Md Mohsin

PhD Candidate · Physics

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Education

University of Texas at San Antonio — *San Antonio, Texas, USA*
PhD (candidate) Physics — *12/2024 (expected)*

University of Texas at San Antonio — *San Antonio, Texas, USA*
MS Physics — *08/2022*

University of Chittagong — *Chittagong, Bangladesh*
MS Physics — *02/2008*

University of Chittagong — *Chittagong, Bangladesh*
B.Sc. (Hons.) Physics — *08/2006*

Professional Experience

2022–present	**Graduate Teaching Assistant**, Department of Physics and Astronomy, University of Texas at San Antonio.
2021–2022	**Post Bac Fellow**, Department of Physics and Astronomy, University of Texas at San Antonio.
2020–2021	**Graduate Research Assistant**, Department of Physics and Astronomy, University of Texas at San Antonio.
2014–2020	**Assistant Professor**, Department of Physics, University of Chittagong, Bangladesh.
2013–2017	**Adjunct Lecturer**, School of Engineering & Computer Sciences, Chittagong Independent University, Bangladesh.
2012–2014	**Lecturer**, Department of Physics, University of Chittagong, Bangladesh.

Certifications

Certified Associate **Python** Programmer (2024). OpenEDG, Python Institute.

Certified Entry-Level **Python** Programmer (2023). OpenEDG, Python Institute.

Wolfram Technology Certified | Level 1 | **Mathematica** (2021). Wolfram U.

Technical Skills

Computer Programming	Python, C++, and Wolfram Language.
Scientific Software	Mathematica, COMSOL, MATLAB, Origin, Material Studio, VMD, and VASP.
Operating Systems	Windows, Linux, and Mac.
Selected Applications	Word Processing, Spread Sheet, and Presentation applications. LaTeX and Text editors.
Language	*Native or Bilingual Proficiency*: Bengali *Full Professional Proficiency*: English *Elementary Proficiency*: Chinese and Hindi

Research Experience

University of Texas at San Antonio - Department of Physics and Astronomy *San Antonio, TX*

Advisor: Dr. Marcelo Marucho *2021–present*

- *Oscillatory signal generation and propagation along microtubules.* In this project, we investigate electrical signal propagation along sub-cellular biopolymers. We develop electrical transmission line models (circuits and differential equations) and solve them numerically to explain the experimental results. We use Mathematica, Python, and the multiphysics tool COMSOL for numerical computation.
- *Electrical signal propagation along actin filaments in physiological and pathological conditions.* In this completed project, I used the multiscale theory developed by our group to study signal propagation along actin filament, a biopolymer, in healthy and diseased cells. I developed a Mathematica application as a research tool for this project. The application and related studies were published in computer physics communications.

University of Chittagong - Department of Physics *Chittagong, Bangladesh*

Advisor: Dr. Arun Kumar Deb *2006–2007*

- *Master's Thesis: Study of Lorentz and CPT violations in neutrino physics.* In this research, I studied the quantum phenomena of neutrino oscillation by applying theories and techniques in advanced quantum mechanics.

Publications

Research Article

Hunley, C., **Mohsin, M.**, & Marucho, M. (2022). Electrical impulse characterization along actin filaments in pathological conditions. *Computer Physics Communications, 275*, 108317.https://doi.org/10.1016/j.cpc.2022.108317

Rahman, A. K. M. R., Meaze, A. K. M. M. H., Chakraborty, S. R., & **Mohsin, M.** (2020). Evaluations of $n + {}^{27}Al$ reaction in the energy range 0.1–200 MeV. *Indian Journal of Physics, 94*(8), 1255–1262. https://doi.org/10.1007/s12648-019-01555-y

Ferdous, J., Gafur, Md. A., Das, S. K., Chakraborty, S. R., **Mohsin, M.**, Deb, A. K., & Qadir, Md. R. (2014). Study of $Cu_xZn_{1-x}Fe_2O_4$ ferrite humidity sensors with and without naphthalene. *Sensor Letters, 12*(9), 13531360. https://doi.org/10.1166/sl.2014.3297

Ghose, P., Abdul Gafur, Md., Das, S. K., Chakraborty, S. R., **Mohsin, M.**, Deb, A. K., & Rakibul Qadir, Md. (2014). Effects of flux concentrations and sintering temperature on dental porcelain. *The European Physical Journal Applied Physics, 65*(2), 20701. https://doi.org/10.1051/epjap/2014130378

Presentations

Conference

Mohsin, M., & Marucho, M. (2024, May 21–24). *"Skin-like" Layer Formation around Cytoskeleton Filaments and their Exceptional Biophysical Properties* [Poster session]. 9th annual Biophysical Society of Canada (BSC) meeting, Université de Montréal in Montréal, Québec, Canada.

Mohsin, M., & Marucho, M. (2023, February 2). *Cytoskeleton filaments and their potential role in electrical activities of healthy and dysfunctional neurons* [Poster session]. San Antonio Military Health and Universities Research Forum (SURF), San Antonio, TX, United States.

Mohsin, M., Hunley, C., & Marucho, M. (2022, October 13–15). *Ionic transport along actin filaments* [Poster session]. Meeting of the Texas Section of the American Physical Society (TSAPS), Houston, TX, United States. https://meetings.aps.org/Meeting/TSF22/Session/H01.13

Mohsin, M., Hunley, C., & Marucho, M. (2022, September 19). *Actin filaments acting as signal propagation pathways in muscle and non-muscle cells* [Poster session]. Triangle Cytoskeleton Meeting (TCM), Raleigh, NC, United States.

Professional Service

Peer review (1 review for 1 publication)
journal, Biochemistry and Biophysics Reports, ISSN: 2405-5808

Teaching Experience

University of Texas at San Antonio, San Antonio, USA

Spring 2024 **PHY-1951 Physics for Scientist and Engineers 1 Lab**, Teaching Assistant
Fall 2023 **PHY-1631 Algebra-based Physics-II Lab**, Teaching Assistant
Summer 2023 **PHY-1971 Physics for Scientist and Engineers-II Lab**, Teaching Assistant
Spring 2023 **PHY-1631 Algebra based Physics-II Lab**, Teaching Assistant
Fall 2022 **PHY-1971 Physics for Scientist and Engineers-II Lab**, Teaching Assistant
Summer 2022 **PHY-1611 Algebra based Physics-I Lab**, Teaching Assistant
Fall 2020 **PHY-1631 Algebra based Physics-II Lab**, Teaching Assistant
Spring 2020 **PHY-1631 Algebra based Physics-II Lab**, Teaching Assistant

University of Chittagong, Chittagong, Bangladesh

2019 **PHY-371 Modern Physics**, Assistant Professor
2018–2019 **PHYS-403 Quantum Mechanics-II**, Assistant Professor
2014–2019 **PHYS-101 Mathematical Physics-I and Classical Mechanics-I**, Assistant Professor
2018 **PHYS-208 Physics Practical-II**, Assistant Professor
2016–2018 **PHYS-303 Quantum Mechanics-I**, Assistant Professor
2017 **MATH-107 Physics-I**, Assistant Professor
2015–2017 **PHYS-204 Computer Fundamental and Programming**, Assistant Professor
2016 **PHYS-203 Statistical Mechanics and Radiation**, Assistant Professor
2015–2016 **AC-115 Physics-I**, Assistant Professor
2015 **AC-215 Physics-II Practical**, Assistant Professor
2014–2015 **OCEAN-103 Physics**, Assistant Professor
2014 **PHYS-107 Physics Practical-I**, Assistant Professor
PHYS-201 Classical Mechanics-II, Assistant Professor
PHY-141 Heat and Thermodynamics, Waves and Oscillation, Structure of Matter, Lecturer
AC-406 Physics-II (Heat, Thermodynamics and Optics), Lecturer
2012–2014 **PHYS-301 Optics**, Lecturer
PHYS-101 Mathematical Physics-I and Classical Mechanics-I, Lecturer

Chittagong Independent University, Chittagong, Bangladesh

Spring 2017 **PHY-101 Physics-I**, Adjunct Lecturer
Spring 2016 **PHY-101L Physics-I Lab**, Adjunct Lecturer
PHY-101 Physics-I, Adjunct Lecturer
Autumn 2015 **PHY-102 Physics-II**, Adjunct Lecturer
Summer 2015 **PHY-201 Perspective of Modern Physics**, Adjunct Lecturer
Summer 2014 **PHY-102 Physics-II**, Adjunct Lecturer

Mentoring

University of Chittagong - Department of Physics *Chittagong, Bangladesh*
Student: Md. Yeasir Arafat *2017*

- Master's Thesis: Inverse Weibull distribution in analysis of wind speed data for wind power generation at few prospective locations in Bangladesh.

Honors and Awards

2023 **Writing Scholarship**, College of Sciences, University of Texas at San Antonio *$250*
Writing Scholarship, College of Sciences, University of Texas at San Antonio *$50*

2022	**Travel Grant**, Texas Section of APS student awards	*$110*
	Travel Grant, The Graduate School Professional Development Award, University of Texas at San Antonio	*$ 750*
2021	**College of Science Alvarez Scholarship**, College of Sciences, University of Texas at San Antonio	*$ 500*
2020	**Competitive Graduate Scholarship**, College of Sciences, University of Texas at San Antonio	*$ 1,000*
2014	**Summer School Fees**, The High Energy Accelerator Research Organization (KEK)	*INR 71,000*
	Travel Grant, The International Centre for Theoretical Physics (ICTP)	*Travel Expenses*
	Travel Grant, European Organization for Nuclear Research (CERN) and Deutsches Elektronen-Synchrotron (DESY)	*Health Insurance*

Honors

Who's Who at UTSA (2021) for outstanding accomplishments and excellence as a student. University of Texas at San Antonio, San Antonio, Texas, USA.

Outreach & Professional Development

Service and Outreach

2022–2023	**Student Representative, Faculty Meeting**, Graduate Society of Physics Students (GSPS), Department of Physics and Astronomy, The University of Texas at San Antonio.	*San Antonio, USA*
2022	**President**, Bangladeshi Students' Association (BSA) at UTSA, The University of Texas at San Antonio.	
2021–2022	**Member**, FGSA Nominating Committee, American Physical Society (APS).	
2021–2023	**Volunteer Judge**, Science Fair, Alamo Regional Science and Engineering Fair (ARSEF).	
2020	**Participant**, Group Project, Transdisciplinary Team Grand Challenge: Social Justice, University of Texas at San Antonio.	
2020	**Volunteer Judge**, Science Fair, John Jay Science and Engineering Academy High School.	
2018–2019	**Secretary**, Chittagong University Club (City), University of Chittagong.	*Chittagong, Bangladesh*
2018	**Rapporteur**, Seminar Week, Faculty of Science, University of Chittagong.	
2016	**Joint Secretary**, Chittagong University Teachers Association, University of Chittagong.	
2015	**Volunteer Judge**, Debate Competition, Faculty of Social Sciences, University of Chittagong.	
2015	**Volunteer Judge**, Debate Competition, Faculty of Arts, University of Chittagong.	

Summer Schools

First Bangladesh-CERN School on Particle Physics (2014, December 15–18). Bose Center for Advanced Study and Research in Natural Sciences of University of Dhaka and The European Center for Nuclear Research (CERN), Dhaka, Bangladesh.

Second Asia-Europe-Pacific School in High Energy Physics (AEPSHEP) (2014, November 4–17). Tata Institute of Fundamental Research of the Government of India and The European Center for Nuclear Research (CERN), Puri, India.

Professional Memberships

American Physical Society (APS)
Graduate Society of Physics Students (GSPS) at UTSA
Bangladesh Physical Society (BPS)