

The Fiber Society

Fall 2002 Annual Technical Conference October 16-18, 2002

Natick Crowne Plaza
Natick, Massachusetts

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U.S. Army Soldier Systems Center

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The Fiber Society

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North Carolina State University
2401 Research Drive
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Organized by:

U.S. Army Soldier Systems Center
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Tuesday October 15, 2002

7 - 9 pm REGISTRATION
7:30 Reception

Wednesday Oct 16, 2002

7:00 REGISTRATION
Pick-up Breakfast

7:45 OPENING REMARKS

Polymers and Processing

Chair: Greg Rutledge, MIT

8:00 Morphological and Orientation Effects on the Optical and Electronic Properties of Conjugated Electroactive Organic Polymeric Fibers

Richard V. Gregory

8:30 Molecular Simulation of Polymer Crystallization: Growth Kinetics

Numan Waheed, Min Jae Ko, Gregory C. Rutledge

9:00 Physical Properties and Morphology of Polypropylene/Nylon 6 Alloy Filaments

B. S. Gupta, R. Koteck, M. Afshari

9:30 Lewis Acid Complexation of Nylon 66 and Effect of Hydrogen Bonding on Film Drawability

Richard Koteck, Dong Wook Jung, Alan E. Tonelli

10:00 BREAK

10:15 Determination of the Orientation Parameters and the Raman Tensor of the 998 cm⁻¹ Band of Poly(ethylene Terephthalate)

Shuying Yang and Stephen Michielsen

10:45 Numerical Simulation of Hydroentangling Orifice Flow

H. Vahedi Tafreshi, B. Pourdeyhimi

11:15 A Blending of Thai Hybrid Silk Wastes and Cotton in The Cotton's Spinning System

R. Chollakup, A. Sinoimeri, J. Y. Dréan

11:45 CLOSING REMARKS

12 - 1:30 LUNCH

Fiber and Fabric Treatments

Chair: Memis Acar, Loughborough University

1:45 Plasma Deposition of a Durable, Water Repellent Coating on Aramid Fabric

D. Tessier, M. Filteau

2:15 Evaluating Single-Use Operating Room Gowns: The Influence of the Sterilisation using Different Doses of Ionising Irradiation

L. Schacher, D.C. Adolphe, M.J. Abreu, M.E. Cabeço-Silva

2:45 Antibacterial Activity of Polyamide Fabrics

D. Saihi, A. El-Achari, A. Ghenaïm, C. Caze

3:15 Optimisation of Textile Applications in Hospitals

Lucas, J.M., Miguel, R.A.L., Gomes, J.F., Ribeiro, A., Mendes, C.

3:45 BREAK

4:00-4:45 STUDENT PRESENTATIONS (3)

5:15 ANNUAL MEMBERSHIP BUSINESS MEETING

6:00-8:00 POSTER SESSION

Thursday Oct 17 Session A

- 7:00 REGISTRATION
Pick Up Breakfast
- Fiber and Fabric Mechanics**
Chair: Richard Farris, University of Massachusetts
- 8:00 False Twist Induced Loss of Yarn Tenacity
Urs Meyer
- 8:30 Omnidirectional Measurement of the Compliance of Woven Fabrics
Claudio Caccia
- 9:00 Fiber-to-Fiber Load Transfer in the Extension of Twisted Yarns
Thomas A. Godfrey, John N. Rossettos, Sinan Müftü
- 9:30 Strain Sensitivity of Polypyrrole-coated Fabrics under Unidirectional Tensile Deformation
M.Y. Leung, X.M. Tao, M.C.W. Yuen
- 10:00 BREAK
- 10:15 Resistance of Staple Yarns to Dynamic Loading
Maria Cybulska
- 10:45 Characterization of the Mendability of Carpet Backing Fabrics
Mary Lynn Realf, Anneil Basnandan, Lindsay Evens, Matthew Realf
- 11:15 Modeling the Impact Behavior of High-Strength Fabric Structure
Yiping Duan, Michael Keefe, Travis Bogetti, Bryan Cheesman
- 11:45 CLOSING REMARKS
- 12-1:30 LUNCH
- Protective Clothing**
Chair: Don Rivin, U.S. Army Soldier Systems Center
- 1:45 Predicting Performance of Protective Clothing Systems
Jim Barry, Roger Hill
- 2:15 Improving the Properties of Protective Clothing by Exposing Nanofiber Webs to a One Atmosphere Uniform Glow Discharge Plasma (OAugDP)
Peter P. Tsai and J. Reece Roth
- 2:45 Heat Resistance and Flammability of High Performance Fibers for Protective Clothing (Virgin Fibers and Blends of High Performance and Natural Fibers).
Xavier Flambard, Serge Bourbigot, Manuela Ferreira, Bernard Vermeulen
- 3:15 Evolutionary Design of Barriers and Filters Using Genetic Intelligence
E. Unsal, P. Schwartz and G. Dozier
- 3:45 BREAK
- Comfort Factors**
Chair: Behnam Pourdeyhimi North Carolina State University
- 4:00 Experimental Analysis on Thermal Insulation and Thermal Contact Properties of Animal Furs with Biomimetic Objectives
Lubos Hes
- 4:30 Comfort, Muscle Tension & UV Protection
Malgorzata Zimmiewska, Ryszard Kozlowski, Michal Rawluk
- 5:00 Water Vapor Permeability of Hydrophilic Polyurethane Membrane With Melting Point as Switch Temperature
X. M. Ding, J. L. Hu, C. P. Hu, X. M. Tao
- 5:30 ADJOURN
6:30 RECEPTION
7-9 PM BANQUET

Thursday Oct 17 Session B

- 7:00 REGISTRATION
Pick Up Breakfast
- Nanofibers and Electrospinning**
Chair: You-Lo Hsieh, University of California Davis
- 8:00 Functionalized Nanofibers by Electrospinning.
Andreas Greiner
- 8:30 Numerical Modeling of an Electrostatically Driven Liquid Meniscus in the Cone-jet Mode
Bakhtier Farouk, Fang Yan, Frank Ko
- 9:00 Electrospun Molecular Sieve and Composite Fibers
Kenneth J. Balkus, Jr., Sudha Madhugri, John P. Ferraris
- 9:30 Electrospinning of Poly(Vinyl Alcohol), Copolymers, and Derivatives
E.R. Kenawy, L. Yao, J. Layman, E. Sanders, R. Kloefkorn, G. L. Bowlin, D. G. Simpson, G. E. Wnek
- 10:00 BREAK
- 10:15 Evaluation of Pore Structure Characteristics of Nanofiber Nonwovens
Akshaya Jena and Krishna Gupta
- 10:45 Electrospinning of Nylons, Poly(ethylene terephthalate) and Their Blends
Kevin M. Kit, Sudhakar Jagannathan
- 11:15 Carbon Nanotube Based Nanocomposite Fibrils by Electrospinning
Frank K. Ko, Ashraf Ali, Yury Gogotsi, Guoliang Yang, Christopher Li
- 11:45 CLOSING REMARKS
- 12-1:30 LUNCH
- Nanofibers and Electrospinning**
Chair: Julie Chen University of Massachusetts Lowell
- 1:45 Liquid Interactions in Electrospun Fibrous Membranes - Effects of Electrospinning and Chemical Reactions.
You-Lo Hsieh
- 2:15 Micromorphology Characterization of Electrospun Nanofiber Webs Using Multi-fractals and Random Functions
Jooyong Kim, Sung Weon Byun, Hyungsup Kim, Dae Young Lim
- 2:45 Studies on the Internal Structure of Nanofibers
R. Dersch, Taiqi Liu, A. K. Schaper, A. Greiner, J.H. Wendorff
- 3:15 Characterization of conducting polymer nanofibers prepared via electrospinning
N.J. Pinto, Y.X. Zhou, M. Freitag, A.T. Johnson, A.G. MacDiarmid
- 3:45 BREAK
- 4:00 Polycarbonate Fibers by Electrospinning and Ceramic Coating on Nano-Fibers for Photovoltaic Cells.
Jamila Shawon, Christopher Drew, Changmo Sung
- 4:30 Unique Micro and Nanostructured Morphologies on Electrospun Materials
JS Stephens, CL, Casper, JF Rabolt
- 5:00 Electrospun Polymer and Polymer/Clay Carbon Nanotube Composite Fibers
Kenneth J. Balkus, Jr., Sudha Madhugri, Raluca Matea, John P. Ferraris, Alan Dalton, Arnavar Zhakidov
- 5:30 ADJOURN
6:30 RECEPTION
7-9 PM BANQUET

FRIDAY Oct 18 Session A

Fiber/Film Composites

Chair: Joey Mead

University of Massachusetts Lowell

- 8:00** A Stochastic Simulation of Interfacial Failure in Fiber Reinforced Polymer Composites
Wen Zhong and Ning Pan
- 8:30** Hot Compaction of PET Fibers: Influence of Processing on Crystallinity and Mechanical Properties.
P. Rojanapitayakorn, P. T. Mather, R. A. Weiss, A. J. Goldberg
- 9:00** Nanoclay Modified Dyeable Polypropylene
Qinguo Fan, Samuel C. Ugbolue, Alton R. Wilson, Yassir S. Dar, Yiqi Yang
- 9:30** Size Reduction of Clay Particles For Nanocomposite Polypropylene
Gopinath Mani, Qinguo Fan, Samuel C. Ugbolue, Isabelle M. Eiff

10:00 BREAK

Innovative Applications

Chair: Tom Godfrey

U.S. Army Soldier Systems Center

- 10:15** Air Particulate Filtration Through Parallel Fiber Alignment
Kyung-Ju Choi
- 10:45** Image Processing Technology in Textile Applications
B.K. Behera
- 11:15** Innovative Assembly- Future Clothing Fabrication Processes
Steve Szczesuil, Steven Paquette, Brian Corner, Peng Li
- 11:45** Melt Blown and Spunbond Thermoplastic Polyurethanes for Elastic Military Protective Chemical Liners and for Other Possible Military Applications
Larry C. Wadsworth, Youn Eung Lee, Heidi L. Schreuder-Gibson, Phillip W. Gibson

12:15 CLOSING REMARKS

FRIDAY Oct 18 Session B

Nanofibers and Electrospinning

Chair: Steve Warner

University of Massachusetts Dartmouth

- 8:00** Physics of Electrostatic Production of Nanofibers (Electrospinning)
S. V. Fridrikh, J. H. Yu, M. P. Brenner, G. C. Rutledge
- 8:30** Ultrafine Fibers from Electrostatic Solution Spinning
Veli E. Kalayci, Prabir K. Patra, Samuel C. Ugbolue, Yong K. Kim, Steven B. Warner
- 9:00** Fibers and Films of Polyacrylonitrile Acrylic Acid Copolymers
M.M. Demira, A. V. Mironovb, A. R. Khokhlovb, B. Ermana
- 9:30** Viscosity Effect on Fiber Morphology in Highly Filled Fibers
Christopher Drew, Jamila Shawon, Xianyan Wang, Lynne Samuelson, Jayant Kumar

10:00 BREAK

- 10:15** Novel Bonding Process for CBW Protective Electrospun Fabric Laminates
John D. Lennhoff, Poonam Narula, Karen Jayne, Heidi Schreuder-Gibson, Phillip Gibson
- 10:45** Combination of Electrospinning and Electrostatic Layer-by-Layer Self Assembly: A New Strategy for Sensor Fabrication
Xianyan Wang, Young-Gi Kim, Christopher Drew, Bon-Cheol Ku, Jayant Kumar, Lynne A. Samuelson
- 11:15** Quality Control in Manufacturing of Electrospun Nanofiber Composites
Dmitry M. Luzhansky
- 11:45** Control of the Morphology and Orientation of Electrospun Nano-Fibers
Samira Farboodmanesh, Julie Chen, Navin Bunyan, Kari Stevens

12:15 CLOSING REMARKS

Poster Presentations

6:00-8:00 Wednesday, 16 October

1. Woven fabric engineering using artificial intelligence
B.K.Behera and S.B.Muttagi
2. Effect of Planar Conduction of Moisture on Measured Water Vapour Permeability of Thin Woven Fabrics
Lubos Hes
3. Manipulation of Nylon 6 Crystal Structures with Molecular Nanotubes
Min Wei and Alan E. Tonelli
4. The Description and Properties of Medical Textiles
Nurhan Onar
5. Electrospinning of conducting fibers from iodine doped polyisoprene
Zhaohui Sun, Darrell H. Reneker, Liming Dai, Jingli Xu
6. Protective Textiles: Permethrin Treated Camouflage Uniforms
Bartley McNally
7. The Role of Baffles in Fiber Dispersion in Mixing Tanks
H. Vahedi Tafreshi and Behnam Pourdeyhimi
8. Physician's Attitudes Toward the Utilization of Smart Fabrics in Cybermedicine
Ella Carter
9. Mechanical Properties of Electrostatically Spun, Nonwoven Fiber Membranes
A. Pedicini and R.J. Farris
10. Fatigue Behavior of Nylon Industrial Yarns
Rodney Averett, Mary Lynn Realf and Stephen Michielsen
11. Dry-jet Wet Spinning of Fire Safe Polymers Poly(hydroxy amide) and Poly(methoxy amide)
Eui-Sang Yoo, E. Bryan Coughlin and Richard J. Farris
12. Biodegradable/Bioresorbable Scaffolding for the Re-Growth of Bone Tissue Developed from Electrospun Fibers 28
S. Iadarola, A. Crugnola, R. Joshi, J. Tessier, B. Kang, S. Farboodmanesh, C. Sung
13. Tridimensional Fabrics for Smart Textiles
Miguel, R.A.L., Lucas, J.M., Manich, A.M., Carvalho, J.
14. Molecular Simulation of Polymer Crystallization: Nucleation from Pre-oriented Melt
Min Jae Ko, Numan Waheed, Marc S. Lavine, Gregory C. Rutledge
15. Crucial parameters for electrospun polymer nanofibers
Zeng Jun, Michael Bognitzki, Haoqing Hou, J. H. Wendorff, Andreas Greiner
16. Water vapor transfer through textile under a temperature and humidity gradient
Nefzi Nada, Ben Nasrallah Sassi
17. Fabric Softness Classification Using Surface Fiber Profiles: Fuzzy Logic Approach
Eun Ae Kim, Dong Ock Kim, Shin Jung Yoo and Jooyong Kim
18. Electrospinning Biocompatible Polymer Nanofibers
Woraphon Kataphinan, Darrell Reneker, Daniel Smith
19. Poly(meta-phenylene isophthalamide) nanofiber templates for nanotube synthesis
Wenxia Liu, Edward A. Evans, Darrell H. Reneker and Brian J. Satola
20. Electrospinning of Molten Polycaprolactone in Air
Ratthapol Rangkupan and Darrell H. Reneker
21. Prediction of electrospinning jet diameter via interference colors
Han Xu, Daniel Galehouse, Darrell Reneker
22. Surface Modification of Natural Fibres by Using β -Cyclodextrin Derivative
Bojana Voncina, Nataša Majcen, Alenka Majcen le Marechal
23. Use of Electrospun Nanofibers for Aerosol Filtration In Textile Structures
Heidi Schreuder-Gibson and Phil Gibson
24. Temperature-Dependent Water Vapor Diffusion Through Shape-Memory Polymer Laminates: Comparison with Other Waterproof-Breathable Laminates
Phil Gibson
25. Application of Electrospinning to the Reinforcement and Fabrication of Gossamer Space Structures
Kevin White, John Lennhoff, Edward Salley, Karen Jayne
26. Comfort Properties of Textiles as a Function of Treatment
Majda Sfiligoj Smole, Bojana Voncina, Kristina Stakne, Karin Stana Kleinschek, Jelka Geršak
27. Making Matrix-Free Spectra Fiber Reinforced Composites
Tao Xu
28. Effect of Fabric Construction on Mechanical Behavior of Fabric Reinforced Rubber
Samira Farboodmanesh, Julie Chen, Kari Stevens, and Joey Mead
29. Treatment of Cotton Fibers with Purified Cellulases
Anand P. Kanchagar and J. Nolan Eppers
30. Preparations of the Nanostructured TiO₂/Ethylene Glycol (EG) Colloid Solutions as a Precursor for the In Situ Polymerization of PET
I-Shou Tsai, Pen-Yi Liao, Yi-Chun Yeh, Rong -Fuh Louh, Jeng-Yue Wu, Tung-Ying Kuo
31. Structure and Transport Properties in Electrospun Butyl Rubber Membranes
Nantiya Viriyabanthorn, Jamila Shawon, Joey L. Mead, and Ross G. Stacer
32. Characterization of Beaded PU Nanofibers Deposited on Electrospun PET Nonwovens
Hak Yong Kim, Myung Seob Khil, Min Sub Kim, Dong Il C Cha and Kwan Woo Kim
33. A Study on Electrospun Poly(vinyl acetate) Nonwovens
Hak Yong Kim, Keun Hyung Lee, Kyung Ju Choi, Bong Souk Lee, Douk Rae Lee
34. Electrospun Hybrid Nanofibers of Alumina-Boria-Silica
Hak Yong Kim, Hongqin Dai, Jian Gong, Douk Rae Lee
35. Carbon Nanofibers Hybridized with Palladium Nanoparticles Produced by Electrospinning
Haoqing Hou and Darrell H. Reneker, Andreas Greiner and Joachim H. Wendorff
36. Melt Electrospinning of Thermoplastic Polymers
Jason Lyons, Frank Ko, Amotz Geshury
37. Hand Value by Wet Cleaning of Wool Fabric
Yoshihiro Yamashita, Hiroshi Okaji and Akira Tanaka
38. Absorption of Fluids by Fibrous Substrates and Nanofiber Webs
Konstantin G. Kornev, Alexander V. Bazilevsky, Aleksey N. Rozhkov, and Alexander V. Neimark