curriculum vitaé of **RUBAB AMIN**

Suite 5000, 800 22nd St. NW,
Washington, DC 20052
USA

+1-(505)-492-7823
rubabmn@gmail.com; rubabmn@gwu.edu
rubabmn.weebly.com

SUMMARY OF QUALIFICATIONS

Experienced Ph.D. with a solid background in Silicon/III-V photonics design, characterization and prototyping, Photonic Integrated Circuits, Nanofabrication and Measurements.

- ◊ 4+ years of experience in Integrated Photonic Device Design, Simulation and Characterization, and Plasmonics
- ◊ 4+ years of experience in Data Analysis, Failure Analysis, Project Management
- ◊ 3+ years of hands-on experience in Silicon/CMOS Nanofabrication, Optical Metrology, and Material Characterization
- ◊ Assisted PI in securing *US Presidential early carrier award* (PECASE 2019) by securing competitive research grants from AFOSR, ARO, ONR, DoD, NSF, SBIR, etc.
- ◊ Collaborated with 30+ faculties and researchers showcasing effective teamwork skills
- ◊ Problem solver, self-starter, quick learner, self-motivated creative thinker

EDUCATION

Ph.D. in Electrical Engineering, Photonics, Electronics and MEMS, 2020.
OPEN Lab, ECE Dept., The George Washington University, Washington D.C. 20052, USA.
GPA: 3.94 on a scale of 4.00

B.Sc. in Electronics and Telecommunications Engineering, North South University, Dhaka, Bangladesh. 2012.
CGPA: 3.80 on a scale of 4.00; *'Summa Cum Laude'*

Higher Secondary Certificate (HSC) Examination, Dhaka College, Dhaka, Bangladesh. 2006.
GPA Obtained: 5.00 on a scale of 5.00

Secondary School Certificate (SSC) Examination, Govt. Laboratory High School, Dhaka, Bangladesh. 2004.
GPA Obtained: 5.00 on a scale of 5.00

RESEARCH INTERESTS

Opto-Electronics & Photonics, Plasmonics, Nano-photonics, Semiconductor Photonics, Electro-Optic Modulators, Solid State Devices, Transparent Conductive Oxides, Optical Cavities, Thin films, Light-Matter Interaction, Non-linear Optics, RF, Microwave antennas etc.

ACADEMIC HONORS

- ◊ *SPIE* Optics and Photonics Education Scholarship, 13th Aug. 2019 ($3,000)
- ◊ ECE Dept. Best Poster Runner-up Prize, GW SEAS R&D Showcase, 25th Oct. 2019 ($1,000)
- ◊ AccelerateGW I-Coprs **National Science Foundation (NSF)** Award, 25th Oct. 2019 ($3,000)
- ◊ GWNIC Best Poster Award, GW Research Days, 9th Apr. 2019 ($300)
- ◊ ***University Fellowship (Stipend + Tuition Award)*** from *The George Washington University*, Department of Electrical and Computer Engineering, for the 2015-17 academic years.
- ◊ *International Amigo Scholarship*, University of New Mexico, Albuquerque, NM 2015-16
- ◊ Graduated ***'Summa Cum Laude'***, distinction based on academic excellence in Bachelors' degree
- ◊ Scholarship for excellent result in the Higher Secondary Certificate (HSC) national examination, Bangladesh
- ◊ Scholarship for excellent result in the Secondary School Certificate (SSC) national examination, Bangladesh
- ◊ Golden A^+ (A^+ in all subjects) in the Secondary School Certificate (SSC) national examination, Bangladesh

RESEARCH EXPERIENCES

◊ *Electro-Optic Modulators (EOMs):*

Ph.D. Advisor: *Fall 2015 – Present*
Prof. Dr. Volker J. Sorger
ECE Dept., Science & Engineering Hall (SEH),
The George Washington University, Washington D.C.

Miniature modulators of light

◊ Worked on theory, design and fabrication of nanoscale electro-optic modulators; contrasting between phase and absorption modulation dictated by the fundamental Kramers-Kronig relations for different schemes of actively modulated materials including free carrier accumulation/depletion in indium tin oxide (ITO), low-dimensional materials (e.g. graphene, transition metal dichalcogenides), III-V quantum wells etc. Worked in funded projects from AFOSR, NSF, ARO, SBIR and SRC.

Design, fabrication, simulation, measurement and optimization of electro-optic (EO) devices:

◊ Developed layered architecture using KLayout, **electron beam lithography (EBL)** using Raith VOYAGER and Raith PIONEER, **atomic layer deposition (ALD)**, e-beam evaporation, sputtering, **ion beam deposition (IBD)** etc.

- ◊ Developed method for **atomic layer deposition (ALD)** growth of dielectric films with hydrophilic/hydrophobic surfaces for wet transfer of commercial CVD grown low-dimensional material films.
- ◊ Developed patterned wet etch method of aluminum oxide using MF319 and characterized etch rate using profilometry and Filmetrics F20-UV system.
- ◊ Developed an Indium Tin Oxide (ITO) thin film process using ion beam deposition (IBD) with 4Wave Cluster sputter tool and subsequent characterization in spectroscopic ellipsometry (JAWoollam M2000) and capacitive measurements.
- ◊ Demonstrated the **1st ITO-based Mach-Zehnder modulator** on Silicon platform ($V_\pi L$ = 0.52 V-mm). Developed a complete fabrication process of photonic and plasmonic modulators on SOI platform, including wafer preparation, lithography, material deposition, material quality control, error analysis, related measurements and testing methods.
- ◊ Demonstrated record-low $V_\pi L$ = 0.06 V-mm MZI modulator ITO plasmon on Silicon photonics.
- ◊ Developed photonic neuromorphic nonlinear activation function using electro-optic modulators.
- ◊ Developed a solid state beam steering platform for LiDAR using ITO phase-shifters on Silicon platform.
- ◊ Conducted *ab-initio* holistic theoretical study for different novel active materials for electro-absorption modulators and their performance analysis and developed a unique metric 'Energy-Bandwidth ratio (EBR)' for cross-platform comparison.
- ◊ Conducted holistic Graphene optical modulator study comparing Kubo, random phase approximation, and *ab-initio* methods for Graphene absorption along with cryogenic temperature and multilayered study.
- ◊ Developed a method for achieving solid state tunable cavity in 1-D photonic crystal using ITO on Si slot waveguides.
- ◊ Demonstrated GHz-fast sub-wavelength ITO plasmon phase-shifter on Silicon photonic Mach-Zehnder interferometer ($V_\pi L$ = 0.095 V-mm).
- ◊ Demonstrated Graphene-oxide-ITO heterogeneous integration on Silicon waveguide and tunable absorption leading to rectified linear behavior exhibiting ReLU activation function for photonic neural networks.

◊ *Semiconductor (III-V) Lasers:*

Thesis Advisor: *Dec. 2010 – Sep. 2011*

Prof. Dr. Saiful Islam

EEE Dept., Bangladesh Uni. of Engg. & Tech. (BUET)

Developed a design for 450 nm and 488 nm edge emitting MQW Lasers using *InGaN/AlGaN* active layer by bandgap alterations of alloy compositions of corresponding III-V nitrides and analyzed their performance characteristics. Correspondingly coupled both the Lasers with similar SOA and analyzed the performance.

JOURNAL PUBLICATIONS

- ◊ **R. Amin**, R. Maiti, Y. Gui, C. Suer, M. Miscuglio, E. Heidari, R. T. Chen, H. Dalir, and V. J. Sorger, "*Sub-wavelength GHz-fast broadband ITO Mach–Zehnder modulator on silicon photonics*," Optica **7**(4), 333-335 (2020).
- ◊ Z. Ma, K. Kikunaga, H. Wang, S. Sun, **R. Amin**, R. Maiti, M. H. Tahersima, H. Dalir, M. Miscuglio, and V. J. Sorger, "*Compact Graphene Plasmonic Slot Photodetector on Silicon-on-Insulator with High Responsivity*," ACS Photonics **7**(4), 932-940 (2020).
- ◊ **R. Amin**, R. Maiti, J. K. George, X. Ma, Z. Ma, H. Dalir, M. Miscuglio, and V. J. Sorger, "*A lateral MOS-capacitor-enabled ITO Mach–Zehnder modulator for beam steering*," J. Lightwave Technol. **38**(2), 282-290 (2020).
- ◊ **R. Amin**, J. George, S. Sun, T. F. de Lima, A. Tait, J. Khurgin, M. Miscuglio, B. J Shastri, P. Prucnal, T. El-Ghazawi, and V. Sorger, "*ITO-based Electro-absorption Modulator for Photonic Neural Activation Function*," APL Materials **7**(8), 081112 (2019).
- ◊ M. H. Tahersima, Z. Ma, Y. Gui, S. Sun, H. Wang, **R. Amin**, H. Dalir, R. Chen, M. Miscuglio, and V. J. Sorger, "*Coupling-enhanced dual ITO layer electro-absorption modulator in silicon photonics*," Nanophotonics **8**(9), 1559-1566 (2019).
- ◊ J. K. George, A. Mehrabian, **R. Amin**, J. Meng, T. F. Lima, A. N. Tait, B. J. Shastri, T. El-Ghazawi, P. R. Prucnal, and V. J. Sorger, "*Neuromorphic photonics with electro-absorption modulators*," Opt. Express **27**(4), 5181-5191 (2019).
- ◊ R. Maiti, C. Patil, R. A. Hemnani, M. Miscuglio, **R. Amin**, Z. Ma, R. Chaudhary, A. T. C. Johnson, L. Bartels, R. Agarwal, and V. J. Sorger, "*Loss and coupling tuning via heterogeneous integration of MoS_2 layers in silicon photonics*," Opt. Mater. Exp. **9**(2), 751-759 (2019).
- ◊ **R. Amin**, R. Maiti, C. Carfano, Z. Ma, M. H. Tahersima, Y. Lilach, D. Ratnayake, H. Dalir, and V. J. Sorger, "*0.52 V mm ITO-based Mach-Zehnder modulator in silicon photonics*," APL Photonics **3**(12), 126104 (2018).
- ◊ **R. Amin**, J. B. Khurgin, and V. J. Sorger, "*Waveguide-based electro-absorption modulator performance: comparative analysis*," Opt. Express **26**(12), 15445-15470 (2018). **(Editor's pick √)**
- ◊ **R. Amin**, Z. Ma, R. Maiti, S. Khan, J. B. Khurgin, H. Dalir, and V. J. Sorger, "*Attojoule-efficient graphene optical modulators*," Appl. Opt. **57**(18), D130-D140 (2018).
- ◊ H. Dalir, F. Mokhtari-Koushyar, I. Zand, E. Heidari, X. Xu, Z. Pan, S. Sun, **R. Amin**, V. J. Sorger, and R. T. Chen, "*Atto-Joule, high-speed, low-loss plasmonic modulator based on adiabatic coupled waveguides*," Nanophotonics **7**(5), 859-864 (2018).
- ◊ **R. Amin**, M. H. Tahersima, Z. Ma, C. Suer, K. Liu, H. Dalir, and V. J. Sorger, "*Low-loss tunable 1D ITO-slot photonic crystal nanobeam cavity*," J. Opt. **20**(5), 054003 (2018).
- ◊ V. J. Sorger, **R. Amin**, J. B. Khurgin, Z. Ma, H. Dalir, and S. Khan, "*Scaling vectors of attoJoule per bit modulators*," J. Opt. **20**(1), 014012 (2017).

- ◊ **R. Amin**, C. Suer, Z. Ma, I. Sarpkaya, J. B. Khurgin, R. Agarwal, and V. J. Sorger, "*Active material, optical mode and cavity impact on nanoscale electro-optic modulation performance*," Nanophotonics **7**(2), 455-472 (2017).
- ◊ **R. Amin**, C. Suer, Z. Ma, I. Sarpkaya, J. B. Khurgin, R. Agarwal, and V. J. Sorger, "*A deterministic guide for material and mode dependence of on-chip electro-optic modulator performance*," Solid-State Elect. **136**, 92-101 (2017).
- ◊ **R. Amin**, "*Design of a 488 nm SOA Coupled Edge Emitting MQW Laser and Computation of its Performance Characteristics*," Dhaka University of Engineering and Technology (DUET) Journal **2**(2), 25-32 (2015).
- ◊ N. Chowdhury, S. Jaman, **R. Amin**, and Md. S. S. Chowdhury, "*Crosstalk Analysis of a FBG-OC based Optical Add-Drop Multiplexer for WDM crossconnects System*," IJAET **4**(1), 54-67 (2012).

PATENT

- ◊ **Rubab Amin**, and Volker J. Sorger, Transparent Conductive oxide-based Mach-Zehnder Modulator in Silicon Photonics, USPTO 16/545.733, Filed 2019; *Patent pending*.

CONFERENCE PROCEEDINGS

- ◊ **R. Amin**, M. Miscuglio, B. J. Shastri, P. Prucnal, and V. J. Sorger, "Electro-optic perceptron towards 10^{18} MAC/J-efficient photonic neural networks (Conference Presentation)," SPIE Proceedings Volume 11299, AI and Optical Data Sciences; 112990D (2020).
- ◊ **R. Amin**, R. Maiti, Z. Ma, M. Miscuglio, H. Dalir, and V. J. Sorger, "An ITO-based Mach-Zehnder Modulator with Lateral MOS-Capacitor on SOI Platform," in *Frontiers in Optics + Laser Science* APS/DLS, The Optical Society (Optical Society of America, 2019), JW3A.67.
- ◊ **R. Amin** et al., "Silicon-on-Insulator Integrated ITO-Based Mach-Zehnder Modulator," 2019 *IEEE Research and Applications of Photonics in Defense Conference (RAPID)*, Miramar Beach, FL, USA, 2019, pp. 1-3.
- ◊ R. Maiti, C. Patil, R. Hemnani, T. Xie, **R. Amin** and V. J. Sorger, "2D TMDCs-Based NIR Photodetector on a Silicon Microring Cavity," 2019 *IEEE Research and Applications of Photonics in Defense Conference (RAPID)*, Miramar Beach, FL, USA, 2019, pp. 1-3.
- ◊ **R. Amin**, R. Maiti, C. Carfano, Z. Ma, M. H. Tahersima, Y. Lilach, D. Ratnayake, H. Dalir, and V. J. Sorger, "Mach-Zehnder ITO Modulator on SOI," in *OSA Advanced Photonics Congress (AP)* 2019 (IPR, Networks, NOMA, SPPCom, PVLED), OSA Technical Digest (Optical Society of America, 2019), ITh2C.4.
- ◊ Z. Ma, K. Kikunaga, S. Sun, **R. Amin**, M. Miscuglio, and V. J. Sorger, "Integrated Graphene Plasmonic Slot Photodetector with High Responsivity," in *OSA Advanced Photonics Congress (AP)* 2019 (IPR, Networks, NOMA, SPPCom, PVLED), OSA Technical Digest (Optical Society of America, 2019), IT3A.5.
- ◊ **R. Amin**, R. Maiti, C. Carfano, Z. Ma, M. H. Tahersima, Y. Lilach, D. Ratnayake, H. Dalir, and V. J. Sorger, "ITO Mach-Zehnder Modulator on Si," in *Conference on Lasers and Electro-Optics* (CLEO), OSA Technical Digest (Optical Society of America, 2019), JTh2A.45.
- ◊ Z. Ma, K. Kikunage, H. Wang, S. Sun, **R. Amin**, M. Miscuglio, H. Dalir, and V. Sorger, "Compact graphene plasmonic slot photodetector on silicon-on-insulator with high responsivity," *Proc. SPIE* 10927, Photonic and Phononic Properties of Engineered Nanostructures IX, 109270V (8 March 2019).
- ◊ V. J. Sorger, **R. Amin**, Z. Ma, R. Chen, H. Dalir, "Energy-efficient graphene and ITO-based MZI and absorption modulators," *Proc. SPIE* 10914, Optical Components and Materials XVI, 109140M (5 March 2019);
- ◊ **R. Amin** et al., "A Guide for Material and Design Choices for Electro-Optic Modulators," *2019 Optical Fiber Communications Conference and Exhibition (OFC)*, San Diego, CA, USA, 2019, pp. 1-3.
- ◊ J. George, A. Mehrabian, **R. Amin**, P. R. Prucnal, T. El-Ghazawi and V. J. Sorger, "Neural Network Activation Functions with Electro-Optic Absorption Modulators," *2018 IEEE International Conference on Rebooting Computing (ICRC)*, McLean, VA, USA, 2018, pp. 1-5.
- ◊ J. K. George, A. Mehrabian, **R. Amin**, T. El-Ghazawi, P. R. Prucnal and V. J. Sorger, "Photonic Neuromporphic Computing with Electrooptic Nonlinear Activation," *2018 Photonics in Switching and Computing (PSC)*, Limassol, Cyprus, 2018, pp. 1-3.
- ◊ **R. Amin**, R. Maiti, C. Carfano, and V. J. Sorger, "ITO-based Mach Zehnder Modulator," in *Frontiers in Optics/ Laser Science*, OSA Technical Digest (Optical Society of America, 2018), JTu3A.73.
- ◊ **R. Amin**, M. H. Tahersima, Z. Ma, C. Suer, K. Liu, R. Maiti, and V. J. Sorger, "Purcell Enhancement in 1-D ITO-slot Photonic Crystal Nanobeam Cavity," in *Frontiers in Optics/Laser Science*, OSA Technical Digest (Optical Society of America, 2018), FW5E.2.
- ◊ J. George, A. Mehrabian, **R. Amin**, T. El-Ghazawi, P. K. Prucnal, and V. J. Sorger, "Photonic Neural Network Nonlinear Activation Functions by Electrooptic Absorption Modulators," in *Frontiers in Optics/Laser Science*, OSA Technical Digest (Optical Society of America, 2018), JW3A.123.
- ◊ R. Maiti, R. Hemnani, **R. Amin**, and V. J. Sorger, "Integration of TMDCs Layer on a Silicon Micro-ring Resonator for Photonic Applications," in *Frontiers in Optics/Laser Science*, OSA Technical Digest (Optical Society of America, 2018), JW4A.96.
- ◊ J. George, **R. Amin**, A. Mehrabian, J. Khurgin, T. El-Ghazawi, P. R. Prucnal, and V. J. Sorger, "Electrooptic Nonlinear Activation Functions for Vector Matrix Multiplications in Optical Neural Networks," in *Advanced Photonics 2018* (BGPP, IPR, NP, NOMA, Sensors, Networks, SPPCom, SOF), OSA Technical Digest (online) (Optical Society of America, 2018), SpW4G.3.
- ◊ **R. Amin**, S. Khan, C. J. Lee, H. Dalir, and V. J. Sorger, "110 Attojoule-per-bit Graphene Plasmon Modulator on Silicon," in *Advanced Photonics 2018* (BGPP, IPR, NP, NOMA, Sensors, Networks, SPPCom, SOF), OSA Technical Digest (online) (Optical Society of America, 2018), IW3B.2.

- ◊ **R. Amin**, S. Khan, C. J. Lee, H. Dalir and V. J. Sorger, "110 Attojoule-per-bit Efficient Graphene-based Plasmon Modulator on Silicon," *2018 Conference on Lasers and Electro-Optics (CLEO)*, San Jose, CA, 2018, pp. 1-2.
- ◊ **R. Amin**, J. B. Khurgin and V. J. Sorger, "Electro–Absorption Waveguide Modulator Performance," *2018 Conference on Lasers and Electro-Optics (CLEO)*, San Jose, CA, 2018, pp. 1-2.
- ◊ **R. Amin**, J. George, J. Khurgin, T. El-Ghazawi, P. R. Prucnal, and V. J. Sorger, "Attojoule Modulators for Photonic Neuromorphic Computing," in *Conference on Lasers and Electro-Optics*, OSA Technical Digest (online) (Optical Society of America, 2018), ATh1Q.4.
- ◊ **R. Amin**, C. Suer, Z. Ma, I. Sarpkaya, J. B. Khurgin, R. Agarwal, and V. J. Sorger, "Implications of Active Material and Optical Mode on Nanoscale Electro-Optic Modulation," in *Frontiers in Optics 2017*, OSA Technical Digest (online) (Optical Society of America, 2017), JW3A.96.
- ◊ Z. Ma, M. Tahersima, **R. Amin**, S. Khan, and V. J. Sorger, "Sub-wavelength Plasmonic Graphene-based Slot Electro-optic Modulator," in *Frontiers in Optics 2017*, OSA Technical Digest (online) (Optical Society of America, 2017), FM2A.3.

Invited & Contributed Presentations

- ◊ Frontiers in Optics + Laser Science (FiO+LS), Optical Society of America (OSA), Washington, DC, USA, 2017
- ◊ GW SEAS R&D Showcase, Washington, DC, USA, 2017 (Finalist)
- ◊ Conference on Lasers and Electro-Optics (CLEO), Optical Society of America (OSA), San Jose, CA, USA, 2018
- ◊ Frontiers in Optics + Laser Science (FiO+LS), Optical Society of America (OSA), Washington, DC, USA, 2018
- ◊ IEEE Research and Applications of Photonics in Defense Conference (RAPID), Miramar Beach, FL, USA, 2019
- ◊ Frontiers in Optics + Laser Science (FiO+LS), Optical Society of America (OSA), Washington, DC, USA, 2019
- ◊ ECE Blitz, SEAS, GWU, Washington, DC, USA, 2019
- ◊ GW Research Days, Washington, DC, USA, 2019
- ◊ Conference on Lasers and Electro-Optics (CLEO), Optical Society of America (OSA), San Jose, CA, USA, 2019
- ◊ AccelerateGW I-Corps Course, Washington, DC, USA, 2019
- ◊ AFOSR MURI 'Attojoule Nano-optoelectronics' Annual Meeting, Stanford, CA, USA, 2020
- ◊ Conference on Lasers and Electro-Optics (CLEO), Optical Society of America (OSA), 2020 [Held online due to global pandemic COVID-19]

Reviewer

Reviewed for prestigious journals in relevant field including Applied Physics Letters (APL), Optics Letters, Applied Optics, Journal of Physics D: Applied Physics, Semiconductor Science and technology, Journal of Optical Society of America B (JOSA B), IEEE Journal of Selected topics in Quantum Electronics (JSTQE), Photonics Research, etc.

Professional Experiences

◊ *Research Associate* — *May 2017 - Present*
National Institute of Standards and Technology (NIST)
Center for Nanoscale Science and Technology (CNST)
100 Bureau Drive, Gaithersburg, MD 20899

◊ *Research Associate* — *May 2017 - Present*
GW Nanofabrication & Imaging Center (GWNIC)
Science & Engineering Hall (SEH), 800 22nd St., Washington D.C. 20052

◊ *Graduate Research Assistant (GRA)* — *Summer 2017 – May 2020*
Orthogonal Physics Enabled Nanophotonics (OPEN) Lab — *PI : Prof. Dr. Volker J. Sorger*
Department of Electrical & Computer Engineering
School of Engineering & Applied Sciences (SEAS)
The George Washington University, Washington D.C. 20052

◊ *Graduate Teaching Assistant (GTA)* — *24 Aug 2015 – July 2019*
Department of Electrical & Computer Engineering
School of Engineering & Applied Sciences (SEAS)
The George Washington University, Washington D.C. 20052
Courses : Circuit Theory (ECE 2110), Engineering Electronics (ECE 2115), Introduction to ECE (ECE 1010)

◊ *Assistant Engineer* — *10 Jun 2012 – 14 July 2015*
Operation & Maintenance: Network Operations Center (NOC)
Mir Telecom – The1st IGW Operator of Bangladesh
Red Crescent Borak Tower-2 (Level-7),
71-72, Old Elephant Rd, Dhaka, Bangladesh.
Operation & maintenance of NGN equipment HUAWEI Softx3000, UMG 8900, SE2300, and Dialogic Soft switches.

◊ *Teaching Assistant (UGA)* — *25 Jan 2010 – 27 Apr 2010*, *18 May 2010 – 25 Aug 2010*
Department of Electrical Engineering & Computer Science,
School of Applied Sciences, North South University, Dhaka, Bangladesh.
Course : Electromagnetic Fields & Waves (ETE 361)

Skills & Training

◊ Software: FDTD (Lumerical), FEM (COMSOL), Matlab, Origin
◊ Nanofabrication: Class 100 cleanroom basics, Lithography (EBL/Photo), Sputtering, IBD, E-beam evaporation, ALD
◊ Imaging: SEM, FIBSEM, Optical microscopy

◊ Measurement: Optical fiber and electrical probe system, free-space measurement, thin-film measurement and characterization, spectroscopic ellipsometry (transmission/reflection), Electro-optic measurement (modulation depth, speed, I-V, Tx line, etc.).
◊ COMSOL Day Training Course (Bethesda, MD, 2018)
◊ JAWoollam Spetroscopic Ellipsometry Certificate Course (Gaithersburg, MD, 2019)
◊ 2D Material Summer School, MiNiC, University of Minnesota (May 15th –16th, 2017)
◊ AIM Photonics Summer Academy, Massachusetts Institute of Technology (July 24 – 28, 2017)

◊ **INTEGRATED PHOTONICS**
Electro-optic modulators, Mach Zehnder interferometers, Ring resonators, Photonic crystal cavities, Directional couplers, Switch, Photodetectors, Grating couplers, NoC

◊ **DESIGN & SIMULATION**
Lumerical FDTD, Mode, COMSOL Multiphysics (FEM), Matlab, LabView, KLayout, CAD, PDK

◊ **NANOFABRICATION**
Electron beam lithography (EBL), Contact photolithography, Atomic layer deposition (ALD)–Hydrophobic/philic surface, PVD, PECVD, Sputtering, Ion beam deposition (IBD), ICP, RIE, FIB, RTA

◊ **MEASUREMENT & TESTING**
SEM, FIBSEM, AFM, TEM, Electrical/Optical Probing, Optical Alignment, Visible/IR Camera Measurement, I-V, Tx Line, Cutback, Free-space Measurement, Optical Metrology, Spectroscopic Ellipsometry (Transmission/Reflection), Profilometry, Thin-Film Characterization, Tunable Laser, Optical Spectrum Analyzer, BERT, VNA, Statistical Data Analysis

PROFESSIONAL AFFILIATION

◊ Vice-President, GWU OSA Student Chapter (Oct 2017 – Present)
◊ MicroSoft Developer Network Academic Alliance (MSDNAA)
◊ Student Member: OSA, APS, SPIE

SYNERGISTIC ACTIVITIES

◊ Lifetime member in the governing body of *Nowapara High School*, Alfadanga, Faridpur, Bangladesh since 2006.
◊ Volunteer for the *'We Foundation'* for Winter-Clothes drive in 2011 and 2012.
◊ Volunteer to help raise awareness against environmental pollution and to promote eco-tourism for *Bangladesh Parjatan Corporation (BPC)*, in 2011-12.
◊ Won 6th prize in school science fair for building a model of riverine and mangrove ecosystems, 2002.