Mohannad **ABU-ROMOH**

Machine Learning Researcher · Fiber-Optic Networks Specialist · Robotics & Computer Engineering Educator

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Personal Information

Citizenship	Jordanian
Visa Type	Work Visa – Private Sector
Residency Status	Transferable

Education

Institut Polytechnique de Paris (Télécom Paris)

Paris, France

Ph.D. in Networks, Information, and Communications — *Nov. 2019 – Nov. 2023*

- Thesis: *Equalization in Optical Fiber Communication Using Model-based Neural Networks*.
- Developed learned digital back-propagation and neural equalization schemes for dispersion-managed coherent optical systems within the EU H2020 MSCA REAL-NET network.
- Combined model-based DSP with deep learning to reduce receiver complexity while maintaining performance in long-haul and metro transmission scenarios.

University of Idaho

Moscow, ID, USA

M.Sc. in Electrical Engineering — *Oct. 2016 – May 2019*

- Thesis: *Low Complexity Algorithms for Automatic Modulation Classification*.
- Gained expertise in machine learning, neural networks, and statistical signal processing with a focus on modulation recognition and low-complexity receiver design.

Jordan University of Science and Technology

Irbid, Jordan

B.Sc. in Electrical Engineering — *Sep. 2011 – Feb. 2016*

- Specialized in communications and electronics, including wireless communications, optical fiber communications, and digital signal processing.
- Built a strong foundation in mathematics, probability theory, and programming (C++ and MATLAB).

Research Experience

Institut Polytechnique de Paris (Télécom Paris) & Infinera GmbH

Palaiseau, France & Munich, Germany

Marie Skłodowska-Curie Early-Stage Researcher (REAL-NET ITN/EID) — *Oct. 2019 – May 2023*

- Conducted PhD research on equalization in optical fiber communication using model-based neural networks within the EU H2020 MSCA REAL-NET network.
- Developed learned digital back-propagation and low-complexity convolutional neural network equalizers for dispersion-managed coherent optical links.
- Implemented and evaluated fiber-channel simulations including chromatic dispersion, Kerr nonlinearity, and polarization effects, targeting practical transceiver complexity constraints.

University of Idaho

Moscow, ID, USA

Research Assistant, Machine Learning for Communications — *Oct. 2016 – Oct. 2018*

- Investigated low-complexity automatic modulation classification algorithms based on statistical moments and likelihood maximization for wireless channels.
- Implemented and compared machine-learning-based and parametric modulation classifiers under realistic fading and noise conditions.
- This work culminated in an IEEE Communications Letters publication on moment-based AMC with likelihood maximization.

American College of the Middle East

Egaila, Kuwait

Robotics and Embedded AI Research — *2024 – Present*

- Developing AI-assisted segment detection and PID gain scheduling methods for competitive line-following robots using IR sensor arrays and physics-based simulation.
- Exploring where machine learning should be inserted within the sensing and control pipeline (sensor processing, segment recognition, or action generation) without replacing classical PID control.
- This line of work supports student competition teams and has led to one submitted conference paper and one manuscript in preparation on machine learning placement in line-following robot control.

Publications

- **Mohannad Abu-Romoh**, N. Costa, Y. Jaouën, A. Napoli, J. Pedro, B. Spinnler, and M. Yousefi, "Equalization in dispersion-managed systems using learned digital back-propagation," *Optics Continuum*, vol. 2, no. 10, pp. 2088–2105, Oct. 2023, Optica Publishing Group.
- **Mohannad Abu-Romoh**, N. Costa, A. Napoli, B. Spinnler, Y. Jaouën, and M. Yousefi, "Learned Digital Back-Propagation for Dual-Polarization Dispersion Managed Systems," in *Proc. European Conference and Exhibition on Optical Communication*, pp. We1C.6, Sep. 2022, Optica Publishing Group.
- **Mohannad Abu-Romoh**, N. Costa, A. Napoli, J. Pedro, Y. Jaouën, and M. Yousefi, "Low Complexity Convolutional Neural Networks for Equalization in Optical Fiber Transmission," in *Proc. Signal Processing in Photonic Communications*, pp. SpM5C.5, Jul. 2021, Optica Publishing Group.
- **Mohannad Abu-Romoh**, A. Aboutaleb, and Z. Rezki, "Automatic modulation classification using moments and likelihood maximization," *IEEE Communications Letters*, vol. 22, no. 5, pp. 938–941, Feb. 2018, IEEE.

- **Mohannad Abu-Romoh**, "AI-assisted Fast Segment Detection and PID Gain Scheduling for Competitive Line-Following Robots," in *Proc. 15th International Conference on Pattern Recognition Applications and Methods (ICPRAM 2026)*, SciTePress, INSTICC, 2026. [Under review]
- **Mohannad Abu-Romoh**, F. Ziyad, W. Dawaghreh, O. Al-Attia, and Y. Imamverdivey, "Machine Learning Placement in Line-Following Robot Control: A Comparative Study of Classical and Learned Pipelines," manuscript in preparation. [In-progress]

Grants and Funding

Marie Skłodowska-Curie Early-Stage Researcher, REAL-NET (Horizon 2020) — *France & Germany*

European Union — *Nov. 2019 - Feb. 2023*

- Funded PhD fellowship on advanced equalization techniques for optical fiber networks within the REAL-NET ITN/EID consortium.

Research Assistantship, University of Idaho — *Moscow, ID, USA*

Department of Electrical Engineering — *Oct. 2016 - Oct. 2018*

- Graduate research assistantship supporting work on machine-learning-based modulation classification for wireless communications.

Professional Experience

Computer Engineering Technology (CET) Program Coordinator — *Egaila, Kuwait*

American College of the Middle East — *Feb. 2025 - Jul. 2025*

- Appointed as Program Coordinator for the CET department.
- Responsibilities included curriculum oversight, faculty coordination, and enhancing student academic experiences within the program.

Instructor, Computer Engineering Technology — *Egaila, Kuwait*

American College of the Middle East — *August 2024 - **Present***

- Teaching core Computer Engineering Technology courses, including CPET 181 (Computer Operating Systems Basics, with VMware-based labs on Linux and Windows virtual machines), CPET 281 (Introduction to Computer Communication Networks, using Cisco Packet Tracer for network design and troubleshooting), ECET 111 (Introduction to Digital System Design I), ECET 146 (Introduction to Microprocessors), ECET 264 (Applications of the C Programming Language), CNS 176 (Information Technology Architecture), and ECET 296 (Electric Systems Fabrication using PCB).
- Actively engaged in research focused on machine learning applications for communication systems.

Machine Learning Scientist — *Munich, Germany*

Infinera — *Nov. 2020 - May 2022*

- Conducted advanced research in optical communications as part of the REAL-NET project. Worked on real-world transmission experiments, applying machine learning for optical signal recovery and classification, improving data transmission accuracy.
- Collaborated with industry experts to bridge the gap between theoretical research and practical implementation.

Undergraduate Intern — *Rzeszow, Poland*

ELMAT/Ferbrain — *Jun. 2015 - Aug. 2015*

- Selected for a competitive IAESTE internship in optical fiber solutions at ELMAT.
- Gained hands-on experience in optical fiber manufacturing, passive device production, and FTTH (Fiber to the Home) technologies.
- Worked across various departments, contributing to quality control and optical network configuration.

Lab Assistant, Department of Electrical Engineering — *Irbid, Jordan*

Jordan University of Science and Technology — *Feb. - Jun. 2015*

- Guided undergraduate students in the Microcontrollers and Embedded Systems Lab, teaching C-based microcontroller programming and leading labs on embedded design, Proteus circuit simulation, and PIC18F4520 applications.

Teaching Experience

American College of the Middle East (ACM)

Egaila, Kuwait

Instructor, Computer Engineering Technology

*Aug. 2024 - **Present***

- **CPET 181 – Computer Operating Systems Basics**: Introduces fundamental OS concepts (processes, memory, file systems) with hands-on labs using VMware to deploy and manage Linux (Ubuntu, Kali) and Windows virtual machines.
- **CPET 281 – Introduction to Computer Communication Networks**: Covers core networking topics (TCP/IP stack, routing, switching, subnetting) with practical exercises in Cisco Packet Tracer for network design, configuration, and troubleshooting.
- **ECET 111 – Introduction to Digital System Design I**: Teaches combinational and sequential logic design, truth tables, and state machines, supported by logic simulators and introductory FPGA design using Quartus.
- **ECET 146 – Introduction to Microprocessors**: Focuses on microprocessor and microcontroller architecture, C programming, and interfacing (timers, ADCs, serial communication) with embedded system examples.
- **ECET 264 – Applications of the C Programming Language**: Emphasizes problem-solving and structured programming in C, with applications drawn from embedded systems and low-level computing.
- **CNS 176 – Information Technology Architecture**: Provides a conceptual and technological survey of information technology architectures, including operating systems, network operating systems, distributed system architectures, and distributed application architectures.
- **ECET 296 – Electric Systems Fabrication using PCB**: Capstone course guiding students through PCB design and fabrication workflows using OrCad (Capture CIS, PCB Editor, PadStack Editor), progressing towards a complete hardware project.

Skills

Programming Languages	Python, C, C++, MATLAB
Markup & Scripting	HTML, CSS, JavaScript, LaTeX
ML Frameworks	Keras, TensorFlow, Jupyter, Weka
Networking Tools	Cisco Packet Tracer, VMware (Linux/Windows virtual machines)
FPGA & Digital Design	Pspice, Quartus (FPGA design, simulation, and programming)
PCB Design	OrCad (PCB Editor, Capture CIS, PadStack Editor)
Languages	Arabic, English, French

Honors & Awards

2019	**Marie Skłodowska-Curie Fellowship**, REAL-NET Horizon 2020 Early-Stage Researcher in optical fiber communication networks	*France & Germany*
2023	**Editor's Pick**, Optics Continuum, for the article "Equalization in dispersion-managed systems using learned digital back-propagation"	
2025	**1st Place – Student Team (Mentor)**, Kuwait National Robotex Competition, Line-Following Category	*Kuwait*
2016	**Ranked 2nd in Communication & Electronics**, B.Sc. cohort, Jordan University of Science and Technology	*Jordan*
2016	**M.Sc. Scholarship**, Department of Electrical Engineering, University of Idaho	*Idaho, U.S.A.*
2018	**Perfect GRE Quantitative Score**, 170/170	
2011–2016	**Three-time Honor's List**, Jordan University of Science and Technology	*Jordan*

Extracurricular Activities

Board Member (2023); Volunteer Member (2022–Present)

Marie Curie Alumni Association (MCAA) Middle East Chapter

Jun. 2022 – Present

- Contributed to organizing outreach events, webinars, and networking activities connecting Marie Curie fellows and alumni across the Middle East.
- Supported initiatives to promote research mobility, career development, and collaboration between regional universities and European institutions.

American College of the Middle East

Egaila, Kuwait

Robotics and AI Club Mentor

2024 – Present

- Mentor student teams in line-following robotics and embedded AI, linking coursework in C programming, digital design, and microcontrollers to competition-ready robots.
- Guide students preparing for national competitions such as Robotex Kuwait, focusing on control tuning, sensor integration, and robust autonomous behavior.