera, C., Rinaldi, C., Satcher, M., Hinestroza, J. Electrospun Nanofibers with Magnetic Domains for Smart Tagging of Textile Products, Handbook of Nanoscience, Engineering, and Technology, Second Edition (2007); Taylor and Francis Publishing
3. De Kee, D., Hinestroza, J., Liu, Q. (2005). Non-Fickian diffusion in systems with complex interfaces. In P. Chen (Ed.), Molecular interfacial phenomena of polymers and biopolymers. (pp. 23-36). Abington Hall, Abington, Cambridge, CB1 6AH, England : Woodhead Publishing Limited

RESEARCH RECORD

Cornell University (2.5 Million)

MODELING OF FLOW CONTAINING NANOPARTICLES THROUGH ELECTROSTATICALLY CHARGED MONOLITH FILTERS

PI: J. Hinestroza
Source of Funds: US Defense Threat Reduction Agency
Amount Funded: \$ 359,998
Starting Date: December 2007
Ending Date: September 2010

MANIPULATION OF NANOSCALE PHENOMENA AS A CLEAN AVENUE FOR THE PRODUCTION OF SMART AND MULTIFUNCTIONAL TEXTILES: A COLLABORATIVE ENDEAVOR OF CORNELL UNIVERSITY AND HONG KONG POLYTECHNIC UNIVERSITY

PI: J. Hinestroza
Source of Funds: Lehman Fund for Scholarly Exchange with China
Amount Funded: \$ 20,000
Starting Date: Jan 2008
Ending Date: December 2008

METAL-ORGANIC POLYHEDRA BLENDED FIBERS FOR ADVANCED FILTRATION AND PERSONAL PROTECTION

PI: J. Hinestroza
Source of Funds: US Defense Threat Reduction Agency
Amount Funded: \$756,114
Starting Date: January 2008
Ending Date: December 2011

LIGNOCELLULOSICS AS PRECURSORS OF HIGH PERFORMANCE BIOPOLYMER STRUCTURES

PI: J. Hinestroza, O. Rojas, J. Kadhla
Source of Funds: US Department of Agriculture- National Research Initiative
Amount Funded: \$435,000

Starting Date: July 2007
Ending Date: June 2012

ENGINEERING PHYSIOLOGICAL DISTRIBUTIONS OF ZONE-SPECIFIC PHENOTYPE AND FIBER ORIENTATION IN 3-D TISSUE-ENGINEERED CARTILAGE SCAFFOLDS

PI: B. Kirby., J. Hinestroza, M. Frey
Source of Funds: Morgan Family Tissue Engineering Fund
Amount Funded: \$ 115,000
Starting Date: September 2007
Ending Date: December 2008

CAREER: EXPLORING THE USE OF INDUCED NEGATIVE VISCOSITIES AS A NEW DEGREE OF FREEDOM IN POLYMER NANOMANUFACTURING

PI: J. Hinestroza
Source of Funds: National Science Foundation
Amount Funded: \$400,000
Starting Date: July 2007
Ending Date: June 2011

FUNCTIONALIZED NANOFIBERS FOR HIGH PERFORMANCE FILTRATION OF CONTAMINANTS, BIOLOGICAL AGENTS AND HAZARDOUS MATERIALS

PIs: J. Hinestroza
Source of Funds: NY State Office of Science, Technology and Academic Research
Amount Funded: \$200,000
Starting Date: February 2006
Ending Date: January 2008

NER/COLLABORATIVE RESEARCH: MANIPULATION OF THE ELECTROSPINNING OF POLYMER FIBERS USING APPLIED MAGNETIC FIELDS

PIs: J. Hinestroza
Source of Funds: National Science Foundation
Amount Funded: \$55,999 (Includes a \$6,000 REU supplement)
Starting Date: February 2006
Ending Date: February 2007

NANOLAYER SELF-ASSEMBLIES: NOVEL, ADAPTABLE FIBER SURFACES

PIs: J. Hinestroza, P. Hauser
Source of Funds: National Textile Center
Amount Funded: \$163,500
Starting Date: May 2006
Ending Date: May 2007

BOUNDARY LAYER AND SELF-ASSEMBLY IN FIBER PROCESSING

PIs: O. Rojas, J. Hinestroza, W. Krause

Source of Funds: National Textile Center
Amount Funded: \$95,756
Starting Date: May 2006
Ending Date: May 2007

NC State University (\$ 2.1 Million)

SMART TEXTILES VIA SELF-ASSEMBLED NANOLAYERS AND ATOMIC LAYER DEPOSITION

PIs: J. Hinestroza, G. Parsons
Source of Funds: NCSU Nanotechnology Steering Committee
Amount Funded: \$50,000
Starting Date: July 2005
Ending Date: June 2006

BIODEGRADABLE NANORODS FOR HIGH-PERFORMANCE MULTIFUNCTIONAL NANOCOMPOSITES

PIs: O. Rojas, J. Hinestroza, J. Genzer
Source of Funds: NCSU Nanotechnology Steering Committee
Amount Funded: \$50,000
Starting Date: July 2005
Ending Date: June 2006

DEBOTTLENECKING THE ELECTROSPINNING PROCESS

PIs: J. Hinestroza, C. Rinaldi
Source of Funds: Institute of Textile Technology
Amount Funded: \$45,000
Starting Date: March 2005
Ending Date: May 2006

BOUNDARY LAYER AND SELF-ASSEMBLY IN FIBER PROCESSING

PIs: O. Rojas, J. Hinestroza, W. Krause
Source of Funds: National Textile Center
Amount Funded: \$158,000
Starting Date: May 2005
Ending Date: May 2006

HIGH MODULUS ALIPHATIC NYLON FIBERS

PIs: R. Kotek, A. Tonelli, J. Hinestroza
Source of Funds: National Textile Center
Amount Funded: \$152,000
Starting Date: May 2005
Ending Date: May 2006

MECHANICAL PROPERTIES OF INDIVIDUAL NANOFIBERS

PIs: J. Hinestroza

Source of Funds: Nonwovens Cooperative Research Center

Amount Funded: \$120,000

Starting Date: August 2004

Ending Date: August 2006

NANOTECHNOLOGY IN TEXTILES

PIs: J. Hinestroza, W. Krause

Source of Funds: Department of Energy/ Oak Ridge National Laboratory

Amount Funded: User Grant- Access to CNMS Instrumentation

Starting Date: December 2003

Ending Date: October 2005

LIGHT WEIGHT CBRN PROTECTIVE FIRE FIGHTER TURNOUT

PIs: R. L. Barker, D. Thompson, J. Hinestroza, B. Pourdeyhimi

Source of Funds: Department of Homeland Security/ Technical Support Working Group

Amount Funded: \$836,217

Starting Date: January, 2004

Ending Date: June, 2005

INVESTIGATION OF FILTER DEGRADATION PROCESSES FOR RESPIRATORY PROTECTIVE SYSTEMS AND DEVELOPMENT OF MODELS FOR SYSTEM FUNCTION AND DETERIORATION

PIs: W. Jasper, R. Grimes, J. Hinestroza, R. L. Barker, D. Thompson

Source of Funds: NIOSH, CDC

Amount Funded: \$497,322

Starting Date: May 2003

Ending Date: June 2005

ELECTROSPUN MAGNETIC NANOFIBERS

PIs: J. Hinestroza

Source of Funds: NCSU Faculty Research and Professional Development Fund

Amount Funded: \$8,000

Starting Date: March 2004

Ending Date: March 2005

SELECTIVE MEMBRANES FOR THE SEPARATION OF BIOETHANOL FROM PLANT BIOMASS

PIs: R. Sharma and J. Hinestroza

Source of Funds: NCSU Faculty Research and Professional Development Fund

Amount Funded: \$20,000

Starting Date: May 2004

Ending Date: May 2005

TEXTILE ENGINEERING EDUCATION AND RESEARCH IN CENTRAL AMERICA

PIs: J. Hinestroza

Source of Funds: NCSU Office of International Affairs
Amount Funded: \$5,000
Starting Date May 2004
Ending Date July 2005

DEPOSITION OF FUNCTIONAL NANOLAYERS OVER TEXTILE FIBERS

PIs: J. Hinestroza
Source of Funds: Institute of Textile Technology
Amount Funded: \$45,000
Starting Date May 2004
Ending Date May 2005

SYNTHESIS OF FUNCTIONALIZED POLYMERIC RESINS WITH A REACTIVE AMINO GROUPS

PIs: R. Kotek, J. Hinestroza and H. Freeman
Source of Funds: American Red Cross and PRD Technologies, Inc
Amount Funded: \$107,000
Starting Date May 2004
Ending Date July 2005

GRADUATE STUDENT ADVISING RECORD

Ph.D. Students

Jooyoun Kim

Investigation on Charge Deterioration of Electrically Charged Filter Media Using Electric Force Microscopy
NC State University (2005)
Current position: Senior Researcher 3M Corporation

Vivian Lee

Probing Friction at the Nanoscale using Lateral Force Microscopy
Cornell University (Expected 2008)

Christina Diaz

Deposition of Self-Assembled Nanolayers over Natural Fibers
Cornell University (Expected 2010)

M.Sc. Students

Karmann Mills

Electrospinning of Rigid Polymers via Manipulation of their Viscoelasticity
Cornell University (Expected 2008)

Timothy Price

Effect of Mechanical Deformation on the Barrier Properties of Protective Clothing
NC State University (2006)
Current position: Improvement Engineer at Milliken and Company

Bilge Hatiboglu

Structure property relationships in micro and nanofibers
NC State University (2006)
Current position: Doctoral student at Georgia Institute of Technology

Melinda Satcher

De-bottlenecking the Electrospinning Process Using Superparamagnetic Particles.
NC State University (2006)
Current position: Improvement Engineer at Milliken and Company

Kevin Hyde

Electrostatic Self-assembled Nanolayers on Textile Fibers.
NC State University (2005)
Current position: Doctoral student at NC State University

Brian Shiels

Evaluation of Chemical Protective Clothing Materials under Mechanical Deformation.
NC State University (2005)
Current position: Research Associate at the TPACC Center at NC State University

Member of Graduate Committees

Ph.D. Students

Chunhui Xiang

Controlled Release of Pesticides using Nanofiber Based Assemblies
Fiber Science
Cornell University (Expected 2008)

Hongyi Liu

Probing friction at the nanoscale using molecular dynamics simulations
Fiber and Polymer Science
NC State University (Expected 2008)

Kevin Hyde

Atomic Layer Deposition of Inorganic Layers over Natural Fibers
Chemical and Biomolecular Engineering
NC State University (Expected 2008)

David Frankowsky

Formation of Organic-Inorganic Nano/Microcomposites using Environmentally Benign Solvents
Chemical and Biomolecular Engineering
NC State University (2006)
Currently Position: Research Engineer at The Dow Chemical Company

Nikhil Dani

The Fundamentals of Air-jet Texturing
Fiber and Polymer Science
NC State University (2004)
Current Position: Research Engineer at Clorox Corporation

M.Sc. Students

Joshua Manasco

Melt electrospinning of PAN and PCL
Chemical and Biomolecular Engineering
NC State University (Expected 2008)

Sachin Talwar

Hydrophobically Modified Associative Polymers: Solution Rheology and Electrospun nanofibers
Chemical and Biomolecular Engineering
NC State University (Expected 2008)

Shawn Hutchinson

Thermoplastic polyacrylonitrile: investigations of polymer structure, melt behavior and fiber properties
Textile Engineering
NC State University (2005)

Jyotsna Vedula

Reorganization of structure to alter the properties of polyethylene terephthalate
Textile Engineering
NC State University (2004)

Undergraduate Researchers

Cornell University

2007

Naomi Birbach
Selina Lok
Juan Uribe
Hekia Bodwitch

2006

Michael Crouch
Jimmy Zhou
Elizabeth Franzen

NC State University

2003-2005

Christina Diaz	Graduate Student at Cornell University
Michael Crouch	Graduate Student at Stanford University
Troy Gould	
William McGuire	
Mary Rebovich	Graduate Student at Cornell University
Amika Olchovick	Graduate Student at Duke University
Errol Purkett	
Jordan Massey	Graduate Student at University of Texas

Other Activities

Reviewer of peer-reviewed publications:

Nanotechnology
Journal of Engineered Fibers and Fabrics
AIChE Journal
Journal of Biomaterials: PartB: Polymers
Journal of the Textile Institute
Journal of Polymer Science: PartB: Polymer Physics
Current Opinions in Colloidal Science
Chemistry of Materials
Colloids and Surfaces A: Physicochemical and Engineering Aspects

Reviewer of proposals:

National Science Foundation
U.S. Department of Agriculture
U.S. Civilian Research and Development Foundation
U.S. Department of Defense
U.S. Army Research Office