



# Amr El Mougny

Associate Professor of Computer Science

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## ABOUT ME

Driven by a passion for learning and the desire to innovate and to use technology for social good.

## COMPETENCE

### Teaching

Security and Privacy | Computer Networks | Wired and Wireless protocols | Internet of Things

### Research

Security | Privacy | Artificial Intelligence | Autonomous systems | Internet of Things | Sensor Networks | Embedded Systems | Vehicular Networks | IoT | Information-Centric Networking | Complex-Event Processing |

## WORK HISTORY

### Associate Professor

(Aug 2023 - Present)

Department of Computer Science and Engineering  
American University in Cairo, Cairo, Egypt

Teaching various courses in security. Established the AUC's cyber range dedicated to training and research in cybersecurity fields. Research in security and privacy as well as autonomous vehicles.

### Associate Professor

(Apr 2021 – Aug 2023)

### Assistant Professor

(Jan 2014 – Apr 2021)

Faculty of Media Engineering and Technology  
German University in Cairo, Cairo, Egypt

Teaching various courses. Conducting research focusing on Security and Networks. Established the Internet of Things lab and research team. Successfully obtained several research grants from national and international funding bodies in collaboration with international researchers and industry partners.

### Chief Technology Officer, Co-Founder

(Aug 2018 – Jun 2023)

Preventia Technologies, U.S.A.

Established the Engineering Department at Preventia Technologies. Worked with management to set the vision and strategy of the company, in particular as it relates to innovation and technological development. Currently serving as security consultant and research director,

### Vice Dean for Academic Affairs

(Nov 2015 – Aug 2023)

Faculty of Media Engineering and Technology  
German University in Cairo, Cairo, Egypt

Responsibilities include promoting research in the faculty and ensuring excellence in teaching. Also leading the accreditation committee.

### Post-Doctoral Fellow

(Feb 2013 – Dec 2013)

School of Electrical Eng. and Computer Science  
Ottawa University, Ottawa, Canada

Led a team of researchers working on LTE-based public safety networks. Also responsible for coordination between academic, industry and government partners involved in this project. Worked on several research grants and published several papers in international venues.

### Research Assistant

(Sep 2006 – Jan 2013)

Faculty of Electrical and Computer Eng.  
Queen's University, Kingston, Canada

Led a team of researchers working on several projects related to sensor networks, which involved industry and government partners.

## Grants

### Acquired

- **DAAD-BMBF**, Immersive AI: Visualizing AI and Big Data in Virtual Environments "", 2021 – 2023.
- **GERF**, "Resense: Retrospective sensing in the IoT" 2021 – 2023.
- **GE-SEED**, "Networked Appliances, Applications, and Sensing Systems for the Smart City", 2017 – 2019.
- **GERF**, "An IoT Testbed for Smart Energy Management", 2017 – 2019.
- **DAAD-BMBF**, "Software-Defined Infrastructure for the IoT", 2017 – 2019.
- **DAAD-BMBF**, "An IoT Framework for Energy Management", 2015 – 2017.
- **HORIZON EU**, "We4STEM: Women Entrepreneurs for STEM.", 2023.

## Extracurricular Research

- Mapping economic indicators in Egypt using satellite images.
- Business intelligence for smart energy management based on big data analysis.
- Tackling the "Uncanny Valley" challenge in 3D virtual systems.
- A semantic SPAM filter for SMS messaging systems.

## EDUCATION

### Doctor of Philosophy

(Sep 2006 – Jan 2013)

Queen's University, Kingston, Canada

Thesis title: *Cognitive Solutions for Resource Management in WSN*

### Master of Applied Science

(Sep 2004 – Jun 2006)

Concordia University, Montreal, Canada

Thesis title: *Design and Performance Analysis of a Low Complexity MIMO-OFDM System with Walsh Block Coding*

### Bachelor of Science

(Sep 1998 – Jun 2003)

Ain Shams University, Cairo, Egypt

Bachelor thesis title: *Frequency Planning of a GSM Network*

## RESEARCH PROFILE

### Key Achievements

- Established the **Self-Driving Lab and research cluster through internal GUC funding**. The lab focuses on research into autonomous driving including security and privacy of autonomous and connected vehicles.
- Established the **Internet of Things (IoT) lab and research cluster** through internal GUC and 3<sup>rd</sup> party funding. The lab focuses on research in IoT projects and supports teaching as well (practical projects, experiments, etc.). Focus is given to usable security and privacy-enabled data collection.
- Launched the **Smart Campus Initiative** at the GUC, which aims to turn the GUC campus into a technology hub that provides services to students, academics, and administrators.
- Established successful and stable collaboration with several international partners from universities such as Stuttgart, Ulm, and Passau in Germany; as well as Queen's, Ottawa, and Carleton Universities in Canada.
- Established successful collaboration with several industry partners such as Vodafone, ElSewedy, Innova, and Alcatel (Canada).
- As a post-doctoral fellow at Ottawa University, I led a team to design and implement an **LTE-based public safety network** across the city of Ottawa. In addition to my responsibilities as a researcher, I was responsible for coordinating activities between academic, government, and industry partners.
- Led a team that implemented several wireless sensor networks in the province of Ontario for animal monitoring.

### Research Directions

- Security and privacy, including security of machine learning algorithms
- Autonomous driving and connected vehicles
- Explainable AI
- Ubiquitous computing
- Sensing and computing in IoT networks
- Secure public sensing and crowdsourcing platforms for data collection.
- Distributed, accurate, and consistently stable indoor localization.
- Semantic architectures for reasoning and data reuse.

## Philosophy

- To create a comfortable, interactive, and intellectual learning atmosphere for the students.
- Encourage participation from ALL students.
- Consider student feedback and adapt to their needs without compromising quality of teaching.
- Practice-oriented teaching (learn by doing).

## Performance

Consistently one of the most highly evaluated professors in our faculty.

## Experience

- Associate professor at the GUC.
- Teaching fellow at Queen's University (instructor for several courses).
- Teaching assistant at Queen's University.

## Additional Contributions in Teaching

- Organized the "**Teach the Teacher**" workshop where I gave a series of lectures about teaching skills (preparing a lecture/tutorial, presentation and communication skills)
- Organized the "**Teach the Researcher**" workshop, where I gave a series of lectures about research skills (research methodology, technical writing, etc.)

## Key Projects

- **The GUC Self-Driving Fleet.** Established a fully autonomous vehicle within the GUC campus. Working on extending it to a connected fleet.
- **The Smart Campus Initiative.** Featured in Hannover Messe 2016. Projects include smart rooms controlled using voice recognition and a chatbot, and monitored using computer vision algorithms; indoor navigation; and smart attendance in tutorials using BLE beacons, among many others.
- **CHEOPS:** cultural heritage enhancement over cyber physical systems: exploring various technologies such as augmented reality and animations to enhance the touristic experience in cultural heritage sites.

# TEACHING PROFILE

## Key Achievements

- **Designed the curriculum for the IT-Security major** at the GUC's sister university: German International University.
- Introduced and taught several courses in security including cryptography, network security, web security and pentesting, and digital forensics.
- Established a **research environment for undergraduate students.** Several venues are used such as course projects, bachelor projects, internships, and extracurricular projects. Students are encouraged to innovate and work with state of the art technologies. Distinguished projects are published.
- This research atmosphere led to a group of students winning the 1<sup>st</sup> prize in the **Google Mobile Application Launchpad competition** in 2016 (Team 7asala), and claiming a prize of \$20,000. Several teams from the MET are entering this year's competition as well under my supervision.
- Introduced two new elective courses titled: "Selected Topics in Communication Networks", and "Internet of Things". The two courses discuss state of the art topics in the areas of communication networks and the IoT. Students get to work on practical projects that are research-oriented. These electives are the two most popular ones in the entire list of electives offered by the faculty.
- Developed the practical skills of students in my courses by training them to work on hardware and software supported by the IoT lab.
- Redesigned the course "Networks and Media Lab" to improve the contents and include modern experiments.
- Redesigned the course "Computer and Network Security" to include an extensive practical component. The students are required to implement a series of security attacks/defenses that apply the theoretical concepts they study in the lectures.
- Worked with QMAC at the GUC to ensure excellence in teaching.

## Courses

### Courses previously taught

Web security  
Cryptography and Network Security  
Digital Forensics  
Introduction to Networks  
Network and Media Lab

Advanced Topics in Security  
Internet of Things  
Introduction to Computer Science  
Digital Logic Design  
Selected Topics in Networks

# Industrial Experience

## Leadership Qualities

Lead by example | Focus on end goals and key objectives | Inspire others to achieve their best | Communicate effectively | Transparent Decision Making | Positive attitude | Confidence | Passion for excellence

## Key Achievements

- Established the engineering team at Preventia Technologies, U.S.A. and succeeded in recruited highly talented individuals in various roles.
- Supervised the establishment of workflows and software engineering processes within the team.
- Ensured continuous career development and learning paths for the team members.
- Worked with management to set the vision and strategy for the engineering team.
- Supervised the design and implementation of the artificial intelligence components of the products of Preventia Technologies.
- Established the security and privacy framework for the products of Preventia Technologies.
- Established the strategy for growth of the capabilities and capacity of the engineering team.
- Set the strategy for the integration of security and privacy protocols within the software development cycle.
- Worked with management to launch services in international markets.

# VICE DEAN ROLE

## Other Responsibilities

- Writing monthly faculty reports
- Working with the faculty of post-graduate studies to ensure a smooth defense and graduation process
- Managing the teaching load of faculty members
- Managing any academic issues occurring during the semester
- Recruitment of new staff
- Represent the faculty in meetings and events

## Key Achievements

- Led the team that completed and submitted the re-accreditation catalogue of the Faculty of Media Engineering and Technology.
- Initiated a training program for junior researchers and teaching assistants. The program is required for all new faculty recruits and provides sessions related to teaching and research skills.
- Worked on improving the evaluation methods for all faculty members to focus on excellence in research and effectiveness in teaching.
- Organized a series of workshops involving national and international partners from industry and academia to increase the visibility of the faculty.
- Established research partnerships with international institutions.
- Established a series of new practice-oriented elective courses with collaboration with industry partners that focus on satisfying market needs.
- Worked with the dean on developing a strategic plan for the development of the faculty. The plan includes advancing the research activities (increasing quality and productivity), developing the academic staff, and ensuring an efficient and intellectual learning atmosphere for the students, among many other factors.
- Leading the curriculum committee to review content of all courses and update where needed.
- Acquired an internal fund of \$700,000 to establish a series of new labs for teaching and research.
- Modified the faculty structure to establish research clusters in the faculty's key competence areas.
- Encouraged exploration into new research fields through workshops, short research stays, and DAAD scholarships.

## Other Activities

- Periodic friendly social gatherings of faculty members
- Group meetings to discuss improving the teaching and research process

# Other Information

## Personal Info

- Date of Birth: 17<sup>th</sup> Aug 1981
- Social status: married, one child
- Nationality: Egyptian/Canadian

## Practical Skills

### Hardware

- Worked with several development platforms on a wide variety of projects, including Arduino, Raspberry Pi, and Intel Edison.
- Experience with several communication technologies including BLE, WiFi, ZigBee, and 2G/3G.
- Designed projects using RFID systems.
- Worked with a wide range of sensors/actuators.
- Experience on development projects involving several interface types such as Leap Motion, HTC virtual headset, and Eye gaze detection, among others.

### Network Simulators/Emulators

- NS2/NS3 network simulator
- Omnet++ network simulator and many associated packages including inet, Veins, and SUMO
- Mininet emulator for software-defined networks

### Software

- Burp Suite (pentesting)
- Wireshark
- Digital forensics tools
- Several programming languages including C/C++, Python, Java, Javascript

## Awards

- Nortel graduate fellowship award (2008).
- Queen's graduate award (2006 – 2010).
- Research assistantship (2006 – 2013).
- Best presentation awards in the WiSense workshop (2010, 2013).
- Third best presentation award in NSERC DIVANET workshop (2012).