WAFA TONNY
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Education

- Doctor of Philosophy (Ph. D.) in Materials Science & Engineering Program — August 2024
  University of Houston- Houston, TX
- Master of Science (Thesis) in Materials Science & Engineering Program — May 2020
  University of Houston- Houston, TX
- Master of Science (Thesis) in Chemistry and Biochemistry — August 2017
  University of Texas at Arlington- Arlington, TX
- Bachelor of Science in Applied Chemistry & Chemical Engineering — December 2011
  University of Dhaka- Dhaka, Bangladesh

Academic Appointments

- **Adjunct Faculty**, Chemical Engineering, Prairie View A & M University, Prairie View, TX (September 2024- Present)
  - Instructed undergraduate-level students in introduction to chemical engineering, ethics in global society and environmental impact in engineering courses in-person and lab classes as per course curriculum.
- **Adjunct Faculty**, Chemistry, Dallas College-Cedar Valley and Mountain View Campus, Dallas, TX (January- July 2018)
  - Instructed undergraduate-level students in general chemistry, biochemistry and engineering chemistry courses in-person and lab classes as per course curriculum of community college.
  - Helped build hands-on lab experimental set-ups and course syllabus with instructional videos available on YouTube. (*https://www.youtube.com/@wafatonny9721*)
- **Senior Lecturer**, Chemistry, School of Natural Science, American International University-Bangladesh, Dhaka, Bangladesh (August 2012- May 2015)
  - Instructed undergraduate-level engineering, natural sciences, social science and business education major students in general chemistry courses in-person and lab classes as per course curriculum of engineering college.
  - Helped build hands-on lab experimental set-ups and course syllabus with detailed instructions.
  - Graded and proctored midterm and final exams and maintained regular office hours.
- **Instructional Assistant**, Mechanical Engineering Technology, College of Technology, University of Houston, TX (August 2019- May 2020)
  - Instructed and supervised undergraduate-level students in multiple materials and mechanical engineering and technology-based lab classes.
  - Graded and proctored multiple materials technology courses.

Research Experiences

- **Graduate Research Assistant**, Materials Science & Engineering Program, Cullen College of Engineering, University of Houston, TX (August 2020- August 2024) (**Ph. D. (Dissertation)** titled ('Molecular Structure-Property Relations in Chitosan Nanocomposite Bulk and Thin Films')
  - Elucidated molecular structure-property relations, especially the effect of humidity (R.H. 45-90%) in colorimetric response as sensors (5sec response time) and the effect of nanofillers in the mechanical and thermal properties by reducing the water absorption by 1000% and increasing the toughness 200% in hydrophilic chitosan polymer and nanocomposite biodegradable films in nano- to micro-meter regime.
  - Expert in different materials properties characterization techniques and variety of analytical instruments such as AFM, XRD, FTIR, SEM, TEM, XPS, 3D printing, UV-Vis, NMR, DSC-TGA, DMA, LC-MS, GPC, ToF- SIMS, Instron, Texture Analyzer, ASTM standards for mechanical properties for composites, Optical Microscopy, Ellipsometry, Interferometer, etc.
  - Instructed and supervised graduate-level students in multiple polymer-related research projects, and spearheaded collaboration between three principal investigators for dissertation work, agency funded, and company funded research projects.

- **Research Assistant,** Materials Science & Engineering Program, Cullen College of Engineering, University of Houston, TX (December 2018- May 2020) (**M.S. (Thesis**) titled 'Enhanced Vertical Orientation in Cylindrical PS-*b*-PMMA using Ionic Liquid and Direct Immersion Annealing')
  - Highly trained in formulations and polymer thin film deposition and film processing techniques-coating, etching, annealing, nanopatterning for semiconductor-based and ultrafiltration membrane materials.
  - Studied the macro- phase separation and polymer orientation in block copolymer nano- meter thin films using different annealing techniques such as thermal, solvent vapor and direct immersion.
  - Studied the effect of an additive in phase separation in block copolymer and characterized the surface morphology.
  - Evaluated the mechanical stability and nano-pattern capability in the block copolymer thin films for nanolithography and membrane applications.
  - Studied the addition of nanofillers in the orientation of block polymers in thin films for electromagnetic interference applications.
- **Graduate Teaching and Research Assistant**, Department of Chemistry and Biochemistry, University of Texas at Arlington, TX (August 2015- August 2017) (**M.S. (Thesis)** titled 'Toxicity Study of $CaCe_2S_4$')
  - Supervised undergraduate-level students in hands-on lab experiments for general chemistry and engineering general chemistry courses.
  - Instructed, proctored, and graded the undergraduate-level general chemistry courses and trained new graduate students for lab teaching assistantships.
  - Synthesized polycrystalline rare-earth and alkaline earth mixed chalcogenides, rare-earth metal and transition metal mixed chalcogenides using high temperature high vacuum system aiming at semiconducting and thermoelectric materials application.
  - Evaluated the crystal structures and the toxicity of the rare-earth chalcogenides in two different assays to establish towards household paint pigments.
- **Student Researcher,** Nuclear and Radiation Chemistry Division, Institute of Nuclear Science and Technology, Bangladesh Atomic Energy Commission, Dhaka, Bangladesh (August 2010- February 2012) (**Thesis)** titled 'Characterization of Glycerol incorporated Chitosan-Starch based Biodegradable Films for Packaging Application')
  - Studied the thermo-mechanical properties of biodegradable polymer blend films and the effect of plasticizer aiming towards food packaging applications.
  - Demonstrated the pH sensitivity, chemical structure-mechanical properties relation and biodegradability of the prepared polymer films which was published as an article.

Publications

Published - 6

(Google Scholar: https://scholar.google.com/citations?view_op=list_works&hl=en&hl=en&user=kQjUYpAAAAAJ)

- **Wafa Tonny**, Mohammad Oliuddin Tuhin, Rafiqul Islam, Ruhul Amin Khan*; "Fabrication and Characterization of Biodegradable Packaging Films Using Starch and Chitosan: Effect of Glycerol"; *J Chem Eng Chem* **2014**, Res *1* (5), 343-352.
- Muhammad Ayser, **Wafa Tonny**, Isabella Sanchez Hernandez, Rohana Kuriakose, Justin D Smith, Samuel Wallaert, Alamgir Karim, Megan L Robertson, Venkatesh Balan*; "Fractionating Chitin and Coproducts from *Pleurotus ostreatus* Mushrooms"; *Waste Biomass Valor* **2023**, 1-14 (https://doi.org/10.1007/s12649-023-02364-5).
- Ali Masud, Wenjie Wu, Maninderjeet Singh, **Wafa Tonny**, Ali Ammar, Kshitij Sharma, Joseph W. Strzalka, Tanguy Terlier, Jack F. Douglas*, and Alamgir Karim*; "Solvent Processing and Ionic Liquid-Enabled Long-Range Vertical Ordering in Block Copolymer Films with Enhanced Film Stability" *Macromolecules* **2021**, *54, 18,* 8512−8525.
- Wenjie Wu, Maninderjeet Singh, Yue Zhai, Ali Masud, **Wafa Tonny**, Chuqing Yuan, Rongguan Yin, Abdullah M Al-Enizi, Michael R Bockstaller, Krzysztof Matyjaszewski, Jack F Douglas, and Alamgir Karim*; "Facile Entropy-Driven Segregation of Imprinted Polymer-Grafted Nanoparticle Brush Blends by Solvent Vapor Annealing Soft Lithography"; *ACS Appl. Mater. Interfaces* **2022**, *14*, 40, 45765−45774.
- Mohammad O. Tuhin, Nazia Rahman*, M.E. Haque, Ruhul A. Khan*, N.C. Dafader, Rafiqul Islam, Mohammad Nurnabi, **Wafa Tonny;** "Modification of mechanical and thermal property of chitosan–starch blend films"; *Radiation Physics and Chemistry* **2012**, *81* (10), 1659-1668.

- Kamol Dey, Poonam Alamgir, Shahnaz Parvin, Gulshana Mohol, **Wafa Tonny**, Mubarak A Khan, Ruhul A Khan*; Characterization of Phosphate Glass Reinforced Gelatin Blend Bioactive Composite Films" *Journal of Research Updates in Polymer Science* **2014**, *3* (3), 149-156.

Conference Proceedings

- **Wafa Tonny**, Samuel Wallaert, Justin D. Smith, Venkatesh Balan, Megan L. Robertson, Alamgir Karim*, "Humidity Induced Swelling of Sustainable Chitosan Nanocomposite Thin Films for Optical Sensors"; S33.00007, Session S33: Physics of Polymer Coatings and Thin Films, ***American Physical Society* (APS) March Meeting 2024**, March 4-8, 2024, Minneapolis, MN
- **Wafa Tonny**, Samuel Wallaert, Justin D. Smith, Venkatesh Balan, Megan L. Robertson, Alamgir Karim*, "Humidity Induced Swelling of Sustainable Chitosan Nanocomposite Thin Films for Colorimetric Optical Sensors"; **Society of Plastics Engineers (SPE) International Polyolefins Conference 2024**, February 18-21, 2024, Galveston, TX
- **Wafa Tonny**, Samuel Wallaert, Justin D. Smith, Venkatesh Balan, Megan L. Robertson, Alamgir Karim*, "Chitosan Nanocomposite Thin Films as Sustainable Biopolymer Based Colorimetric Humidity Sensors"; EN03—Biodegradable, Resorbable and Sustainable Materials, **2023 *Materials Research Society* (MRS) Fall Meeting**, November 26-December 1, 2023, Boston, MA
- **Wafa Tonny**, Samuel Wallaert, Justin D. Smith, Venkatesh Balan, Megan L. Robertson, Alamgir Karim*, "Humidity Induced Swelling of Sustainable Chitosan Nano-Composite Thin Films for Colorimetric Sensors"; 431f- Sustainable Composites, **2023 *American Institute of Chemical Engineers* (AIChE) Annual Meeting**, November 5-10, 2023, Orlando, FL
- **Wafa Tonny**, Samuel Wallaert, Justin D. Smith, Ali Ammar; Mohammad Tuhin, Venkatesh Balan, Megan L. Robertson, Alamgir Karim*, "Sustainable chitosan/graphene oxide nanocomposite thin film based colorimetric humidity sensor"; General Papers/New Concepts in Polymeric Materials-Paper ID: 3828057, Division of Polymeric Materials Science and Engineering, ***American Chemical Society* (ACS) Spring Annual Meeting 2023**, March 26-30, 2023, Indianapolis, IN
- Muhammad Ayser, **Wafa Tonny**, Samuel Wallaert, Justin D. Smith, Megan L. Robertson, Alamgir Karim, Venkatesh Balan, "Fractionation of mushroom stems to various bioactive molecules and processing chitin to hydrogel for wound healing application"; Poster Board #1304, Division of Polymeric Materials Science and Engineering, ***American Chemical Society* (ACS) Spring Annual Meeting 2023**, March 26-30, 2023, Indianapolis, IN
- **Wafa Tonny**, Samuel Wallaert, Justin D. Smith, Ali Ammar, Mohammad Tuhin, Venkatesh Balan, Megan L. Robertson, Alamgir Karim*, "Study of Swelling Behavior of Sustainable Chitosan Nanocomposite Thin Films"; Q04.00008, Session Q04: Polymer Thin Films and Interfaces, ***American Physical Society* (APS) March Meeting 2023**, March 5-10, 2023, Las Vegas, NV
- **Wafa Tonny**, Samuel Wallaert, Justin D. Smith, Ali Ammar, Mohammad Tuhin, Venkatesh Balan, Megan L. Robertson, Alamgir Karim*, "Sustainable Chitosan Thin Film Based Humidity Sensor"; Talk B04, Session B: Contributed session: Biological and Synthetic Polymers I, **10th *Annual Texas Soft Matter* (TSM) Meeting**, August 5, 2022, Austin, TX
- **Wafa Tonny**, Mohammad Tuhin, Ali Ammar, Venkatesh Balan, Megan L. Robertson, Alamgir Karim*; "Chitosan nano-thin film for humidity sensor prepared from mushroom bio-waste", Paper ID: 3661980, Virtual PMSE/POLY Poster Session, Division of Polymeric Materials Science and Engineering, ***American Chemical Society* (ACS) Spring Annual Meeting 2022**, March 20-24, 2022, San Diego, CA
- Mohammad Tuhin, **Wafa Tonny**, Ali Ammar, Venkatesh Balan, Megan L. Robertson, Alamgir Karim*; "Study of 3D-printed design architectures prepared using biopolymers", Division of Polymeric Materials Science and Engineering, ***American Chemical Society* (ACS) Spring Annual Meeting 2022**, March 20-24, 2022, San Diego, CA
- **Wafa Tonny**, Mohammad Tuhin, Ali Ammar, Venkatesh Balan, Megan L. Robertson, Alamgir Karim*; "Swelling Behavior of Sustainable Chitosan/Graphene Oxide Nanocomposite Ultrathin Films", D17.00008, Session D17: Sustainable Polymers: Physics of New Materials, Design for Sustainability, and End-of-Life, ***American Physical Society* (APS) March Meeting 2022**, March 14-18, 2022, Chicago, IL

Skills

- ***Technical:*** Polymer films deposition and processing (coating, etching, annealing, nanopatterning); Chemical structure characterization (single crystal, polycrystalline powders, polymer chain crystallinity); Expertise in different analytical instruments AFM, XRD, FTIR, SEM, TEM, XPS, UV-Vis, NMR, DSC-TGA, DMA, Instron, Texture Analyzer, Optical Microscopy, Ellipsometry, Interferometer, *etc.*)
- ***Computer:*** Microsoft office- all applications, Origin Pro, Adobe Illustrator, MATLAB, etc.

Service to the Scientific Community

- **Session Presider,** Session title: General Papers/New Concepts in Polymeric Materials, Division of Polymeric Materials Science and Engineering, 2:00-6:00 PM, March 28, ***American Chemical Society* (ACS) Spring Annual Meeting 2023,** March 26-30, 2023, Indianapolis, IN **(**https://acs.digitellinc.com/sessions/566582/view)
- **Invited talk with honorarium at 3M company,** St. Paul, MN on March 6, 2024
- **Volunteer at** Division of Polymer Physics (**DPOLY**) and Division of Soft Matter (**DSOFT**) desk, ***American Physical Society*** **(APS) March Meeting 2024**, March 4-8, 2024, Minneapolis, MN
- **Symposium Assistant at 2023 *Materials Research Society* (MRS) Fall Meeting**, November 26-December 1, 2023, Boston, MA
- **Volunteer at** Division of Polymeric Materials Science and Engineering (**PMSE)** Desk, March 27-28, ***American Chemical Society*** **(ACS) Spring Annual Meeting 2023**, March 26-30, 2023, Indianapolis, IN
- **Volunteer at 11th *Annual Texas Soft Matter* (TSM) Meeting**, August 18, 2023, Houston, TX
- **Participant at 3MT competition 2023**, University of Houston, TX
- **Partcipent at Circular Plastics Challenge: UH Energy Transition Institute 2023**, University of Houston, TX
- **Volunteer at Chevron Girls Engineering the Future STEM Day 2019**, University of Houston, TX

Awards

- **Distinguished Student (DS) Program Travel Award 2024** by ***American Physical Society* (APS)** and **Forum on International Physics (FIP) at *American Physical Society* (APS) March Meeting 2024**, March 4-8, 2024, Minneapolis, MN
- **Society of Plastics Engineers (SPE) Scholarship at the International Polyolefins Conference 2024**, February 18-21, 2024, Galveston, TX
- **Honorable Mention, Student Poster Competition at Society of Plastics Engineers (SPE) International Polyolefins Conference 2024**, February 18-21, 2024, Galveston, TX
- **Cullen Fellowship Travel Grant, Fall 2023,** Cullen College of Engineering, University of Houston, TX
- **Best Graduate Student Talk at 10th *Annual Texas Soft Matter* (TSM) Meeting**, Austin, TX, August 5, 2022
- **Research Fellow** at National Science & Information and Communication Technology Division (awarded by The Ministry of Science and Technology of Govt. of People's Republic of Bangladesh) (January - December 2011)

Memberships

- Society of Plastics Engineers (SPE) UH chapter — January 2022- May 2026
- Materials Research Society (MRS) — April 2023- December 2025
- American Chemical Society (ACS) — January 2022- January 2025
- American Physical Society (APS) — October 2021- September 2024
- American Institute of Chemical Engineers (AIChE) — April 2023- December 2023