

# **The Fiber Society 2022 Fall Meeting and Technical Conference**

80 Years of Excellence in Advancing  
Scientific Knowledge Pertaining to Fibers  
and Fiber Materials

Raleigh, North Carolina, USA  
19 – 21 October 2022

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## Wednesday, October 19

- 7:15 Registration, Hunt Library, Lobby, Room 2110A  
 7:30 Continental Breakfast, Hunt Library, Room 2110A
- 8:30 Welcoming Remarks and Announcements (Room 2110D) *David Hinks, Dean, Wilson College of Textiles*  
*Takeshi Kikutani, President, The Fiber Society*  
*Xiangwu Zhang, Conference Chair*
- 8:50 **Plenary Lecture:** Gregory Rutledge, Massachusetts Institute of Technology  
*Separation of Oil/Water Emulsions Using Electrospun Nonwoven Fiber Membranes* 2
- 9:30 **Plenary Lecture:** Behnam Pourdeyhimi, North Carolina State University  
*Designing Sustainable Biopolymer Blends* 3
- 10:10 **Break**

### *Morning Sessions*

	Room 2110C	Room 2110D
	<b>Session: Fibers for Healthcare and Medical Applications</b> <i>Chair: Caroline Schauer, Drexel University</i>	<b>Session: Fiber Composites</b> <i>Chair: Ian Hardin, University of Georgia</i>
10:30	<i>Vitamins Suitable for Preparation of Daylight-induced Antibacterial and Antiviral Nanofibers and Textiles</i> 8 Gang Sun, University of California–Davis	<i>Continuous Fiber Composites Additive Manufacturing</i> 18 Kelvin Fu, University of Delaware
10:50	<i>Novel Medical Facemasks for COVID-19</i> 9 Sabit Adanur, Auburn University	<i>Chemical-protective and Water Transport Properties of MOF-Textiles Composites</i> 19 Dennis Lee, North Carolina State University
11:10	<i>Biophysically Sensing the Fiber: Cell Coiling on Suspended Non-electrospun Nanonets</i> 10 Christian Hernandez-Padilla, Virginia Tech	<i>Optimization of Impact, Tensile, and Flexural Properties of Kevlar-29/Epoxy/Shear Thickening Fluid (STF) Laminates Using Taguchi Experimental Design and Hand Layup Technique</i> 20 Gurumurthy Ramaiah for Daniel Asfaw, Ethiopian Technical University
11:30	<i>Comparison of Antibacterial Properties of Agave Americana and Bamboo Fibers and Their Nonwoven Fabrics</i> 11 Ali Afzal, National Textile University	<i>Making Fused Deposition Modeling Greener: A Review of Challenges and Opportunities</i> 23 Muneeb Tahir, North Carolina State University
11:50	<i>Open</i>	<i>Additive Manufacturing of Three-dimensional Recycled Carbon Fiber Scaffold for Thermoset Composites</i> 24 Chunyan Zhang, University of Delaware
12:10–1:40 <b>Lunch, Convocation Center, Wilson College of Textiles</b>		

## Afternoon Sessions

<b>Room 2110 D</b>	
1:40– 3:00	<p><b>Student Paper Competition</b> <span style="float: right;"><b>Chair: Frederic Heim</b></span></p> <ul style="list-style-type: none"> <li>• Hardeep Jhinjer, IIT Delhi, <i>Metal-Organic Frameworks Functionalized Smart Textiles for Adsorptive Removal of Hazardous Aromatic Pollutants from Ambient Air</i></li> <li>• Yelin Ko, Cornell University, <i>Sustainable and Direct Upcycling of Dyed Polyethylene Terephthalate (PET) Fabrics into Copper-1,4-Benzenedicarboxylate (CuBDC) Metal-Organic Frameworks</i></li> <li>• Levi Kapllani Maharaj, Drexel University, <i>TopoKnit: A Process-oriented Representation for Modeling the Topology of Yarns in Weft-knitted Textiles</i></li> </ul>
3:00 <b>Break</b>	
<b>Room 2110C</b>	
<b>Session: Fiber Formations, Structures, and Properties</b> <b>Chair: Gang Sun, University of California–Davis</b>	
3:20	<p><i>Control of Fiber Diameter Fluctuation in the Melt-blowing Process by Introducing Long-chain Branching to Polypropylene</i> 26 Takeshi Kikutani, Tokyo Institute of Technology</p>
3:40	<p><i>False-Twist Texturing: An Essential Process in the Production of Algae-based Sporting Goods</i> 27 Mathias Schmitz, RWTH Aachen University</p>
4:00	<p><i>Determination of Fiber Volume Fraction of Carbon Fiber-reinforced Thermoplastic Polymer Using Thermogravimetric Methods</i> 30 Kasahun Asfew, KU Leuven</p>
4:20	<p><i>Electrospun Hierarchical Nanofiber Filters with Versatile Fiber Architectures and Surface Functionalities for Highly Efficient Air Filtration</i> 31 Jiang-Ping Chen, University of Chinese Academy of Sciences</p>
<b>Room 2110D</b>	
<b>Session: Fiber Testing and Characterization</b> <b>Chair: Minyoung Suh, NC State University</b>	
37	<p><i>Spectroscopic Single Molecule Imaging Captures Nanoscale Polarity Changes of Polymer Assembly</i> Yang Zhang, North Carolina State University</p>
38	<p><i>Impact of Polylactic Acid (PLA) on the Aquatic Aerobic Biodegradation of Polyhydroxy Butyrate (PHB) in Polymer-blended Fibers</i> Soojin Kwon, North Carolina State University</p>
39	<p><i>Sensory Analysis of Fabric Friction Noise: Methodology, Training, and Validation of a Panel to Evaluate Fabric Friction Noise Perception</i> Floriane Leclinche, ENSISA</p>
40	<p><i>Psychoacoustic Characterization of Crosslinker and Softener Treatment Effect on Fabric Frictional Sound</i> Emilie Dréan, ENSISA</p>
5:00– 7:00 <b>Poster Session and Reception</b> <b>Room 2110A</b>	

## Thursday, October 20

- 7:30 Continental Breakfast
- 8:30 **Plenary Lecture (Room 2110D):** Anil Netravali, Cornell University  
*Advanced Green Composites: Recent Developments* 4
- 9:10 **Break**

## Morning Sessions

<b>Room 2110C</b>	
<b>Session: Yarns and Fabrics: Processes, Structures, and Properties</b> <b>Chair: Ericka Ford, NC State University</b>	
9:25	<p><i>Comparative Study on Measurement Accuracy of FAST Instruments</i> 45 Jonathan Chen, University of Texas–Austin</p>
<b>Room 2110D</b>	
<b>Session: Smart Polymers, Fibers, and Textiles</b> <b>Chair: Takeshi Kikutani, Tokyo Institute of Technology</b>	
55	<p><i>Thermoregulatory Materials and Wearables for Personal Thermal and Moisture Management</i> Jintu Fan, Hong Kong Polytechnic University</p>

9:45	<i>Geometric Modeling of Complex Knitting Stitches Using a Bicontinuous Surface and Its Offsets</i> David Breen, Drexel University 46	<i>3D Printed Auxetic Metamaterials for Improved Footwear Comfort</i> 56 Mars Harvey, North Carolina State University
10:05	<i>Experimental Study of Modified Ring Yarns by Feeding Three-roving Strands</i> 47 Yali Ling, North Carolina State University	<i>Explanatory and Predictive Modeling of the Sewability of Conductive Materials</i> 57 Rishika Vontela, North Carolina State University
10:25 <b>Break</b>		
	<b>Room 2110C</b>	<b>Room 2110D</b>
	<b>Session: Yarns and Fabrics cont'd</b> <b>Chair: Jintu Fan, Hong Kong Polytechnic University</b>	<b>Session: Smart Polymers cont'd</b> <b>Chair: Xiaomeng Fang, NC State University</b>
10:40	<i>Finishing of Microfibrous Nonwovens for Soft Fabric Applications</i> 48 Ericka Ford, North Carolina State University	<i>Standardization of Graphene Ink Coating and Test of Its Conductivity on Fabric Used for Wearable Electronics Applications</i> 58 Gurumurthy Ramaiah, Ethiopian Technical University
11:00	<i>Statistical Models for the Relationship Between Fiber-blended Ratio and Spinning Parameters and Properties of Meta-aramid/FR Viscose-blended Vortex Yarns</i> 49 Tao Hua, Hong Kong Polytechnic University	<i>Woven Fabric Artificial Muscles Driven by Ultrafine Pneumatic Fiber Actuators</i> 61 Muh Amdadul Hoque, North Carolina State University
11:20	<i>Evaluations of Commercial Conductive Yarns for Use as Sewing Thread</i> 50 Yu Chen, North Carolina State University	<i>Influence of Manufacturing Conditions on the Performance of Electronic Embroidery</i> 62 Shourya Lingampally, North Carolina State University
11:40	<i>CO<sub>2</sub>-containing TPU for Highly Elastic Yarns</i> 51 Jan Thiel, RWT Aachen University	<i>Open</i>
12:00–1:30 <b>Lunch, Convocation Center, Wilson College of Textiles</b>		

### *Afternoon Sessions*

	<b>Room 2110C</b>	<b>Room 2110D</b>
	<b>Session: Fibers for Healthcare and Medical Applications</b> <b>Chair: Kelvin Fu, University of Delaware</b>	<b>Session: Fibers for Energy and Sensor Applications</b> <b>Chair: Wei Gao, NC State University</b>
1:30	<i>Gelatin Nanoyarns: Electrospun 3D Twisted Nanofibrous Scaffolds</i> 12 Caroline Schauer, Drexel University	<i>Fiber-based Material and Its Application in Biosensing</i> 64 Dong Wang, Wuhan Textile University
1:50	<i>Tunable Non-electrospun Suspended Nanofiber Networks Allow the Spatiotemporal Characterization of Cellular Protrusions</i> 13 Atharva Agashe, Virginia Tech	<i>Fibre Strain Sensors: Development and Integration</i> 65 Jeanette Ortega, RWTH Aachen University
2:10	<i>Collagen Nanoyarns: Hierarchical Three-dimensional Biomaterial Constructs</i> 14 Emeka Chikelu, Drexel University	<i>Melt-coated Flexible Stainless Steel, Thread-based Coaxial Triboelectric Yarn Nanogenerators</i> 66 Md Mazbah Uddin, University of Georgia
2:30	<i>Application of Wearable Smart Textiles in Medical and Healthcare Field: A Review</i> 15 Jiangrui Qian, Donghua University	<i>Comparative Electrochemical Study of Porous and Hollow Carbon Nanofibrous Structures from Bicomponent and Coaxial Electrospinning for Supercapacitor Application</i> 67 Kingsford Asare, North Carolina AT&T State University
2:50	<i>Touchspinning PCL Nanofibers with Ag Nanoparticle Inclusion Directly onto Gauze for Antibacterial Wound Dressing</i> 16 Emily Herbert, Drexel University	<i>Open</i>
3:10 <b>Break</b>		

	<b>Room 2110C</b>	<b>Room 2110D</b>
	<b>Session: Fiber Testing and Characterization</b> <b>Chair: Yang Zhang, NC State University</b>	<b>Session: Fibers for Energy cont'd</b> <b>Chair: Jonathan Chen, University of Texas-Austin</b>
3:25	<i>Evaluation and Enhancement of Adhesion in Fiber-reinforced Laminated Structures: Correlation Between T-peel Test and Pullout Test</i> 41 Feyi Adekunle, North Carolina State University	<i>The Remaining Issues in Yarn-shaped Energy Storage Devices</i> 68 Wei Gao, North Carolina State University
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4:25	<i>Open</i>	<i>Gigantic Effect Due to Phase Transition on Thermoelectric Properties of Ionic Sol-Gel Materials</i> 71 Jin Liu, Hong Kong Polytechnic University
4:45–5:30	<b>Fiber Society Annual Business Meeting: Open to Fiber Society Members Only</b> <b>Room 2110D</b>	

**5:45–6:15** Reception, Lonnie Poole Golf Center  
**6:15** Banquet, Lonnie Poole Golf Center  
**Speaker: Dr. Ian Hardin, University of Georgia**  
*Eighty-plus Years of Sharing Science and International Friendships*

## Friday, October 21

7:30 Continental Breakfast

**8:30 Plenary Lecture (Room 2110D):** Tushar Ghosh, North Carolina State University  
*Electronic Textiles: The Natural Wearable* 5

9:10 **Break**

### Morning Sessions

	<b>Room 2110C</b>	<b>Room 2110D</b>
	<b>Session: Natural Fibers</b> <b>Chair: Alan Tonelli, NC State University</b>	<b>Session: Fibers for Protection Applications</b> <b>Chair: Bryan Ormond, NC State University</b>
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10:05	<i>Open</i>	<i>Performance Trade-offs Between PFAS and PFAS-free Turnout Gear Outer Shell Materials in New and Aged Conditions</i> 78 Nur Mazumder, North Carolina State University
10:25	<b>Break</b>	

	<b>Room 2110C</b>	<b>Room 2110D</b>
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11:00	<i>Mechanical Drawing of Polymer Nanofibers for Design of Three-dimensional Nanofibrous Structures</i> 33 Reva Street, Drexel University	<i>Sustainable, Nanofibrillated Cellulose-based Textile Dyeing Technology</i> Smriti Rai, University of Georgia 81
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12:00–1:30 <b>Lunch, Convocation Center, Wilson College of Textiles</b>		

### Afternoon Sessions

	<b>Room 2110C</b>	<b>Room 2110D</b>
	<b>Session: Textile/Apparel Marketing and Management</b> <i>Co-chairs: ByoungHo Ellie Jin and Yingjiao Xu, NC State University</i>	<b>Session: Fiber Surfaces and Interfaces</b> <i>Chair: Lifeng Zhang, North Carolina A&amp;T State University</i>
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2:30	<i>Disabled Makers in Fashion and Textiles: A Historical Study in Social Entrepreneurship</i> 88 Katherine Annett-Hitchcock, North Carolina State University	<i>A Biobased Flame Retardant Coating for Improving Flame Retardancy and Anti-dripping Performance of Polyimide 6 Fabric</i> 93 Wen-Jie Jin, Soochow University
2:50 <b>Conference Closes</b>		

## Poster Session

**Wednesday, October 19, 5:00–7:00, Room 2110A**

**Emilie Dréan, Session Chair**

<b>Presenter</b>	<b>Title</b>	
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