

Islam I. Abdulaal

PhD Candidate

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🌐 [iabdul-aal.github.io](https://github.com/iabdul-aal) **in** [linkedin.com/in/iabdul-aal](https://www.linkedin.com/in/iabdul-aal) 📧 @iabdul-aal 🆔 0009-0004-9300-3936

EDUCATION

B.Sc in Electronics and Communications Engineering Aug 2021 – Aug 2026
Alexandria University, Faculty of Engineering *Alexandria, Egypt*

- **CGPA:** 3.39/4.0 (Excellent)
- **Bachelor Thesis:** “Intra-DC IEEE 802.3 Ethernet MDM-based 400 Gb/s Integrated Si Transceiver”
- **Thesis Focus:** Modeling and Design of waveguide-based Ge/Si PIN photodetector; collaborated on mode division multiplexing, electro-optic modulator design, and optical digital signal processing
- **Relevant Coursework:** Electromagnetic Fields, Electromagnetic Waves, Optical Devices, Optical Communications, Digital Signal Processing

RESEARCH EXPERIENCE

Research Intern Sep 2025 – Present
*NanoPhoto Lab, IMRE, A*STAR* *Remote*

- Extended collaboration from Egypt Scholars program to work with Dr. Abdelraouf at nanophoto.org
- Contributing to comprehensive review paper on metamaterial bound states in the continuum (BIC)
- Investigating quantum photonics including applications of 2D MoS₂ and Liquid crystals
- Conducting device-level simulations for MPM SPDC using Lumerical FDTD and MATLAB

Research Intern Jul 2025 – Sep 2025
Advanced Labs Program, Egypt Scholars Inc. *Remote*

- Completed intensive 10-week training program focused on developing independent research capabilities
- Collaborated with Dr. Omar Abdelraouf in Group 4 on MPM SPDC inverse design using PINNs
- Trained 12 million parameters model for NbOCl_{2x}, benchmarking PINN against conventional
- Contributing to technical manuscript and review paper on multiphysics simulations using PINN

Undergraduate Researcher Jul 2023 – Aug 2025
OPST Group, CSMNP, SmartCI, Alexandria University *Hybrid*

- Completed comprehensive 3-month lecture-based training program covering fundamentals of photonics
- Completed following 3-month hands-on training in Lumerical simulation and MATLAB modeling
- Developed FBG for multi-parameter vital monitoring with emphasis on asthma and COPD detection
- Co-authored research proposal securing USD 15k in funding from Alexandria University Technology Park
- Implemented models for fiber core and cladding mode coupling in MATLAB, validated using Lumerical
- Designed low-cost edge-filter detection system using Lumerical INTERCONNECT for sensor

PUBLICATIONS

Preprints

- [1] **Abdulaal, I. I.**, Elsayed, A. W. A., Abdelraouf, O. A. M., *Terahertz quasi-bic metasurfaces for ultra-sensitive biosensing and high-speed wireless communications*, Preprint submitted to *Journal of Optics* (IOP), 2025. arXiv: [2510.00357](https://arxiv.org/abs/2510.00357) [[physics.optics](https://arxiv.org/abs/2510.00357)]. [Online]. Available: <https://arxiv.org/abs/2510.00357>.

In Preparation

- [2] **Abdulaal, I. I.**, Abdelraouf, O. A. M., “Nbocl₂-based spdc inverse design using a physics-informed neural network model,” Manuscript in preparation, 2026.
- [3] **Abdulaal, I. I.**, Elsayed, A. W. A., Abdelraouf, O. A. M., Sallam, B., Mahmoud, A., Hazem, A., “Physics-informed machine learning multiphysics for forward modelling, inverse design, and equation discovery,” Manuscript in preparation, 2026.

TECHNICAL SKILLS AND COMPETENCIES

Photonic Simulation and Design

FDTD/FEM Solvers: Lumerical, COMSOL

Semiconductor Modeling: Silvaco TCAD

General Modeling: MATLAB

Programming and Computational Methods

Scientific Computing: Python

Machine Learning: PyTorch, Tensorflow

Development Tools: Git, Linux

Professional Certifications

Machine Learning Specialization

Dec 2024

Issuer: DeepLearning.AI via Coursera

Languages

Arabic: Native proficiency

English: Professional working proficiency

HONORS, AWARDS, AND RESEARCH FUNDING

Travel Funding

Student Travel Grant Award for ISSCC

2026

Issuer: IEEE SSCS

Research Funding

Alexandria University Technology Park (AUTP) Research Grant

2025

Issuer: Alexandria University

Academic Honors

Dean's Honors for Academic Excellence

2021 – 2025

Issuer: Alexandria University, Faculty of Engineering

Competition Awards

ICMTC Artificial Intelligence Contest (AIC-2) – 4th Place

2024

Issuer: Military Technical College

Huawei ICT Skills Competition – National Finalist (AI Track)

2023

Issuer: Huawei Technologies – MENA

NASA Space Apps Challenge – Global Nominee

2021

Issuer: National Aeronautics and Space Administration (NASA)

LEADERSHIP EXPERIENCE AND ACADEMIC SERVICE

Co-Founder

Apr 2026 – Present

Optica Egypt Local Section

Hybrid

- Converted the IEEE SSCS 2026 optical committee to an open call for Optica Egypt Local Section

Chairman

Feb 2025 – Oct 2025

IEEE SSCS Alexandria University Student Branch Chapter

Hybrid

- Achieved 2025 SSCS Chapter Award by leading impactful programs and advancing key initiative
- Expanded semiconductor outreach nationwide through expert events and collaborative programs
- Led volunteer teams delivering student training, project work, and sustained chapter growth

General Coordinator

Aug 2021 – Sep 2023

Education Clinic (USA-Registered NGO)

Remote

- Led volunteer organization of 80+ members serving 250,000+ students across MENA region
- Developed and launched 3 major programs spanning academic support and technical skill development

- Organized webinars featuring faculty from top-100 universities including Nobel and Fields recipients

TEACHING AND MENTORING EXPERIENCE

- Peer Tutor/Mentor** 2025 – 2026
- Responsible for IEEE SSCS 2026 optical committee intensive training with two graduate students
 - Developed this [curriculum](#) covering fundamental concepts and practical applications in photonics

PROFESSIONAL MEMBERSHIPS

- **Institute of Electrical and Electronics Engineers (IEEE)** 2025 – 2026
Student Member, Member ID: 101099759
 - **IEEE Solid-State Circuits Society (SSCS)** 2025 – 2026
 - **IEEE Photonics Society** 2025 – 2026

REFERENCES

Dr. Omar Abdelraouf

Research Scientist

Institute of MRE

A*STAR

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Additional letters of recommendation available upon request from research supervisors and academic advisors.