

Anupam Chowdhury

PhD Student

Department of Textile and Fibre Engineering

Indian Institute of Technology Delhi

ttz178473@iitd.ac.in — anupamc24@outlook.com

Phone: +91 7002401484

Google Scholar — LinkedIn

Education

- **Ph.D.**

Department of Textile and Fibre Engineering, Indian Institute of Technology Delhi

2018 - December 2024 (*expected*)

Dissertation: Study of Shape Memory Coupled Piezoelectric Nanocomposites

- **Master of Technology in Polymer Science and Technology**

Tezpur University

2015 - 2017

Dissertation: Development of Biodegradable Superabsorbent Nanocomposite Hydrogel Based on Modified Gelatin

- **Bachelor of Technology in Jute Technology**

University of Calcutta

2009 - 2013

Dissertation: Studies on Time-Dependent Mechanical Behavior of Jute Yarn

Research Experience

- **Doctoral Student**

Department of Textile and Fibre Engineering, IIT Delhi

January 2018 - Present

PhD Advisors: Dr. Wazed Ali and Dr. Bipin Kumar

- Synthesized piezoelectric ceramics using hydrothermal methods.
- Characterized materials using XRD, TGA, DSC, SEM, FESEM, TEM, FTIR, Raman spectroscopy, and XPS.
- Fabricated polymer nanocomposites via melt mixing, compression molding, and solution casting.
- Developed shape memory fibers by melt extrusion and analyzed their thermomechanical properties.
- Utilized various software tools for material characterization and structural optimization, including Thermofisher Scientific Omnic spectra for FTIR, Panalytical Xpert for XRD
- Origin for data analysis-representation, Chemdraw for drawing chemical structures
- CAD softwares Fusion 360 for 3D visualization objects (basic)
- Simulation software Materials Studio for polymer structure building and geometry optimization and VESTA for visualization (basic)

- **M.Tech Researcher**

Department of Chemical Sciences, Tezpur University

2015 - 2017

Thesis Advisor: Prof. Swapan Kumar Dolui

- Synthesized polymers through bulk, solution, and emulsion polymerization.
 - Developed fiber-reinforced polymer composites.
 - Conducted hydrogel synthesis and studied controlled release of fertilizers.
 - Utilized various characterization tools including UTM, TGA, SEM, XRD, DSC, and FTIR.
 - Employed Design Expert software for experiment optimization.
- **B.Tech Researcher**
 Department of Jute and Fibre Technology, University of Calcutta
 2009 - 2013
 Thesis Advisor: Prof. Asis Mukhopadhyay
 - Analyzed stress-strain and creep behavior of jute fibers and yarns using UTM.
 - Characterized materials using TGA and FTIR.
 - Applied viscoelastic models to compute parameters of Meredith Equation.

Professional Experience

- Preparation of technical draft of IEC (International Electrotechnical Commission) standards of Future IEC 63203-20X- X: Wearable electronic devices and technologies- Part 20X-X: Test method for measuring performance of fabric based piezoelectric nanogenerator (ongoing)
- Preparation and validation of composite extruded materials for specialized applications (Quantum Copper Inc. USA)

Publications

- Das, S., **Chowdhury, A.**, & Ali, S. W. (2024). Wearable, Machine Washable, Breathable Polyethylenimine/Sodium Alginate Layer-by-Layer-Coated Cotton-Based Multifunctional Triboelectric Nanogenerators. *ACS Applied Materials and Interfaces*, 16 (24), 31098-31113.
- Roy, S., **Chowdhury, A.**, Joshi M., & Ali, S. W. (2024). Flexible PEI/PVDF Blend Films with an Enhanced Curie Temperature for Piezoelectric Energy Harvesting. *ACS Applied Electronic Materials*, 6(4), 2142-2151.
- Das, S., **Chowdhury, A.**, & Ali, S. W. (2024). A Critical Review on Triboelectric Nanogenerators (TENGs) with Flame Retardant Antibacterial Self-Cleaning or Water Repellent Properties. *ACS Applied Electronic Materials*, 6(4), 2093-2119.
- Roy, S., **Chowdhury, A.**, Joshi M., & Ali, W. (2024). Flexible and high-temperature stable nanofiber composite made of PEI/KNN for energy harvesting. *Journal of Materials Science*, 59(1), 171-187.
- Das, S., Mirlekar, M. N., Banerjee S., **Chowdhury, A.**, & Ali, S. W. (2024). Cellulose-Based Hybrid Piezoelectric Materials. In *Hybrid Materials for Piezoelectric Energy Harvesting and Conversion*.
- **Chowdhury, A.**, Das, S., Mirlekar, M. N., & Ali, S. W. (2024). ZnSnO₃-Based Hybrid Piezoelectric Materials. In *Hybrid Materials for Piezoelectric Energy Harvesting and Conversion*, 145-158.

- **Chowdhury, A.**, Das, S., & Ali, W. (2023). 15 Smart textiles for energy harvesting applications. In *Smart and Functional Textiles* (pp. 607–634). De Gruyter.
- Ali, S. W., **Chowdhury, A.**, Banerjee, S., & Bairagi, S. (2022). Bio resources mediated technological advancements in chemical finishing of textiles. In *Applications of Biotechnology for Sustainable Textile Production* (pp. 187-220). Woodhead Publishing.
- Ali, S. W., **Chowdhury, A.**, Bairagi, S., & Banerjee, S. (2022). Green nanomaterials for multifunctional textile finishes. In *Green Functionalized Nanomaterials for Environmental Applications* (pp. 343-364). Elsevier.
- Ali, S. W., **Chowdhury, A.**, Bairagi, S., & Banerjee, S. (2022). Biodegradable nanocomposites: Effective alternative of synthetic polymer in electronic industries. In *Green Nanomaterials for Industrial Applications* (pp. 423-443). Elsevier.
- Gadkari, R. R., Garg, H., **Chowdhury, A.**, & Ali, W. (2022). Chitosan-based bionanocomposites for food packaging applications. In *Bionanocomposites for Food Packaging Applications* (pp. 181-200). Woodhead Publishing.
- Ali, S. W., & **Chowdhury, A.** (2022). Polybutylene succinate based bionanocomposites for food packaging applications. In *Bionanocomposites for Food Packaging Applications* (pp. 165-180). Woodhead Publishing
- Raj, A., **Chowdhury, A.**, & Ali, S. W. (2022). Green chemistry: Its opportunities and challenges in coloration and chemical finishing of textiles. *Sustainable Chemistry and Pharmacy*, 27, 100689.
- Bairagi, S., Banerjee, S., **Chowdhury, A.**, & Ali, S. W. (2021). Development of a sustainable and flexible piezoelectric-cum-triboelectric energy harvester comprising a simple commodity cotton fabric. *ACS Sustainable Chemistry & Engineering*, 9(11), 4004-4013.
- Ali, S. W., **Chowdhury, A.**, Nath, J., Dolui, S. K., & Gadkari, R. R. (2021). Cellulose-based bionanocomposites in tissue engineering and regenerative medicine. In *Bionanocomposites in Tissue Engineering and Regenerative Medicine* (pp. 451-463). Woodhead Publishing.
- **Chowdhury, A.**, Bairagi, S., Ali, S. W., & Kumar, B. (2020). Leveraging shape memory coupled piezoelectric properties in melt extruded composite filament based on polyvinylidene fluoride and polyurethane. *Macromolecular Materials and Engineering*, 305(12), 2000296.
- Ali, W., Gadkari, R., Arora, S., Somkuwar, V., & **Chowdhury, A.** (2020). Antibacterial Electrospun Nanofibres. In *Advanced Antimicrobial Materials and Applications* (pp. 239-255). Singapore: Springer Singapore
- **Chowdhury, A.**, Bairagi, S., Kumar, B., & Ali, S. W. (2020). Composite Electrospun Nanofibers for Energy Scavenging Applications. In *Nanotechnology in Textiles* (pp. 471-505). Jenny Stanford Publishing
- Nath, J., Ahmed, A., Saikia, P., **Chowdhury, A.**, & Dolui, S. K. (2020). Acrylic acid grafted gelatin/LDH based biocompatible hydrogel with pH-controllable release of vitamin B12. *Applied Clay Science*, 190, 105569
- Nath, J., **Chowdhury, A.**, Ali, I., & Dolui, S. K. (2019). Development of a gelatin-poly(acrylic acid-co-acrylamide)-montmorillonite superabsorbent hydrogels for in vitro controlled release of vitamin B12. *Journal of Applied Polymer Science*, 136(22), 47596.

- Nath, J., **Chowdhury, A.**, & Dolui, S. K. (2018). Chitosan/graphene oxide-based multifunctional pH-responsive hydrogel with significant mechanical strength, self-healing property, and shape memory effect. *Advances in Polymer Technology*, 37(8), 3665-3679.
- Nath, J., **Chowdhury, A.**, & Dolui, S. K. (2018). Chitosan/graphene oxide-based multifunctional pH-responsive hydrogel with significant mechanical strength, self-healing property, and shape memory effect. *Advances in Polymer Technology*, 37(8), 3665-3679.

Honors and Awards

- Anundoram Barooah Award (2005) by the Government of Assam for merit-based performance in Secondary Examinations.
- Engineering and Technology Scholarship (2015-17) by the Department of Technical Education, Government of Assam.
- AIR 69 in GATE 2016.
- 3rd Prize in 'Innovation is in my DNA!' contest (2016) by Asian Paints.
- Cover art selected for December 2020 edition of *Macromolecular Materials and Engineering*.
- Cover art selected for April 2024 edition of *ACS Applied Electronic Materials*.

Teaching Assistantship

- Manufactured Fibre Technology Lab
- Technology of Textile Preparation & Finishing Lab
- Technology of Textile Coloration Lab

Courses and Certifications

- Nanotechnology and Nanosensors Part 1, Coursera (August 2020), Technion - Israel Institute of Technology, Credential ID: 97MCCDTSUBPQ

References

- **Dr. Wazed Ali**
Associate Professor, Department of Textile and Fibre Engineering, IIT Delhi
Email: wazed@iitd.ac.in
- **Dr. Bipin Kumar**
Associate Professor, Department of Textile and Fibre Engineering, IIT Delhi
Email: bipin@iitd.ac.in
- **Prof. Swapan Kumar Dolui**
Retired Professor, Department of Chemical Sciences, Tezpur University
Email: skdolui5052@gmail.com
- **Prof. Debasish Das**
Professor, Department of Jute and Fibre Technology, University of Calcutta
Email: drdebasishdas@yahoo.co.in