Sumya Hamid Oishe

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Google Scholar

Academic Credentials

Bachelor of Science (B. Sc.) in Electrical and Electronics Engineering (EEE), University of Dhaka (DU), 2020 — CGPA – **3.31** out of 4.00, Jan. 2016 – Jan 2020

Master of Science (M. Sc.) in Electrical and Electronics Engineering (EEE), University of Dhaka (DU), 2021 — CGPA – **3.50** out of 4.00, Mar. 2020 – Nov 2021

Graduate Degree in Computer Science & Electrical Engineering (CSEE), University of Maryland, Baltimore County (UMBC) — CGPA – **3.63** out of 4.00, Aug. 2023 – Now

Research Interest

- Machine Learning
- Signal Analysis
- Power System Analysis
- Photonics

Research Experience

Graduate Research Assistant — May, 2024 –
Department of CSEE, University of Maryland, Baltimore County — Baltimore, MD
Computational Photonics for Multilayered Structures
Projects:

- Substrate optimization with adjoint method across visible spectrum
- Permittivity optimization of 2D material for object classification

Graduate Teaching Assistant — August, 2023 –
Department of CSEE, University of Maryland, Baltimore County — Baltimore, MD
Courses:
CMPE 212: Principles of Digital Design
CMPE 314: Principles of Electronic Circuits
CMPE 330: Electromagnetic Waves and Transmission
CMPE 323: Signal and Systems Theory

M.Sc. Project — Nov. 2020 – Feb 2021
Department of EEE, University of Dhaka — Dhaka, Bangladesh

- Studies And Analysis of Voice Features for Human Voice System

B.Sc. Project — Jan. 2019 – Jan 2020
Department of EEE, University of Dhaka — Dhaka, Bangladesh

- Construction of an Assisting Smart Stick for Blind & Visually Impired People

Academic Project

- *Obtaining Frequency Comb Solutions for Micro-Resonators Using Machine Learning (CMSC 678)*
  - A computational study of finding frequency combs solutions numerically utilizing data driven machine learning models (Neural Networks, SDG, Random Forest).
  - The data presented in this work and codes to produce the results can be found here.

Current Project

- *Anomaly Detection in Smart Grids (M.S. Project (2025))*
  - Developing an ML pipeline for detecting anomalies in smart grid energy consumption data.

Publications

- E. Simsek, R. Islam, **S. H. Oishe**, and C. R. Menyuk, "Substrate optimization with the adjoint method and layered medium Green's functions," J. Opt. Soc. Am. B 41, 2259–2265 (2024), doi: 10.1364/JOSAB.532752.
    - Demonstrated the use of the adjoint method combined with layered medium Green's functions for efficient substrate optimization, achieving enhanced field intensity and outperforming particle swarm optimization methods for photonic inverse design.
- **S. H. Oishe**, R. Islam, C. R. Menyuk, and E. Simsek, "Broadband substrate optimization with adjoint method and Green's functions," in *Proc. IEEE Photonics Conference (IPC)*, 2024, doi: 10.1109/IPC60965.2024.10799645.
- E. Simsek, **S. H. Oishe** and R. Islam, "Adjoint Method Supported Topology Optimization for Electromagnetic/Photonic Inverse Design," *2025 International Applied Computational Electromagnetics Society Symposium (ACES)*, Orlando, FL, USA, 2025, pp. 1-2, doi: 10.23919/ACES66556.2025.11052563.
- **S. H. Oishe** and E. Simsek, "A Multi-Objective Permittivity Optimization for Object Classification at the Speed of Light," *Machine Learning: Science and Technology*, under review, 2025. Preprint doi: 10.22541/au.175191579.99819423/v2
    - Developed an adjoint-based topology optimization method for photonic medium that dynamically routes light for high-speed object classification, achieving 96.33% accuracy on MNIST-derived scatterers with adaptable performance guided by weighted cost functions.

Standardized Test Scores

- **IELTS: 7** (Listening – 8.0, Reading – 8.0, Speaking – 7.5, Writing – 7) Oct. 2022
- **GRE: 307** (Quant- 162, Verbal-145) Jan. 2023

Technical Skills

Programming Languages: MATLAB, C, Python, Arduino, LATEX, HTML
Simulation & Modeling: Tidy3D, PSpice, Simulink, CST, Quartus, Power-world, LabVIEW, AutoCAD, Linux OS, Verilog.
Machine Learning & Data Science: Scikit-learn, Pytorch, TensorFlow, CNNs, RNNs, data visualization.
Others: Microsoft Office, Google Colab, Jupiter notebook, Anaconda, GitHub

Online Courses & Certifications

- "Programming for Everybody (Getting Started with Python)," University of Michigan (Coursera), Certificate earned. Jun 2020
- "Python Data Structures," University of Michigan (Coursera), Certificate earned. Jun 2020
- "Introduction to Generative AI," Google Cloud (Simplilearn), Certificate earned. Aug 2025

Work Experience

Instructor, Physics Feb 2020 – March 2023
Ucchash Academic Coaching, an educational platform in Bangladesh

Awards & Honors

- Education Board Scholarship in High School, Dhaka, Bangladesh. Jan 2011 – Mar 2013

Club Experiences

- Former member of Electrical and Electronic Club (EEC) at University of Dhaka
- Former member of IEEE WIE Affinity Group