The Fiber Society Fall Meeting and Technical Conference 2012

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The Fiber Society
P.O. Box 40565
Raleigh, NC, 27629-0565
USA

Phone: (919) 515-6568
Fax: (919) 515-3733

pam.fibersociety@gmail.com

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Wednesday, November 7

8:00 Registration and Continental Breakfast
8:40 Welcoming Remarks and Announcements *Gregory Rutledge, Stephen Eichhorn, Co-chairs*
Cheryl Gomes, Co-chair and President, Fiber Society

Morning Session

9:00	**Keynote Speaker: Ray H. Baughman, University of Texas at Dallas, USA** ***High-Performance, Electrolyte-Free Torsional and Tensile Carbon Nanotube Hybrid Muscles*** 1 **(Room 104A)**

9:40	***Break (Room 102A)***

	Room 104A	**Room 104C**
	Session: Carbon Fibers and Composites ***Gregory Rutledge, Chair***	**Session: Thermal and Spectroscopic Properties** ***Janice Gerde, Chair***
10:00	*Use of Raman Spectroscopy to Resolve Analysis of Structure of Graphene-Coated Fibers* 9 Ian R. Hardin and Susan Wilson, University of Georgia	*Atomic Force Microscope-Based Infrared Spectroscopy of Single Fibers* 31 Michael Lo[1], Qichi Hu[1], Curtis Marcott[2], Craig Prater[1], and Kevin Kjoller[1], [1]Anasys Instruments Corp., [2]Light Light Solutions
10:20	*Carbon Fiber from Extracted Commercial Softwood Lignin* 11 D.A. Baker, D.P. Harper, and T.G. Rials, University of Tennessee at Knoxville	*The Response of a Nylon-Cotton Fabric to High Heat Flux* 32 Thomas Godfrey, Margaret Auerbach, Gary Proulx, Pearl Yip, and Michael Grady, U.S. Army Natick Soldier RDE Center
10:40	*Electrospun Carbon Nanofibers from Kraft Lignin* 13 Omid Hosseinaei and Darren Baker, University of Tennessee at Knoxville	*A Study and a Design Criterion for Multilayer Structure in Perspiration-Based Infrared Camouflage* 34 Xia Yin[1], Qun Chen[2], and Ning Pan[1], [1]University of California at Davis, [2]Tsinghua University
11:00	*Mesoporous Activated Carbon Nanofiber Synthesis from Catalytic Graphitization of Polyacrylonitrile/ Cobalt Sulfide Composite* 15 Yakup Aykut[1], Behnam Pourdeyhimi[2], and Saad Khan[2], [1]Uludağ University, [2]North Carolina State University	*Thermal Protective Performance of Protective Clothing Upon Steam and Hot Liquid Splash* 36 Farzan Gholamreza, Guowen Song, and Mark Ackerman, University of Alberta (presented by Shiqi Liu)
11:20	*Electrically Conductive Fibers with Carbon Nanotubes: 3D Analysis of Conductive Networks by Electron Tomography* 17 Wilhelm Steinmann, Johannes Wulfhorst, Thomas Vad, Gunnar Seide, Thomas Gries, Markus Heidelmann, and Thomas Weirich, RWTH Aachen University	*Thermal and Flame Retardant Behaviors of Cotton Fiber Treated with Phosphoramidate Derivatives* 38 Thach-Mien Nguyen, SeChin Chang, and Brian Condon, U.S. Department of Agriculture

11:40	*[Open]*	*Characterization of Component Fibers in Military Textiles Using Pyrolysis-GCMS* 40 Pearl Yip, U.S. Army Natick Soldier RDE Center
12:00	***Lunch On Your Own: Expo: Poster Setup (Room 102A)***	

Afternoon Session

1:30–2:45	**Student Paper Competition** **Room 104A** **Chair: Michael Ellison** Xianwen Mao, MIT: *Electrospun Carbon Nanofiber Webs with Controlled Density of States for Sensor Applications* Hua Zhou, Deakin University: *Durable Superhydrophobic Fabrics Prepared by Surface Coating of Nanoparticle/Elastomeric Polymer Composite* Xiaodan Zhang, Georgia Tech: *Flexible and Transparent Fiber-Based Ionic Diode Fabricated from Oppositely Charged Microfibrillated Cellulose*	
2:45	***Break (Room 102A)***	
3:00–3:40	**Keynote Speaker: Dr. Mary Boyce, Massachusetts Institute of Technology, USA** ***Mechanics of Nonwoven Fibrous Mats: Structure Evolution and Elastic-Plastic Deformation*** **(Room 104A)**	
	Room 104A	**Room 104C**
	Session: Clean Water/Clean Energy ***Konstantin Kornev, Chair***	**Session: Mechanical Properties** ***Stephen Eichhorn, Chair***
3:50	*Electrospun Nanofiber Derived TiO_2 Active Layer for Dye-Sensitized Solar Cell Applications* 21 Xueyang Liu[1], Jian Fang[1], Mei Gao[2], and Tong Lin[1], [1]Deakin University, [2]CSIRO Materials Science and Engineering	*Developing an Environmentally Friendly Isothermal Bath to Obtain a New Class of High-Performance Fibers* 45 H. Avci, H.J. Yoon, and R. Kotek, North Carolina State University
4:10	*Photovoltaic Fiber Having Polymer Anode and Inverted Layer Sequence* 23 İ. Borazan[1], A. Bedeloğlu[2], and A. Demir[1], [1]İstanbul Technical University, [2]Dokuz Eylül University	*The Mechanics and Tribology of Electrospun PA 6(3)T Fiber Mats* 47 Matthew Mannarino and Gregory Rutledge, MIT
4:30	*Optimizing Fiber-Based Bioconversion Media for Ammonia/Water Bio-Remediation* 25 Yong Kim and Armand Lewis, University of Massachusetts at Dartmouth	*On the Design Method of Lightweight Construction Materials: Structural Characteristics-Tearing Strength Relationship* 49 Yusuf Ulcay[1,2] and Fatih Suvari[1], [1]Uludağ University, [2]Bursa Technical University
4:50	*3D Woven Fabrics as Filtration Media in a Membrane Bioreactor for Wastewater Treatment* 27 Fang Zhao, Bubi Jing, Hong Chen, Fujun Xu, Lan Yao, and Yiping Qiu, Donghua University	*Continuous Dynamic Analysis: Evolution of Storage and Loss Modulus in Fibers as a Function of Strain* 51 Sandip Basu and Jennifer Hay, Agilent Technologies

5:20–7:00 **Poster Session and Reception (Room 102A)**

Thursday, November 8

8:00 Continental Breakfast (Room 102A)

Morning Session

9:00	**Keynote Speaker: Dr. David Weitz, Harvard University, USA** ***Biopolymer Networks: How Fiber Structures Provide Rigidity to the Cell*** **(Room 104A)**

9:40	***Break (Room 102A)***

	Room 104A	**Room 104C**
	Session: Natural Fibers ***Ian R. Hardin, Chair***	**Session: Surface Properties** ***Michael Ellison, Chair***
10:00	*Soybean Biorefinery Model: Nanofibers, Nanocomposites, Green Composites and More* 55 Anil Netravali, Cornell University	*Butterfly-Inspired Fiber-Based Nanofluidics* 85 Konstantin Kornev, Clemson University
10:20	*Self-Assembled Nanostructures from Cellulose Nanocrystals* 57 You-Lo Hsieh, University of California at Davis	*Theoretical and Experimental Investigation of Non-Rotationally Symmetrical Droplets on Fibers* 86 Jintu Fan[1,2], Maofei Mei[1], and Dahua Shou[1], [1]Hong Kong Polytechnic University, [2]Cornell University
10:40	*Orientation of Cellulose Nanofibers Using Magnetic Fields and Wet-Stretching* 59 Stephen Eichhorn[1], Arthur Wilkinson[2], and Tanittha Pullawan[2], [1]University of Exeter, [2]University of Manchester	*Optimization of Breathable Waterproof Coating Conditions for Minimizing Fabric Frictional Sound of Korean Military Combat Uniform Fabrics* 87 Kyulin Lee and Gilsoo Cho, Yonsei University
11:00	*Electrospinning Hyaluronic Acid* 61 Caroline Schauer and Laura Toth, Drexel University	*Textile Functional Coloration to Offer Photo-Induced Surface Functions* 89 Gang Sun, Jingyuan Zhou, and Ning Liu, University of California at Davis
11:20	*Structure and Mechanical Properties of Silk-Inspired Flow-Assembled Fibers* 63 Seunghwa Ryu[1], Greta Gronau[1], Michelle Kinahan[2], Sreevidhya Krishnaji[3,4], David Kaplan[3], Joyce Wong[2], and Markus Buehler[1], [1]MIT, [2]Boston University, [3]Tufts University	*Comparison of Color Properties of CO_2 Laser-Treated Cotton Polyester-Blended Fabric Before and After Dyeing* 91 O.N. Hung, C.K. Chan, C.W. Kan, and C.W.M. Yuen, Hong Kong Polytechnic University
11:40	*Submicron Fiber Nonwovens from Ingeo®, a Sustainable Polymer* 65 Gajanan Bhat[1], Kokouvi Akato[1], and Robert Green[2], [1]University of Tennessee at Knoxville, [2] Nature Works	*Development of a Novel Bicomponent Fiber-Based PET/PE Composite with Improved Interface and Mechanical Performance* 92 Mehmet Dasdemir[1], Benoit Maze[2], Nagendra Anantharamaiah[3], and Behnam Pourdeyhimi[2], [1]University of Gaziantep, [2]North Carolina State University, [3]Hollingsworth & Vose

12:00	***Lunch On Your Own; Expo***

Afternoon Session

1:30	**Keynote Speaker: : Dr. Andy Alderson, University of Bolton, UK** ***Auxetic Fibres: History, Applications, and Future Perspectives 2*** ***(Room 104A)***

2:10	***Break (102A)***

	Room 104A	**Room 104C**
	Session: Biology and Health ***Caroline Schauer, Chair***	**Session: Fiber Processing** ***Rudolf Hufenus, Chair***
2:30	*Green Engineering of Antimicrobial Nanofiber Mats* 69 Jessica Schiffman, Katrina Rieger, Nathan Birch, and Nathaniel Eagan, University of Massachusetts at Amherst	*SiC Fiber Made with Aqueous Binder by Melt Spinning* 97 Alex Lobovsky and Mohammad Behi, United Materials Technologies
2:50	*Antimicrobial Finishing of Polyester and Cotton Fabrics* 70 Idris Cerkez, S.D. Worley, and R.M. Broughton, Auburn University	*High-Performance Polyimide Fibers Prepared by Dry Spinning Technology* 98 Qinghua Zhang, Yuan Xu, Jie Dong, Chaoqing Yin, Shihua Wang, and Dajun Chen, Donghua University
3:10	*The Effect of Needlepunched Nonwoven Fabric on Controlling Hyperhydricity of Scutellaria Species In Vitro Liquid Culture Systems* 72 M. Taşcan[1], J. Adelberg[2], A. Taşcan[1], N. Joshee[3], and A.K. Yadav[3], [1]Zirve University, [2]Clemson University, [3]Fort Valley State University	*High-Throughput Needleless Electrospinning of Core-Sheath Fibers* 100 Toby Freyman[1], Xuri Yan[1], Quynh Pham[1], John Marini[1], Robert Mulligan[1], Upma Sharma[1], Michael Brenner[2], and Gregory Rutledge[3], [1]Arsenal Medical, [2]Harvard University, [3]MIT
3:30	*Amidoximated Bacterial Cellulose as an Effective Nanoreactor for In Situ Synthesis of ZnO Nanoparticles* 74 Weili Hu, Shiyan Chen, Bihui Zhou, and Huaping Wang, Donghua University	*Coaxial-Free Surface Electrospinning* 102 Keith Forward[1,2], Alexander Flores[1], and Gregory Rutledge[1], [1]MIT, [2]California State Polytechnic University
3:50	*Textile Heart Valve Prosthesis: Early In Vitro Fatigue Performances* 76 Frederic Heim[1], Bernard Durand[1], and Nabil Chakfe[2], [1]ENSISA, [2]Hôpitaux Universitaires de Strasbourg	*Developing Real-Time Control for Electrospinning of Nanofibers: Evaporation and Measurement Considerations for Aqueous and Non-Aqueous Solutions* 104 Michael Gevelber, Yunshen Cai, Thierry Desire, and Xuri Yan, Boston University
4:10	*Investigation into New 3D Fibrous Structure for Soles Application* 78 Mouna Messaoud[1], Antoine Vaesken[1], Laurence Schacher[1], Dominique Adolphe[1], Jean-Baptiste Schaffhauser[2], and Patrick Strehle[2], [1]ENSISA, [2]N. Schlumberger	*Electro-Centrifugal Nanofiber Spinning* 106 Tao Huang, Jack Armantrout, Kevin Allred, and Thomas Daly, DuPont
4:30	*Property Evaluation of Diabetic Socks Used to Prevent Diabetic Foot Syndrome* 80 M.J. Abreu, A. Catarino, and O. Rebelo, University of Minho	*Governing Equations for the Well-Enchanced Electro-Centrifuge Spinning Process* 108 Seyed Hosseini Ravandi, Afsaneh Valipouri, and Admadreza Pishevar, Isfahan University of Technology
5:00–6:00	**Fiber Society General Body Meeting (Open to Fiber Society Members Only)** **Room 104A**	

6:00 **Reception (Room 104B)**

6:30–10:00 **Banquet and Awards Ceremony**
Ms. Shevy Rockcastle, KVA Kennedy & Violich Architecture
Going Soft: Textiles and Resilient Architecture

Friday, November 9

8:00 Continental Breakfast (Room 102A)

9:00	**Keynote Speaker: Dr. John F. Rabolt, University of Delaware, USA** ***Preparation and Characterization of Multilayer Polymer Nanofibers by Multiaxial Electrospinning*** **4** **(Room 104A)**
9:40	***Break (Room 102A)***

	Room 104A	**Room 104C**
	Session: Nanofibers ***Michael Jaffe, Chair***	**Session: Sensors and Electrical Properties** ***Phillip Gibson, Chair***
10:00	*A Historical Perspective on Nanofibers: Can We Make It More Relevant?* 113 H. Young Chung, Et Esus	*Base Fiber Technologies for Smart Textiles 125* R. Hufenus, D. Hegemann, S. Gaan, F.A. Reifler, and L.J. Scherer, Empa
10:20	*Electrospun Nanofibers Functionalized with Cyclodextrins and Their Potential Applications* 114 Tamer Uyar, Asli Celebioglu, Fatma Kayaci, Zeynep Aytac, and Yelda Ertas, Bilkent University	*Electrical Conductivity of Electrospun Polyaniline and Polyaniline-Blend Fibers and Mats 127* Yuxi Zhang and Gregory Rutledge, MIT
10:40	*Spinning Functional PLA Nanofibers for Controlled Release, Protein Capture, and Sensing* 116 Margaret Frey[1], Dapeng Li[1,2], Chunhui Xiang[1,3], and Ebru Buyuktanir[4,5], [1]Cornell University, [2]University of Massachusetts at Dartmouth, [3]Iowa State University, [4]Kent State University, [5]Stark State University	*Mechanical and Electrical Properties of Polyamide 66 Nanocomposites Reinforced with Buckminster Fullerene C60 129* Reyhan Keskin[2], Ikilem Gocek[1], Guralp Ozkoc[3], Koray Yilmaz[2], and Yunus Kamac[2], [1]İstanbul Technical University, [2]Pamukkale University, [3]Kocaeli University
11:00	*Melt Spinning PP: A Formation Model Development of "Hard Plastic" Behavior* 118 Michael Jaffe, New Jersey Institute of Technology	*Production of Polymer Filament-Shaped Piezoelectric Sensors for E-Textiles Applications* 131 H. Carvalho[4], R.S. Martins[1], R. Gonçalves[2], J.G. Rocha[3], J.M. Nóbrega[1], S. Lanceros-Mendez[2,5], [1]Institute for Polymers and Composites, [2]Centro/Departamento de Física, [3]Dep. Industrial Electronics, [4]University of Minho, [5]International Iberian Nanotechnology Laboratory
11:20	*Characterization of Compressive Properties of Electrospun Mats* 119 Looh Tchuin Choong and Gregory Rutledge, MIT	*Chemical Resistance of Poly(3,4-ethylenedioxythiophene) on Textiles 133* Christopher DeFranco, Qinguo Fan, and Jinlin Cai, University of Massachusetts at Dartmouth

11:40	*Fabrication of Composite Polyallylamine-Nanodiamond Fibers* 121 Marjorie Kiechel, Ioannis Neitzel, Vadym Mochalin, Yury Gogotsi, and Caroline Schauer, Drexel University	*Tunable Force Sensor Based on Flexible Polymeric Optical Fibres* 135 Marek Krehel[1,2], René Rossi[1], Gian-Luca Bona[1,2], and Lukas Scherer[1], [1]Empa, [2] ETH Zurich

12:00	**Close of Conference: Room 104A**

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Poster Presentations

Session Chair: *Stephen Michielsen*
Room 102A

Zachary Dilworth	*3D Volume Representation of Nanowebs 139*
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Kaiyan Qiu	*Biodegradable Polymer Nanocomposites Using Polyvinyl Alcohol and Nanomaterials* 160
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Judith Sennett	*Environmental Aging Study of AuTx® and Kevlar® Yarns and Fabrics 164*
Phillip Gibson	*A Design Tool for Clothing Applications: Wind Resistant Fabric Layers 166*