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

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Preliminary Program

Tuesday, May 21

1:00 PM–5:00 PM	Governing Council Meeting, JSNN Board Room
5:00 PM–6:00 PM	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
Development of Functional Biobased Fiber Materials for a Sustainable Future

9:50 **10 Minute Break, JSNN Atrium**

Morning Sessions

	JSNN Auditorium	**Gateway Conference Room**
	Session: Fiber Manufacturing and Characterization ***Chair: Xiangwu Zhang, North Carolina State University***	**Session: Sustainable Fibers and Textiles** ***Chair: Katarina Goodge, National Institute of Standards and Technology***
10:00	*Advances in Meltblown Nonwovens: Nanofibers to Sustainable Materials for Demanding Applications* Gajanan Bhat, University of Georgia **(Keynote)**	*Developing a Spectroscopic Dataset for Automated Textile Sorting* Katarina Goodge, National Institute of Standards and Technology
10:30	*Characterizing Multifunctional Structure-Property Relationships by Mapping Inside Polymer Fibers* Michael Roenbeck, U.S. Merchant Marine Academy	*Innovative Technique to Convert Sisal Fiber into a Textile Fiber for Clothing* Sheraz Ahmad, National Textile University
10:50	*A Protein-like Nanogel for Spinning Hierarchically Structured Artificial Spider Silk* Xiang Zhou, China Pharmaceutical University	*Microencapsulation of Grapefruit Essential Oil Using Complex Coacervation for the Development of Mosquito Repellent and UV Protection Properties on Cotton* Rupali Kakaria, National Institute of Fashion Technology
11:10	**15 Minute Break, JSNN Atrium**	
11:25	*A Novel Sweat Simulator for Concurrent and Real-time Measurements of Fabric Liquid Moisture Management Properties* Jintu Fan, Hong Kong Polytechnic University	*Secondhand Clothing Sortation by Brand and Condition Supports a Circular Economy* Lisa Sciannella, Helpsy
11:45	*3D Printing with Flexible Filaments: Optimization and Manufacture of Auxetic Metamaterials for Footwear Comfort* Mars Harvey, North Carolina State University	*Bio-renewable Anti-plasticizer as Strengthening Agent in Synthetic Polysaccharide Fibers from Seaweed* Jingyi Zhou, North Carolina State University
12:05	*PHBHX and PCL Composite Nanoyarns* Divya Kamireddi, Drexel University	*Achieving Circularity in Textiles and Apparel Using Spinnable Banana Fibers* Yasir Nawab, National Textile University
12:25–1:25	**Lunch, JSNN Atrium**	

Afternoon Sessions

	JSNN Auditorium	**Gateway Conference Room**
	Session: Nanofibers and Nanofibrous Materials ***Chair: Jianjun Wei, UNC Greensboro***	**Session: Fiber-reinforced Composite Materials** ***Chair: Dattaji Shinde, North Carolina A&T State University***
1:25	*Manipulating Metal Oxide Nanostructures on Aligned Electrospun Carbon Nanofibers: Structures, Properties, and Applications* Jianjun Wei, UNC Greensboro	Effect of Electrospun Carbon Nanofiber on Fracture Toughness of Hybrid Laminated Polymeric Composites Dattaji Shinde, North Carolina A&T State University
1:45	*Sustainable Coloration of Cotton Fibers with Nanopolysaccharide Materials* Senay Yacob Baraki, Technical and Vocational Training Institute	*Synergistic of Modified Flax Fibers and Bio-additives on Flame Resistance of Flax/Vinyl Ester Composites* Prabhakar M.N., Changwon National University
2:05	*Carbon Nanofiber-based Electrode Material for Supercapacitors* Victor Charles, North Carolina A&T State University	*Advancing Cementitious Composites with Multifuncational Polmyeric-based Biotic Self-healing Fiber* Mohammad Houshmand, Drexel University
2:25	*Hybrid Metal Oxides on Aligned Carbon Nanofiber Composite for Photocatalytic Degradation of Organophosphate Pesticides* Jianjun Wei, UNC Greensboro (on behalf of Bukola Adesanmi)	*Multilayer Composites for Improved Mechanical Performance of Flexible Rapier Tape* Hanzla Zubair, National Textile University
2:45	**15 Minute Break, JSNN Atrium**	
	Session: Nanofibers and Nanofibrous Materials cont'd ***Chair: Hemali Rathnayake, UNC Greensboro***	**Fibers for Healthcare and Medical Applications** ***Session Chair: Caroline Schauer, Drexel University***
3:00	*A Novel Bio-based Sorbent Decorated Nanofiber Mat for Lithium* Hemali Rathnayake, UNC Greensboro	*Porosity-tuned, Electrospun Collagen Nanoyarns for Enhanced Cellular Adhesion and Infiltration* Caroline Schauer, Drexel University
3:20	*Morphological and Thermal Properties of Cellulose Nanocrystal-loaded Polylactide/Poly(Butylene Adipate-Co-Terephthalate) Nanocomposite Nanofibers* Hadan Palak, Cornell University	*Inclusive Design in Advanced Wearable Health Monitoring Systems: A Case Study of a Smart Sports Bra Leveraging Contact Pressure Optimization for Enhanced Biosignal Acquisition* Seonyoung Youn, North Carolina State University
3:40	*Electrospun Nanofiber Adsorbents for Rare Earth Element Extraction from Water* Israt Jahan, North Carolina A&T State University	*Tailoring Ionogel Biocomposites for Next-generation Sustainable Textiles* Evan McDowell, North Carolina A&T State University
4:00	*Tunable Bandgap Energy of Benign Eutectic Solvent as a Potential Biological Semiconductor via Tannic Acid/Bacterial Nanocellulose Interaction* *Maurelio Cabo, UNC Greensboro*	*Coiling of Cellular Protrusions Around Fibers* Christian Hernandez-Padilla, Virginia Tech
4:20–6:00	**Poster Session and Reception** **JSNN Atrium**	

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	**Gateway Conference Room**
	Session: Advanced Fibers and Textiles in Convergence Research ***Chair: Narayan Bhattarai, North Carolina A&T State University***	**Fiber-Apparel Interfaces** ***Chair: Ian Hardin, University of Georgia***
9:30	*All-fiber Integrated Self-powered Wearable Electronics* Dong Wang, Wuhan Textile University	*Innovative Photocatalytic Solutions for Sustainable Dye Removal* Yahya Absalan, University of Georgia
9:50	*Novel Triboelectric Yarn and Embroidery for Human-Machine Interaction* Rong Yin, North Carolina State University	*Enabling a Textile Circular Economy Through Standardization* Amanda Forester, National Institute of Standards and Technology
10:10	*Power of Fiber Twist* Zunfeng Liu, Nankai University	*Consumer-perceived Value of Circular Fashion Products* Md. Hasan Sheikh, UNC Greensboro
10:30	*Smart Fiber Materials and Devices for Fabric Computation* Wei Yan, Donghua University	*Using System Dynamics Modeling for Apparel Production* Gurinder Kaur, Thomas Jefferson University
10:50	**15 Minute Break, JSNN Atrium**	
	Session: Advanced Fibers and Textiles in Convergence Research cont'd ***Chair: Wei Gao, North Carolina State University***	**Session: Sustainable Fibers and Textiles** ***Chair: Xin Fei, U.S. Bureau of Engraving and Printing***
11:05	*Fabrication and Modeling of Battery Yarns for e-Textiles* Wei Gao, North Carolina State University	*Adhesion* Xin Fei, U.S. Bureau of Engraving and Printing
11:25	*Scalable Wet-spinning Multilevel Anisotropic Structured PVDF Fibers Enhanced with Cellulose Nanocrystal-Exfoliated MoS_2 for High-performance Piezoelectric Textiles* Liang Pan, Donghua University	*Facilitating a Circular Economy of Textiles* Charlotte Wentz, National Institute of Standards and Technology
11:45	*Hierarchical Cellular Structured Ultrathin Aerogel Micro/Nanofiber Membranes for High-efficiency Wind-resistant Warmth Retention* Yucheng Tian, Donghua University	*Food Packaging Based on Jute Fabric-Aluminum Foil Laminate* Debasish Das, University of Calcutta
12:05	*Oligomers are a Major Fraction of the Submicron Particles Released During Washing of Polyester Textiles* Tong Yang, McGill University	*Removal of Stiffness from Banana Fibers for Better Spinnability* Umaima Saleem, Mehran University of Engineering and Technology
12:25–1:25	**Lunch, JSNN Atrium**	

Afternoon Sessions

	JSNN Auditorium	Gateway Conference Room
	Session: Fibers for Healthcare and Medical Applications ***Chair: Gang Sun, University of California Davis***	**Session: Advanced Fibers and Textiles in Convergence Research** ***Chair: Lifeng Zhang, North Carolina A&T State University***
1:25	*Preparation of Photo-induced Antibacterial Polymers and Fibers by Using Vitamins* Gang Sun, University of California Davis	*Remediation of Short-chain PFAS from Water by Using Sustainable Electrospun Nanofibrous Filter Material* Lifeng Zhang, North Carolina A&T State University
1:45	*Smart Enhanced Silk Fibers with Double-Network Structures* Bin Fei, Hong Kong Polytechnic University	*An Investigation into Microplastics Released from Face Masks* Asis Patnaik, Cape Peninsula University of Technology
2:05	*Poly (lactic acid) Meltblown Microfiber Nonwoven for High-efficiency Filtration Applications* Avik Kumar Dhar, University of Georgia	*Enhancing Phosphorus Filtration Efficiency with Nano-enhanced Electrospun Fibers and Metallic Coating* Sharika Cochran, North Carolina A&T State University
2:25	*Nanonet Force Microscopy to Measure Forces Across Length Scales: Single Cells to Organisms* Atharva Agashe, Virginia Tech	*Metal-Organic Frameworks-based Multifunctional Cotton Fabrics* Hardeep Singh Jhinjer, Indian Institute of Technology Delhi
2:45	**15 Minute Break, JSNN Atrium**	
	Session: Fibers for Healthcare and Medical Applications, cont'd ***Chair: Fangwen Zha, Huizhou Foryou Medical Devices Co.***	**Advanced Fibers and Textiles in Convergence Research cont'd** ***Chair: Ming Dong, UNC Wilmington***
3:00	*Applications of Electrospun Nanofiber Materials in Wound Dressing* Fangwen Zha, Huizhou Foryou Medical Devices Co.	*Computational Analysis of the Binding Mechanism of GenX and HSA* Ming Dong, UNC Wilmington
3:20	*Soft Robotic Tongue Utilizing Fiber-shaped Pneumatic Actuators as a Learning Aid for Tongue Shape During Speech Production* Robert Seevers, North Carolina State University	*Assessment of Adhesion in Fabric Reinforced Laminates (FRLs) Using Novel Yarn Pullout in Laminate Test* Feyi Adekunle, North Carolina State University
3:40	*3D Printed Electrospun Polycaprolactone (PCL)-Zinc (Zn) Composite Structured Platform for Biomedical Applications* Felix Tettey, North Carolina A&T State University	*Performance of NIP $GaAs_{1-x}Sb_x$ Single Nanowire-based Photodetector Grown by MBE on Graphene Substrate* Yugwini Deshmukh, North Carolina A&T State University
4:00	*The Effect of esPAN (a 3D Nanomaterial) on Antifungal Drug Sensitivity in* Candida albicans Nooshin KianvashRad, UNC Greensboro	*Flexural and Impact Properties of Epoxy Composites with Surface Modified Electrospun Glass Nanofibers as Reinforcing Agent* Abhijeet Mali, North Carolina A&T State University
4:20–5:00	**Special Topic** — **JSNN Auditorium** *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)* Moon Won Suh, Charles A. Cannon Professor Emeritus, North Carolina State University	

5:30–6:00 **Reception, Guilford Convention Center, 3113 Cedar Park Rd., Greensboro, NC 27504**

6:00 **Banquet, Guilford Convention Center**

Keynote Speaker: Sherine Obare, Vice Chancellor for Research, UNC Greensboro

The Power of Partnerships in Advancing Fiber Science

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

	JSNN Auditorium	**Gateway Conference Room**
	Session: Fiber Manufacturing and Characterization ***Chair: Xiaomeng Fang, NC State University***	**Session: Advanced Fibers and Textiles in Convergence Research** ***Chair: TBD***
9:30	*High-strength and High-toughness Polyester Fibers with a Homogeneous State of Molecular Entanglement* Takeshi Kikutani, Tokyo Institute of Technology	*A Novel Approach for Identifying the Mechanical Behavior of Textiles* Mahmoud Hussein, Université de Haute Alsace
9:50	*A Breathable Fibrous Membrane with Coaxially Hetero-structured Fibers for Personal Thermal Management and Electromagnetic Interface Shielding* Jiajia Wu, Donghua University	*Enhancing Smart Textile Antennas for Wireless Communication Networks: Integrating Multimaterial Fibers and Machine Learning* Yosef Enku, Federal Technical and Vocation Training Institute
10:10	*Charge Distribution and Durability of Meltblown Electret Fabrics* Ivan Moldavchuk, University of Georgia	*Effect of Fused Deposition Modeling (FDM) Process Parameters on Mechanical Properties of Flexible Polymeric Structures* Ashok Sapkota, Auburn University
10:30	*Predictive Analytics for Weaving Quality Through Machine Learning: A Novel Approach in Fiber Manufacturing and Characterization* Ravindra Babu Bellam, Federal Technical and Vocation Training Institute	*Integrated Dynamic Wet Spinning of Hydrogel Optical Fibers for Photomedicine in Deep Body* Guoyin Chen, Donghua University
10:50	**15 Minute Break, JSNN Atrium**	
	Session: Fiber-Apparel Interfaces ***Chair: Rong Yin, North Carolina State University***	**Session: Session: Advanced Fibers and Textiles in Convergence Research cont'd** ***Chair: TBD***
11:05	*Bridging Research to Retail: Scaling Fiber Innovations in the Apparel Industry* Dhruv Agarwal, Koontoor Brands, Inc.	*Processing Structure and Properties of Carbon Fibers from Bitumen-derived Asphaltenes* Muzaffer Karaaslan, University of British Columbia
11:25	*Temperature-responsive Skin-like Directional Flow and Water Repellent Fabric for Personal Comfort and Protection* Yi Pu, Hong Kong Polytechnic University	*Development of Nanofiber-reinforced Injectable Scaffolds with Shape-Memory Properties for Biomedical Applications* Mahesh Joshi, North Carolina A&T State University
11:45	*Microalgal Dynamics in Swine Wastewater Remediation: Comparative Insights in Four Species Treatment Efficacy* Derrick Kontoh, North Carolina A&T State University	*Nano-clay–based Novel 3D Woven Hemp/Green Epoxy Composites* Muhammad Umair, National Textile University

12:05	*PolyDADMAC Grafted Graphene Oxide-based 2D Sorbent Materials for the Treatment of Phosphate and PFAS* Nafisa Amin, North Carolina State University	*Electrode-Electrolyte Combined Nanofiber-based Supercapacitor* Dong Seok Lee, University of Texas Austin

12:25 Conference Closes

Poster Session

Wednesday, May 22, 4:20 p.m., JSNN Atrium **Session Chair: Chartanay Bonner**

Presenter	Title
Debasish Das	*Functional Breathable Waterproof Coating System*
Farbod Ebrahimi	*Novel Paper-based Biosensor for Ultra-sensitive SERS Detection of Small Extracellular Vesicles (sEVs)*
Xinkang Xu	*Research on Preparation of Eight-leaf Square Hollow Profiled Fiber*
Byeong Jin Yeang	*Development of Spun-laid Spinning for Lyocell Meltblown Nonwoven*
Ming Yang	*Direct Assembly of Two-dimensional Nanofibrous Networks for High-efficiency Separation*
Jin Dai	*Multiphase Ceramic Nanofibers with Super-elasticity from –196℃ to 1600℃*
Siyu Qiang	*Trio Strategy of Harmonizing Electronic Structure, Interface, and Microenvironment on Amorphous Main Group Oxide Nanofiber for Selective Electrochemical Nitrogen Reduction*
Xinyi Chang	*Multiscale Interpenetrated/Interconnected Network Design Confers All-carbon Aerogels with Unprecedented Thermomechanical Properties for Thermal Insulation Under Extreme Environments*
Nigar Rashida	*Robust Silk Nanofibers: Facile Fabrication and Versatile Applications*
Nilesh Rajendran	*Non-destructive Characterization of Changes in Mechanical Properties Due to Mechanical and UV Degradation in Technical Textiles*
Derrick Kontoh	*SARS-CoV-2 Epidemiology and Wastewater Surveillance at North Carolina Agricultural and Technical State University, 2022–2023*
Reedwan Auniq	*Synthesis and Characterization of Magnesium Phosphate Bioceramic-Polycaprolactone Composite Electropsun Nanofibrous Scaffold for Tissue Engineering Applications*
Dekonti Davies	*Encapsulation of Zn Particles into Electrospun Fibers to Control Degradation and Release*
Joshua Tucker	*Impact Damage Mitigation Through Innovative Composite Hybridization*

Alexis Moody	*Decellularized ECM-modified Nanofiber Scaffolds for Advanced Wound Care Applications*
Alden Contreras	*Advancing Frontiers in Materials Science: Innovative Boron Nitrate Filament Fabrication*
Sita Shrestha	*Integrating Zein-coating ZN Bioinstructive Electrospun Scaffolds for Enhancing NIH3T3 Cell Growth and Differentiation*
Md. Shakirul Islam	*Biobased Additives on the Gelatin of Poly (Vinyl Alcohol)*
Dattaji Shinde	*Synthesis and Characterization of PAN/TiO 2-based Electrospun Carbon Nanofibers for Energy Applications*
Maurelio Cabo	*Biotechnical Valorization of Lawn Biomass into Cellulosic Nanofibers*
Dokun Kim	*Changes in Filtration Performance of PLA Meltblown Nonwoven Due to Hydro-charging*
Hyun Ju Oh	*Structure Development of Poly(ethylene terephthalate) Fibers with NIR Fluorescence Inorganic Particle in High-speed Melt Spinning*
Jong Hyuk Bae	*Study on Fiber Structure and Properties of Biodegradable PET Copolymers in High-speed Melt Spinning*
Hyo Kyoung Kang	*Investigation of Polyacrylonitrile Nanofiber/Nanonet Treated with Cationic Surfactants for Particulate Matter Removal*
Kiran Rana	*Electrically Conductive Poly(pyrrole) Nanotubes Doped Nylon 6 Composite Fibers Prepared by Wet-spinning*
Pranay Ahuja	*Up-scalable Synthesis of ZnO Nanostructures for Applications in Functional Textiles*
Maitry Bhattacharjee	*Soil Burial Degradation of Polylactic Acid (PLA)-based Nonwoven Fabrics Under Controlled Conditions*
Laurence Price-Webb	*Concrete Review: Theory for Sustainable Architecture Through Nanoparticle-modified Concrete Composites*
Rashmita Baruah	*Effect of Substrate Temperature on GaAsSb Nanowire-based Photodetectors Grown on Silicon Substrates*
Samir Kattel	*Lithium-doped Biopolymer-based Nanocomposites for Solid State Electrolytes in Energy Storage Device Applications*
Jia Chen	*Host-Guest Supramolecular Assembly of Giant Shape Amphiphiles*
Thakur Sapkota	*Chitin Fibers-enabled Alginate Microcapsules for Cell Culture*
Atharva Agashe	*Suspended Fiber Networks Influence Mitotic Outcomes*