

*THE FIBER SOCIETY*



*Advancing Scientific Knowledge  
Pertaining to Fibers and Fibrous Materials*



JSNN



Joint School of  
Nanoscience and Nanoengineering  
*An Innovative Collaboration between North Carolina Agricultural and Technical State University  
and the University of North Carolina at Greensboro*

# **The Fiber Society's Spring 2024 Conference**

***Fostering Convergence in Fibers and Materials  
Research Toward a Sustainable Future***

**May 22–24, 2024**

**Conference Chair  
*Dr. Lifeng Zhang***

**Venue**  
***Joint School of Nanoscience and Nanoengineering  
North Carolina Agricultural and Technical State University  
University of North Carolina at Greensboro  
Greensboro, North Carolina, USA***

**Sponsored by**

**FORYOU  
MEDICAL**

***Final Program***

**Tuesday, May 21**

1:00 PM–5:00 PM

5:00 PM–6:00 PM

Governing Council Meeting, JSNN Board Room

Early-bird Registration and Reception, JSNN Atrium

## Wednesday, May 22

- 7:00 Registration, JSNN Atrium
- 7:00 Continental Breakfast, JSNN Atrium
- 8:30 Welcoming Remarks and Announcements (JSNN Auditorium) *Lifeng Zhang, Conference Chair*  
*Caroline Schauer, President, The Fiber Society*  
*Eric Muth, Vice Chancellor for Research, North Carolina A&T State University*  
*Mitchell P. Croatt, Interim Dean of the Joint School of Nanoscience and Nanoengineering*
- 8:55 Introduction of Plenary Speaker: Lifeng Zhang
- 9:00 **Plenary Lecture:** Meifang Zhu, Donghua University (virtual)  
*Development of Functional Biobased Fiber Materials for a Sustainable Future*

### Morning Sessions

9:50–10:20	<b>Special Invited Session</b> <i>Advances in Meltblown Nonwovens: Nanofibers to Sustainable Materials for Demanding Applications</i> Gajanan Bhat, University of Georgia	<b>JSNN Auditorium</b>
10:20 <b>15 Minute Break, JSNN Atrium</b>		
	<b>JSNN Auditorium</b>	<b>JSNN 206</b>
	<b>Session: Fiber Manufacturing and Characterization</b> <i>Chair: Xiangwu Zhang, North Carolina State University</i>	<b>Session: Sustainable Fibers and Textiles</b> <i>Chair: Katarina Goodge, National Institute of Standards and Technology</i>
10:35	<i>Characterizing Multifunctional Structure-Property Relationships by Mapping Inside Polymer Fibers</i> Michael Roenbeck, U.S. Merchant Marine Academy	<i>Developing a Spectroscopic Dataset for Automated Textile Sorting</i> Katarina Goodge, National Institute of Standards and Technology
10:55	<i>A Novel Sweat Simulator for Concurrent and Real-time Measurements of Fabric Liquid Moisture Management Properties</i> (virtual) Jintu Fan, Hong Kong Polytechnic University	<i>Innovative Technique to Convert Sisal Fiber into a Textile Fiber for Clothing</i> Sheraz Ahmad, National Textile University (virtual)
11:15 <b>10 Minute Break, JSNN Atrium</b>		
11:25	<i>PHBHX and PCL Composite Nanoyarns</i> Divya Kamireddi, Drexel University (virtual)	<i>Achieving Circularity in Textiles and Apparel Using Spinnable Banana Fibers</i> Yasir Nawab, National Textile University (virtual)
11:45	<i>3D Printing with Flexible Filaments: Optimization and Manufacture of Auxetic Metamaterials for Footwear Comfort</i> Mars Harvey, North Carolina State University	<i>Secondhand Clothing Sortation by Brand and Condition Supports a Circular Economy</i> Lisa Sciannella, Helpsy (virtual)
12:05–1:25 <b>Lunch, JSNN Atrium</b>		

## Afternoon Sessions

	JSNN Auditorium	JSNN 206
	<b>Session: Nanofibers and Nanofibrous Materials</b> <b>Chair: Jianjun Wei, UNC Greensboro</b>	<b>Session: Fiber-reinforced Composite Materials</b> <b>Chair: Lifeng Zhang, North Carolina A&amp;T State University</b>
1:25	<i>Manipulating Metal Oxide Nanostructures on Aligned Electrospun Carbon Nanofibers: Structures, Properties, and Applications</i> Jianjun Wei, UNC Greensboro	<i>Effect of Electrospun Carbon Nanofiber on Fracture Toughness of Hybrid Laminated Polymeric Composites</i> Dattaji Shinde, North Carolina A&T State University (virtual)
1:45	<i>Sustainable Coloration of Cotton Fibers with Nanopolysaccharide Materials</i> Senay Yacob Baraki, Technical and Vocational Training Institute	<i>Flexural and Impact Properties of Epoxy Composites with Surface Modified Electrospun Glass Nanofibers as Reinforcing Agent</i> Abhijeet Mali, North Carolina A&T State University
2:05	<i>Carbon Nanofiber-based Electrode Material for Supercapacitors</i> Victor Charles, North Carolina A&T State University	<i>Advancing Cementitious Composites with Multifunctional Polymeric-based Biotic Self-healing Fiber</i> Mohammad Houshmand, Drexel University (virtual)
2:25	<i>Hybrid Metal Oxides on Aligned Carbon Nanofiber Composite for Photocatalytic Degradation of Organophosphate Pesticides</i> Jianjun Wei, UNC Greensboro (on behalf of Bukola Adesanmi)	<i>Effect of Fused Deposition Modeling (FDM) Process Parameters on Mechanical Properties of Flexible Polymeric Structures</i> Ashok Sapkota, Auburn University (virtual)
2:45 <b>15 Minute Break, JSNN Atrium</b>		
	<b>Session: Nanofibers and Nanofibrous Materials cont'd</b> <b>Chair: Hemali Rathnayake, UNC Greensboro</b>	<b>Session: Fibers for Healthcare and Medical Applications</b> <b>Session Chair: Caroline Schauer, Drexel University</b>
3:00	<i>A Novel Bio-based Sorbent Decorated Nanofiber Mat for Lithium</i> Hemali Rathnayake, UNC Greensboro	<i>Nanonet Force Microscopy to Measure Forces Across Length Scales: Single Cells to Organisms</i> Atharva Agashe, Virginia Tech
3:20	<i>Morphological and Thermal Properties of Cellulose Nanocrystal-loaded Polylactide/Poly(Butylene Adipate-Co-Terephthalate) Nanocomposite Nanofibers</i> Handan Palak, Cornell University	<i>Inclusive Design in Advanced Wearable Health Monitoring Systems: A Case Study of a Smart Sports Bra Leveraging Contact Pressure Optimization for Enhanced Biosignal Acquisition</i> Seonyoung Youn, North Carolina State University
3:40	<i>Tunable Bandgap Energy of Benign Eutectic Solvent as a Potential Biological Semiconductor via Tannic Acid/Bacterial Nanocellulose Interaction</i> Maurelio Cabo, UNC Greensboro	<i>Tailoring Ionogel Biocomposites for Next-generation Sustainable Textiles</i> Evan McDowell, North Carolina A&T State University
4:00	<i>Electrospun Nanofiber Adsorbents for Rare Earth Element Extraction from Water</i> Israt Jahan, North Carolina A&T State University	<i>Porosity-tuned, Electrospun Collagen Nanoyarns for Enhanced Cellular Adhesion and Infiltration</i> Caroline Schauer, Drexel University
4:20–6:00	<b>Poster Session and Reception</b> <b>JSNN Atrium</b>	


## Thursday, May 23

- 7:30 Continental Breakfast, JSNN Atrium
- 8:25 Introduction of Plenary Speaker: Lifeng Zhang (JSNN Auditorium)
- 8:30 **Plenary Lecture:** Narayan Bhattarai, North Carolina A&T State University  
*Evaluation of Polymer-Metal Composite Nanofibers for Wound Healing Modulation*
- 9:20 **10 Minute Break, JSNN Atrium**

### Morning Sessions

	JSNN Auditorium	JSNN 206
	<b>Session: Advanced Fibers and Textiles in Convergence Research</b> <i>Chair: Narayan Bhattarai, North Carolina A&amp;T State University</i>	<b>Session: Fiber-Apparel Interfaces</b> <i>Chair: Ian Hardin, University of Georgia</i>
9:30	<i>All-fiber Integrated Self-powered Wearable Electronics</i> Dong Wang, Wuhan Textile University (virtual)	<i>Innovative Photocatalytic Solutions for Sustainable Dye Removal</i> Yahya Absalan, University of Georgia
9:50	<i>Novel Triboelectric Yarn and Embroidery for Human-Machine Interaction</i> Rong Yin, North Carolina State University	<i>Enabling a Textile Circular Economy Through Standardization</i> Amanda Forester, National Institute of Standards and Technology (virtual)
10:10	<i>Power of Fiber Twist</i> Zunfeng Liu, Nankai University (virtual)	<i>Consumer-perceived Value of Circular Fashion Products</i> Md. Hasan Sheikh, UNC Greensboro
10:30	<i>Smart Fiber Materials and Devices for Fabric Computation</i> Wei Yan, Donghua University (virtual)	<i>System Dynamics Modeling for Sustainable Apparel Production</i> Gurinder Kaur, Thomas Jefferson University (virtual)
<b>10:50 15 Minute Break, JSNN Atrium</b>		
	<b>Session: Advanced Fibers and Textiles in Convergence Research cont'd</b> <i>Chair: Wei Gao, North Carolina State University</i>	<b>Session: Sustainable Fibers and Textiles</b> <i>Chair: Xin Fei, U.S. Bureau of Engraving and Printing</i>
11:05	<i>Scalable Wet-spinning Multilevel Anisotropic Structured PVDF Fibers Enhanced with Cellulose Nanocrystal-Exfoliated MoS<sub>2</sub> for High-performance Piezoelectric Textiles</i> Liang Pan, Donghua University (virtual)	<i>Adhesion of Cellulose Fiber-based Banknote to Polymer Motifs</i> Xin Fei, U.S. Bureau of Engraving and Printing
11:25	<i>Hierarchical Cellular Structured Ultrathin Aerogel Micro/Nanofiber Membranes for High-efficiency Wind-resistant Warmth Retention</i> Yucheng Tian, Donghua University (virtual)	<i>Facilitating a Circular Economy of Textiles</i> Charlotte Wentz, National Institute of Standards and Technology (virtual)
11:45	<i>Oligomers are a Major Fraction of the Submicron Particles Released During Washing of Polyester Textiles</i> Tong Yang, McGill University	<i>Removal of Stiffness from Banana Fibers for Better Spinnability</i> Umaima Saleem, Mehran University of Engineering and Technology
12:05	<i>Fabrication and Modeling of Battery Yarns for e-Textiles</i> Wei Gao, North Carolina State University	<i>Bio-renewable Anti-plasticizer as Strengthening Agent in Synthetic Polysaccharide Fibers from Seaweed</i> Jingyi Zhou, North Carolina State University
<b>12:25–1:25 Lunch, JSNN Atrium</b>		

## Afternoon Sessions

	JSNN Auditorium	JSNN 206
	<b>Session: Fibers for Healthcare and Medical Applications</b> <i>Chair: Gang Sun, University of California Davis</i>	<b>Session: Advanced Fibers and Textiles in Convergence Research</b> <i>Chair: Lifeng Zhang, North Carolina A&amp;T State University</i>
1:25	<i>Preparation of Photo-induced Antibacterial Polymers and Fibers by Using Vitamins</i> Gang Sun, University of California Davis	<i>An Investigation into Microplastics Released from Face Masks</i> Asis Patnaik, Cape Peninsula University of Technology
1:45	<i>Poly (lactic acid) Meltblown Microfiber Nonwoven for High-efficiency Filtration Applications</i> Avik Kumar Dhar, University of Georgia	<i>Enhancing Phosphorus Filtration Efficiency with Nano-enhanced Electrospun Fibers and Metallic Coating</i> Sharika Cochran, North Carolina A&T State University
2:05– 2:25	<i>Coiling of Cellular Protrusions Around Fibers</i> Christian Hernandez-Padilla, Virginia Tech	<i>Remediation of Short-chain PFAS from Water by Using Sustainable Electrospun Nanofibrous Filter Material</i> Lifeng Zhang, North Carolina A&T State University
2:30– 3:00	<b>Special Session</b> <i>Applications of Electrospun Nanofiber Materials in Wound Dressing</i> Fangwen Zha, Huizhou Foryou Medical Devices Co.	<b>JSNN Auditorium</b> 

### 3:00 15 Minute Break, JSNN Atrium

	Session: Fibers for Healthcare and Medical Applications, cont'd <i>Chair: Fangwen Zha, Huizhou Foryou Medical Devices Co.</i>	Advanced Fibers and Textiles in Convergence Research cont'd <i>Chair: Ming Dong, UNC Wilmington</i>
3:15	<i>Soft Robotic Tongue Utilizing Fiber-shaped Pneumatic Actuators as a Learning Aid for Tongue Shape During Speech Production</i> Robert Seevers, North Carolina State University	<i>Computational Analysis of the Binding Mechanism of GenX and HSA</i> Ming Dong, UNC Wilmington
3:35	<i>3D Printed Electrospun Polycaprolactone (PCL)-Zinc (Zn) Composite Structured Platform for Biomedical Applications</i> Felix Tettey, North Carolina A&T State University	<i>Assessment of Adhesion in Fabric Reinforced Laminates (FRLs) Using Novel Yarn Pullout in Laminate Test</i> Feyi Adekunle, North Carolina State University
3:55– 4:15	<i>The Effect of esPAN (a 3D Nanomaterial) on Antifungal Drug Sensitivity in Candida albicans</i> Nooshin KianvashRad, UNC Greensboro	<i>Performance of NIP GaAs<sub>1-x</sub>Sb<sub>x</sub> Single Nanowire-based Photodetector Grown by MBE on Graphene Substrate</i> Yugwini Deshmukh, North Carolina A&T State University
4:20– 5:00	<b>Special Invited Session</b> <i>100 Years of Statistical Methods in Textile Research and a Vision with Data Science and AI: In Memoriam of Sir David R. Cox (1924–2012)</i> Moon Won Suh, Charles A. Cannon Professor Emeritus, North Carolina State University	<b>JSNN Auditorium</b>

**5:15**

**First shuttle departs at front of JSNN to Elliot University Center**

**5:30–6:10**

**Reception, Elliot University Center, Cone A, 507 Stirling Street, Greensboro, NC, 27412**

**6:10**

**Banquet, Elliot University Center, Cone A, 507 Stirling Street, Greensboro, NC, 27412**

**Keynote Speaker: Sherine Obare**

Vice Chancellor for Research and Engagement, University of North Carolina at Greensboro  
*The Power of Partnerships in Advancing Fiber Science*

**Shuttle returns to JSNN when banquet concludes.**

## Friday, May 24

- 7:30 Continental Breakfast
- 8:25 Introduction of Plenary Speaker: Lifeng Zhang (JSNN Auditorium)
- 8:30 **Plenary Lecture:** Donald Sturgeon, Multifibers, LLC  
*Sustaining Textile Competencies and Repurposing Legacy Capabilities*
- 9:20 **10 Minute Break, JSNN Atrium**

### *Morning Sessions*

	<b>JSNN Auditorium</b>	<b>JSNN 206</b>
	<b>Session: Fiber Manufacturing and Characterization</b> <i>Chair: Xiaomeng Fang, North Carolina State University</i>	<b>Session: Advanced Fibers and Textiles in Convergence Research</b> <i>Chair: Xin Fei, U.S. Bureau of Engraving and Printing</i>
9:30	<i>High-strength and High-toughness Polyester Fibers with a Homogeneous State of Molecular Entanglement</i> Takeshi Kikutani, Tokyo Institute of Technology (virtual)	<i>A Novel Approach for Identifying the Mechanical Behavior of Textiles</i> Mahmoud Hussein, Université de Haute Alsace (virtual)
9:50	<i>A Breathable Fibrous Membrane with Coaxially Hetero-structured Fibers for Personal Thermal Management and Electromagnetic Interface Shielding</i> Jiajia Wu, Donghua University (virtual)	<i>Integrated Dynamic Wet Spinning of Hydrogel Optical Fibers for Photomedicine in Deep Body</i> Guoyin Chen, Donghua University (virtual)
10:10	<i>Charge Distribution and Durability of Meltblown Electret Fabrics</i> Ivan Moldavchuk, University of Georgia	<i>Processing Structure and Properties of Carbon Fibers from Bitumen-derived Asphaltenes</i> Muzaffer Karaaslan, University of British Columbia (virtual)
10:30	<i>Textile-based Soft Actuators for Wearable Artificial Muscles</i> Xiaomeng Fang, North Carolina State University	<i>Electrode-Electrolyte Combined Nanofiber-based Supercapacitor</i> Dong Seok Lee, University of Texas Austin (virtual)

### 10:50 **15 Minute Break, JSNN Atrium**

	<b>Session: Fiber-Apparel Interfaces</b> <i>Chair: Rong Yin, North Carolina State University</i>	<b>Session: Session: Advanced Fibers and Textiles in Convergence Research cont'd</b> <i>Chair: Fangwen Zha, Huizhou Foryou Medical Devices Co.</i>
11:05	<i>Host-Guest Supramolecular Assembly of Giant Shape Amphiphiles</i> Jia Chen, Donghua University (virtual)	<i>Development of Nanofiber-reinforced Injectable Scaffolds with Shape-Memory Properties for Biomedical Applications</i> Mahesh Joshi, North Carolina A&T State University
11:25	<i>Microalgal Dynamics in Swine Wastewater Remediation: Comparative Insights in Four Species Treatment Efficacy</i> Derrick Kontoh, North Carolina A&T State University	<i>Temperature-responsive Skin-like Directional Flow and Water Repellent Fabric for Personal Comfort and Protection</i> Yi Pu, Hong Kong Polytechnic University
11:45	<i>PolyDADMAC Grafted Graphene Oxide-based 2D Sorbent Materials for the Treatment of Phosphate and PFAS</i> Nafisa Amin, North Carolina State University	Open

### 12:05 **Conference Closes**

## Poster Session

Wednesday, May 22, 4:20 p.m., JSNN Atrium

Session Chair: Chartanay Bonner

Presenter	Title
1-Farbod Ebrahimi	<i>Novel Paper-based Biosensor for Ultra-sensitive SERS Detection of Small Extracellular Vesicles (sEVs)</i>
2-Byeong Jin Yeang	<i>Development of Spun-laid Spinning for Lyocell Meltblown Nonwoven</i>
3-Nilesh Rajendran	<i>Non-destructive Characterization of Changes in Mechanical Properties Due to Mechanical and UV Degradation in Technical Textiles</i>
4-Derrick Kontoh	<i>SARS-CoV-2 Epidemiology and Wastewater Surveillance at North Carolina Agricultural and Technical State University, 2022–2023</i>
5-Reedwan Auniq	<i>Synthesis and Characterization of Magnesium Phosphate Bioceramic-Polycaprolactone Composite Electrospun Nanofibrous Scaffold for Tissue Engineering Applications</i>
6-Dekonti Davies	<i>Encapsulation of Zn Particles into Electrospun Fibers to Control Degradation and Release</i>
7-Alexis Moody	<i>Decellularized ECM-modified Nanofiber Scaffolds for Advanced Wound Care Applications</i>
8-Maitry Bhattacharjee	<i>Soil Burial Degradation of Polylactic Acid (PLA)-based Nonwoven Fabrics Under Controlled Conditions</i>
9-Laurence Price-Webb	<i>Concrete Review: Theory for Sustainable Architecture Through Nanoparticle-modified Concrete Composites</i>
10-Sita Shrestha	<i>Integrating Zein-coating ZN Bioinstructive Electrospun Scaffolds for Enhancing NIH3T3 Cell Growth and Differentiation</i>
11-Md. Shakirul Islam	<i>Biobased Additives on the Gelatin of Poly (Vinyl Alcohol)</i>
12-Maurelio Cabo	<i>Biotechnical Valorization of Lawn Biomass into Cellulosic Nanofibers</i>
13-Dokun Kim	<i>Changes in Filtration Performance of PLA Meltblown Nonwoven Due to Hydro-charging</i>
14-Hyun Ju Oh	<i>Structure Development of Poly(ethylene terephthalate) Fibers with NIR Fluorescence Inorganic Particle in High-speed Melt Spinning</i>
15-Jong Hyuk Bae	<i>Study on Fiber Structure and Properties of Biodegradable PET Copolymers in High-speed Melt Spinning</i>
16-Hyo Kyoung Kang	<i>Investigation of Polyacrylonitrile Nanofiber/Nanonet Treated with Cationic Surfactants for Particulate Matter Removal</i>

- 17-Joshua White *Effect of Substrate Temperature on GaAsSb Nanowire-based Photodetectors Grown on Silicon Substrates*
- 18-Samir Kattel *Lithium-doped Biopolymer-based Nanocomposites for Solid State Electrolytes in Energy Storage Device Applications*
- 19-Thakur Sapkota *Chitin Fibers-enabled Alginate Microcapsules for Cell Culture*
- 20-Atharva Agashe *Suspended Fiber Networks Influence Mitotic Outcomes*