

MAZBAH UDDIN

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Materials professional with a profound perspective and expertise in polymer, fiber, and textile sciences utilizing advanced and innovative techniques to research, discover, and optimize functional soft materials. Demonstrated expertise in the physical, chemical, mechanical, thermal, structural, and rheological understanding and analysis of soft materials to design and synthesize for functional applications. Skilled in data collection, preprocessing, and analysis, leveraging statistical methods and relevant software tools to generate and present critical insights.

RESEARCH INTERESTS

Polymer Sciences; Textile Sciences; Biomaterials; Nanomaterials; Functional Coatings; Films and Fibers; Aerogels; Composites; Sustainability; Functional Soft Materials

EDUCATION

Ph.D. in Materials Science

Jun 2025

Dissertation: Biodegradable Aqueous Dispersions for Paper Packaging Coating Applications

University of Georgia | Athens, GA

MS in Polymer, Fiber, & Textile Sciences

Jul 2021

Thesis: Co-axial yarn-based electrical nanogenerators of flexible metal threads

University of Georgia | Athens, GA

BS in Textile Engineering

Apr 2018

Bangladesh University of Textiles | Dhaka, Bangladesh

PROFESSIONAL EXPERIENCES

University of Georgia (UGA) | Athens, GA

Aug 2019 – Present

Research Assistant – Textiles, Merchandising, & Interiors (TMI)

- Technical and scientific assistance in developing nanofiber-based lightweight thermal protective fabric prototype for oil and gas field worker's clothing (2024–Present)
 - Charged with instrumentation and optimization of electrospinning and touchspinning parameters for spinning meta-aramid fibers
- Tasked with developing bio-based functional coatings for enhancing mechanical and barrier performance of paper packaging (2021–Present):
 - Synthesized nanocellulose fibrils from lignocellulosic biomass with appropriate aspect ratio
 - Formulated and developed biodegradable polyester-based waterborne dispersions

University of Georgia | Athens, GA

Aug 2021 – Present

Teaching Assistant – Textiles, Merchandising, & Interiors

- Facilitated student learning by providing instructional support, personalized guidance, and thorough assessment, ensuring an engaging and effective educational experience

University of Georgia | Athens, GA

Aug 2019 – Jul 2021

Fellow Research Assistant – Textiles, Merchandising, & Interiors

- Charged with fabricating core-shell yarn-based nanogenerators for harvesting low-frequency mechanical energy into electrical energy (2019–2021):
 - Optimized PVDF melt extrusion coating on metal electrodes to enhance triboelectric yarn performance
 - Engineered nanofiber and solvent-based PVDF coatings on metal electrodes, achieving highly efficient piezoelectric yarns

Ha-Meem Group | Dhaka, Bangladesh

Feb 2018 – Jun 2019

Trainee Merchandiser – Sourcing, Production, & Management

- Led the manufacturing of ready-made woven garments worth \$15 million annually for PVH Corp.

- Effectively performed and managed tasks including materials sourcing, procurement, product development, supply chain management, resource allocation, and timely product shipment

Square Textiles Limited | Gazipur, Bangladesh
Intern – Production & Quality Control

Jun 2017 – Aug 2017

- Received specialized training in yarn production techniques, including ring, rotor, vortex, metallic, plied, and core-spun yarns
- Emphasized exposure to quality control and assurance, finishing processes, and R&D initiatives

TECHNICAL & ANALYTICAL ACUMEN

DSC, TGA, XRD, DMA, SEM, TEM, EDX, AFM, ellipsometry, UV-Vis, FTIR, NMR, mass spectrometry, DLS/SLS, rheometer, universal tester, tensiometer, textiles & packaging performance assessment, instrumentation, & 3D printing. Familiar with ASTM, AATCC, TAPPI, & ISO standards relevant to materials characterization and performance. Data analysis through Microsoft Office, OriginLab, JMP, ImageJ, ANOVA, Python, & R programming.

RESEARCH GRANTS

S. Sharma, V. Mohakar, S. Rai, and **M.M. Uddin**. Developing Vegan Leather Alternatives with Persimmon and NFC-Chitosan Hydrogel Coatings: A Natural and Innovative Approach, \$62000, NSF-CB², 2024

S. Sharma, S. Mani, and **M.M. Uddin**. Bio-Based Coatings for High-Performance Flexible Paper Packaging Application and Improved Understanding of Their Water Barrier Properties, NSF-CB², \$65557, 2023

M.M. Uddin, S. Sharma. Application of Core (PLA)-Sheath (PHB) Nanofibrous Yarn as Implantable Medical Textiles, AATCC Foundation Student Research Support Grant, AATCC, \$500 2019

LICENSED TECHNOLOGIES

S. Sharma, S. Minko, S. Rai, **M. M. Uddin**, et al. The following co-invented technologies are licensed to GATE - Genesis Advance Tech Engineering: (a) Hydrophobic nano cellulosic hydrogels and process of fabricating nanocellulose hydrogels from wood pulp and plant fibers; and sustainable and eco-friendly dyeing/coating of cotton textiles with nanocellulose-indigo gel. (b) Nanocellulose-based coatings for textile sizing application

PATENTS

S. Sharma, S. Minko, A. Liyanapathirana, V. Mohakar, **M. M. Uddin**, S Rai, Y. Absalan, S. Mesihovic. Eco-friendly aerogels and foams from lignocellulosic and protein sources: applications in textiles and environment (US Patent App. 63/655,26, Provisional)

PEER-REVIEWED PUBLICATIONS

Tushar, S. I., Anik HR, **Uddin, M. M**✉, S. Mandal, V. Mohakar, S. Rai, S. Sharma✉. Nanocellulose-based porous lightweight materials with flame retardant properties: A review, Carbohydrate Polymers, 339 (2024), 122237

Tushar, S. I., Sayam A, **Uddin, M. M**, Dip TM✉, Anik HR, Arin MRA, Sharma, S.✉, Triboelectric nanogenerators assisted synthesis and detection of chemical compounds. J. Mater. Chem. A, 2023,11, 19244-19280

Dip, T. M., Arin, M. R. A., Anik, H. R., **Uddin, M. M** ✉., Tushar, S. I., Sayam, A., Sharma, S.✉, Triboelectric Nanogenerators for Marine Applications: Recent Advances in Energy Harvesting, Monitoring, and Self-Powered Equipment. Adv. Mater. Technol. 2023, 2300802.

Uddin, M. M.✉, Dip, T. M., & Sharma, S. "Wearable Nanogenerators". Nanogenerators: Basics, Design Strategies, and Applications. CRC Press, 2022, ISBN# 9781003187615

Uddin, M. M., Blevins, B., Yadavalli, N. S., Pham, M. T., Nguyen, T. D., Minko, S., & Sharma, S✉. (2022). Highly flexible and conductive stainless-steel thread based piezoelectric coaxial yarn nanogenerators via solution coating and touch-spun nanofibers coating methods. Smart Materials and Structures, 31(3), 035028

Uddin, M. M., Yadavalli N. S., Nguyen T. D., Minko S., and Sharma S. ✉, “Melt coated flexible stainless-steel thread based co-axial triboelectric yarn nanogenerators,” Mater. Technol., pp. 1–15, Feb. 2022.

Sikdar, P.✉, **Uddin, M. M.**, Dip, T. M., Islam, S.✉, Hoque, M. S., Dhar, A. K., & Wu, S. (2021). Recent advances in the synthesis of smart hydrogels. Mater. Adv, 2(14), 4532-4573.

PUBLICATION IN PROGRESS

Preparation of Nanofibrillated Cellulose Hydrogels from Diverse Plant Sources for Functional Coatings in Paper Packaging Applications (Soon)

Synthesis of Chitosan-Sodium Dodecyl Sulfate Complex Based Polyhydroxybutyrate Aqueous Dispersion (Soon)

Aligned Polyhydroxybutyrate Fibrous Scaffolds Via Touchspinning Apparatus (Soon)

Lignin-incorporated Nanofibrillated Cellulose Hydrogels of Hemp Fibers for Packaging Application (Soon)

Triboelectric Nanogenerators-Assisted Degradation of Chemical Compounds (submitted to ACS Omega)

Functionalized Applications of Nanocellulose-Based Aerogel In Healthcare (First draft is ready)

Novel Development of Nanofibrillated Cellulose Hydrogels Doped with photoluminescent Nanoparticles for efficient, Sustainable and Versatile Tracing Technologies (co-author, in process)

AWARD & CERTIFICATIONS

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| • Materials Characterization Workshop, PerkinElmer Analytical Solutions B.V. | Oct 2023 |
| • Endsley-Peifer Student Research Award, Graduate School, UGA | Apr 2023 |
| • Basic Introduction to Materials Testing: Static, Instron | Apr 2020 |
| • Jones Anderson Family Scholarship, FACS, UGA | Apr 2022 |
| • The Graduate School Doctoral Fellow Award, Graduate School, UGA | Mar 2021 |
| • AATCC Foundation Student Research Support Grant, AATCC | Dec 2019 |
| • Georgia Impact Now Master's Fellows Program (GAIN) | Feb 2019 |

CONFERENCES AND PRESENTATIONS (BOLD DENOTES PRESENTING AUTHOR)

M. M. Uddin, V.N. Mohakar, S. Mani and S. Sharma, “Preparation of Nanofibrillated Cellulose Hydrogels from Various Plant Materials”, **IBBC-PEERS (TAPPI)**, Nov 2023, Atlanta, Georgia, USA. Poster Presentation

M. M. Uddin, V.N. Mohakar, S. Mani and S. Sharma, “Biodegradable Polymer Based Coatings for High-Performance Flexible Paper Packaging Application” **Fiber Society Conference**, Oct 2023, Drexel University, Philadelphia, PA, USA. Poster Presentation

M. M. Uddin, N. S. Yadavalli, T. D. Nguyen, S. Minko, and S. Sharma, “Melt coated flexible stainless-steel thread-based co-axial triboelectric yarn nanogenerators ”, **Fiber Society Conference**, Oct 2022, North Carolina State University, Raleigh, NC, USA. Oral presentation

M. M. Uddin, B. Blevins, N. S. Yadavalli, T. D. Nguyen, S. Minko, and S. Sharma “Co-axial Yarn Based Electrical Nanogenerators of Flexible Metal Threads”, **Techtextil North America**, May 2022, Georgia World Congress Center, Atlanta, GA, USA. Poster presentation

M. M. Uddin, R. Saremi, and S. Sharma, “Application of Core-Sheath Nanofibrous Yarn as Implantable Medical Textiles”, **4th International Symposium on Materials from Renewables (ISMR)**, Oct 2019, University of Georgia, USA. Poster Presentation

CONTRIBUTED CONFERENCES AND PRESENTATIONS (BOLD DENOTES PRESENTING AUTHOR)

V.N. Mohakar, M. M. Uddin, U.M. Jahan, V. Reukov, S. Minko, and S. Sharma, “Aligned polyhydroxybutyrate (PHB) nanofibers scaffolds via novel touchspinning method”, **Fiber Society Conference**, Oct 2023, Drexel University, Philadelphia, PA, USA. Poster Presentation

M.M. Uddin, S. Mani, and **S. Sharma**, Bio-based coatings for high-performance paper packaging application and improved understanding of their water barrier properties, **CB² Industry Advisory Meeting**, Nov 2022, Kimberly-Clark Corporation, Roswell, GA, USA. Oral presentation

M.M. Uddin and **S. Sharma**, Wearable piezoelectric generator, International conference on sustainable materials, management, and innovative technologies (**ICSMMIT**), Jun 2022, Coimbatore, India. Oral presentation

M.M. Uddin, S. Mani, and **S. Sharma**, Bio-based coatings for high-performance flexible paper packaging application, **CB² Industry Advisory Meeting**, May 2022, Washington State University, Pullman, WA, USA. Oral presentation

PRESS RELEASES AND MEDIA

Study finds neck gaiters can reduce droplet spread, <https://ohsonline.com/articles/2020/12/21/neck-gaiters-are-effective-face-coverings-says-cdc-and-niosh-report.aspx>.

PROFESSIONAL CONTRIBUTIONS

- **MEMBERSHIP, SOCIETY OFFICES, AND ACTIVITIES**
 - Student Member of the Technical Association of the Pulp and Paper Industry (TAPPI), 2022- Present
 - Student Member of the Fiber Society, 2022- Present
 - Student Member of American Chemical Society, 2023- Present
 - Student Member of the American Association of Textile Chemists and Colorists (AATCC), 2020- Present
- **TECHNICAL JOURNAL OR CONFERENCE REFEREE ACTIVITIES**
 - Reviewer for the “Journal of Applied Polymer Science”
 - Reviewer for the “Designed Monomers and Polymers”
- **OTHER PROFESSIONAL INVOLVEMENTS**
 - Q & A Panelist, 46th Georgia Junior Science & Humanities Symposium, UGA, USA, 2021
 - Paper reader, 47th Georgia Junior Science & Humanities Symposium*, UGA, USA, 2022
 - Paper reader, 48th Georgia Junior Science & Humanities Symposium*, UGA, USA, 2023

PUBLIC AND COMMUNITY SERVICES

- **Chair of Social Programming**, TMI, UGA, USA, 2019-2021
 - Initiate, plan, and execute all social events by communicating with the graduate committee, graduate students, and the department head
- **Treasurer** at Bangladeshi Student Association (BASA) for International Student Life (ISL) at UGA, USA, 2019-2020
 - Correspondence with ISL regarding fund allocation and budgeting for BASA-organized programs at UGA
 - Fund collection from ISL, student members, alumni, local community, etc. for BASA
 - Budgeting funds for organizing different cultural and international programs at UGA
- **General Secretary** at BASA for ISL at UGA, USA, 2021-2022
 - Establishing communication among students, the community, and ISL with BASA’s executive committee
 - Organizing social gatherings and meetings

WEBLINKS

- **Google Scholar**: <https://scholar.google.com/citations?user=eChqq80AAAAJ&hl=en>
- **SCOPUS**: <https://www.scopus.com/authid/detail.uri?authorId=57226273306>