

# Mohanad Abu-Romoh

COMMUNICATION SYSTEMS AND AI RESEARCHER

Egaila, Kuwait

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Researcher in communication systems and artificial intelligence, with experience in optical communications, intelligent signal processing, and low-complexity receiver design. Develops practical learning-based methods that combine communication theory with real system constraints.

## Research Interests

**Areas** Optical communications, AI for communication systems, intelligent signal processing, low-complexity receiver design, channel equalization and estimation

## 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 methods 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 preserving performance in long-haul and metro optical 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*.
- Focused on machine learning, statistical signal processing, and low-complexity receiver methods for wireless communication systems.

### 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, and engineering programming.

## Research Experience

### Institut Polytechnique de Paris (Télécom Paris) & Infinera GmbH

Palaiseau, France & Munich, Germany

MARIE SKŁODOWSKA-CURIE EARLY-STAGE RESEARCHER (REAL-NET ITN/EID)

Nov. 2019 – Nov. 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.
- Completed an industry-linked research secondment at Infinera within the REAL-NET framework (Nov. 2020 – May 2021), contributing to the practical evaluation of optical communication methods in an industrially relevant setting.

### 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 automatic modulation classification.

## 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. [Accepted and presented]
- **Mohannad Abu-Romoh**, F. Ziyad, W. Dawaghreh, O. Al-Attia, and Y. Imamverdivy, "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 Fellowship, REAL-NET (Horizon 2020)

France & Germany

EUROPEAN UNION

Nov. 2019 – Feb. 2023

- Competitive EU-funded PhD fellowship supporting research on advanced equalization methods for optical fiber communication 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 research on machine-learning-based modulation classification for wireless communication systems.

## Academic Experience

### American College of the Middle East

Egaila, Kuwait

INSTRUCTOR, COMPUTER ENGINEERING TECHNOLOGY

Aug. 2024 – Present

- Teach undergraduate courses in computer engineering technology, including programming, networking, digital systems, microprocessors, operating systems, IT architecture, and electronic system fabrication.
- Designed course syllabi, assessment structures, grading schemes, laboratory activities, and practical learning workflows for multiple courses.
- Delivered hands-on laboratory teaching across C programming, networking, digital system design, microprocessor-based systems, operating systems, and PCB-focused coursework.
- Assisted the HOD with selected CET coordination tasks in a temporary support role with limited authority.

### American College of the Middle East

Egaila, Kuwait

SELECTED COURSES TAUGHT

- **CPET 181 – Computer Operating Systems Basics:** Covers core operating-system concepts with practical labs using VMware and Linux/Windows virtual machines.
- **CPET 281 – Introduction to Computer Communication Networks:** Covers networking fundamentals with practical exercises in Cisco Packet Tracer for design, configuration, and troubleshooting.
- **ECET 111 – Introduction to Digital System Design I:** Introduces combinational and sequential logic design, truth tables, state machines, and introductory FPGA-related work.
- **ECET 146 – Introduction to Microprocessors:** Covers microprocessor and microcontroller architecture, C programming, and common interfacing concepts through embedded-system examples.
- **ECET 264 – Applications of the C Programming Language:** Emphasizes structured problem solving and C programming with computing- and embedded-oriented examples.
- **CNS 176 – Information Technology Architecture:** Surveys core concepts in information technology architecture, including operating systems, network operating systems, and distributed systems.
- **ECET 296 – Electronic System Fabrication:** Focuses on PCB design and fabrication workflows using OrCad tools, leading toward a complete hardware-oriented project.

### ELMAT / Fibrain

Rzeszow, Poland

UNDERGRADUATE INTERN

Jun. 2015 – Aug. 2015

- Selected for a competitive IAESTE internship in optical fiber solutions.
- Gained hands-on experience in optical fiber manufacturing, passive device production, and FTTH technologies.
- Worked across multiple departments, including quality control and optical network configuration.

### Jordan University of Science and Technology

Irbid, Jordan

LAB ASSISTANT, DEPARTMENT OF ELECTRICAL ENGINEERING

Feb. 2015 – Jun. 2015

- Guided undergraduate students in the Microcontrollers and Embedded Systems Lab, including C-based microcontroller programming, Proteus-based circuit simulation, and PIC18F4520 applications.

## Skills

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<b>Programming</b>	Python, MATLAB, C, C++
<b>AI / Data Tools</b>	TensorFlow, Keras, Jupyter, Weka
<b>Communications / Systems</b>	Signal processing, communication-system simulation, networking fundamentals, receiver-oriented algorithm development
<b>Engineering Tools</b>	Cisco Packet Tracer, VMware, Quartus, PSpice, OrCad, LaTeX
<b>Web / Scripting</b>	HTML, CSS, JavaScript
<b>Languages</b>	Arabic, English, French

## Honors & Awards

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2023	<b>Editor's Pick</b> , Optics Continuum, for the article "Equalization in dispersion-managed systems using learned digital back-propagation"	
2019	<b>Marie Skłodowska-Curie Fellowship</b> , REAL-NET Horizon 2020 Early-Stage Researcher in optical fiber communication networks	<i>France &amp; Germany</i>
2016	<b>M.Sc. Scholarship</b> , Department of Electrical Engineering, University of Idaho	<i>Idaho, U.S.A.</i>
2016	<b>Ranked 2nd in Communication &amp; Electronics</b> , B.Sc., Jordan University of Science and Technology	<i>Jordan</i>
2015	<b>IAESTE Internship Nomination</b> , for a competitive 2-month internship at Fibrain, Rzeszów, Poland	<i>Poland</i>
2025	<b>1st Place – Student Team (Mentor)</b> , Kuwait National Robotex Competition, Line-Following Category	<i>Kuwait</i>

## Extracurricular Activities

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### 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.
- Notable example: Organized and delivered multiple 4-hour introductory sessions on Python.

### American College of the Middle East

*Egaila, Kuwait*

ROBOTICS AND AI CLUB MENTOR

*2024 – Present*

- Mentored student teams in national competitions in robotics, AI, and data analysis.
- Tools: Scratch, C, Python, and Weka.
- Notable competitions: Robotex Kuwait (1st place) and the AI Innovation Challenge by the University of California, Berkeley.