



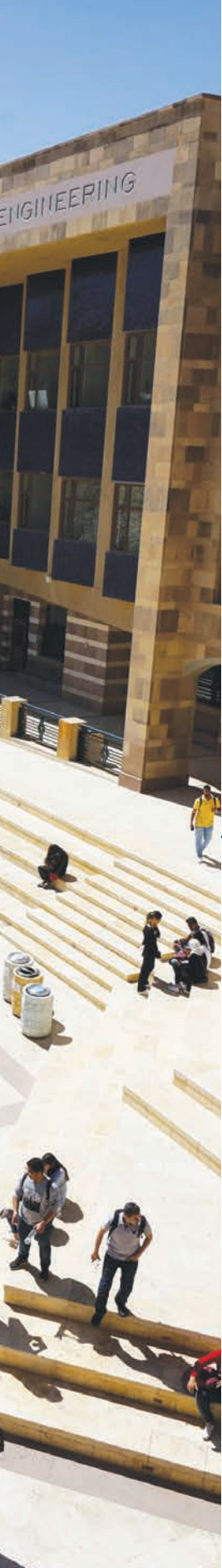
The American  
University in Cairo

School of Sciences  
and Engineering

**AUC'S HUB**  
OF INNOVATION  
AND DISCOVERY







## Message from the Dean



"The School of Sciences and Engineering offers a "curriculum of the future" for a rapidly changing world, integrating theoretical scientific concepts with real-world engineering applications to produce a new generation of skilled professionals ready for the job market.

STEM, or Science, Technology, Engineering and Mathematics, is an educational approach that equips graduates with the in-demand skills needed for the fourth industrial revolution, which harmonizes digital, physical and biological systems. Fostering a culture of excellence and innovation, the school utilizes interdisciplinary and hands-on learning methods for a deeper understanding of complex disciplines like science and technology, combined with an integrated perspective grounded in the liberal arts and sciences tradition of critical thinking, evidence-based discourse and creative acumen."

*Lotfi Gaafar*



# School of Sciences and Engineering

Experiment, invent and transcend boundaries at the University's pulsating hub of research and discovery

Boasts a distinctive multidisciplinary and experiential approach

Fosters an environment of social responsibility

Expert faculty with the experience in fields such as biotechnology, chemistry and nutrition, and environmental engineering to inspire students to excel as professionals, researchers and academicians

Houses the first university FabLab — a laboratory space equipped with tools and machines for digital fabrication — in the region to be launched by students

Faculty producing patented inventions in fields such as biotechnology, pharmaceuticals, diagnostics and computer science

200  
state-of-the-art  
labs

For Two Years in  
a Row, Faculty Members  
Named in Stanford-  
Elsevier's Scopus List  
of Top 2% Impactful  
Scientists Worldwide



## Alumni Spotlight

**Mohamed Zaghou '08**

**Physics**

**AUC LEAD Scholar; Faculty Scientist,  
Laboratory for Laser Energetics,  
University of Rochester**

After graduating from AUC, Zaghou went on to complete his PhD at Harvard University, where he was awarded both the NASA Earth and Space and Goldman Sachs fellowships. In partnership with a group of researchers, Zaghou uncovered revolutionary evidence of the transition of hydrogen from liquid insulator to liquid metal. His findings have been cited by NASA in a report exploring Saturn's magnetic field. Zaghou now serves as a faculty scientist at the Laboratory for Laser Energetics at the University of Rochester in New York, working with lasers to develop a clean and infinite source of energy.





### **Faculty Spotlight** **Rania Siam**

Professor of Microbiology Rania Siam is the founding director of AUC's biotechnology graduate program and previously served as the chair of the biology department. As the leader of the Red Sea Marine Microbiology Group, she is directing a trailblazing study on how microbial communities survive the harsh atmosphere of brine pools in the Red Sea. This research has the potential to uncover the unique properties of these communities that can be leveraged for biotechnology.

*"Our program provides hands-on experimentation in the diverse biological science field. ... This prepares our students to pursue cutting-edge research. In fact, a high percentage of our graduates are pursuing graduate education at top universities in Europe and North America."*

*Rania Siam  
Professor, Department of Biology*

# Pave Your Path

Choose from a diverse set of programs, covering 10 different disciplines



## Faculty Spotlight Nouri Sakr '13

Assistant Professor Nouri Sakr focuses her research on leveraging connections between data science and combinatorial optimization to design data-driven algorithms that efficiently tackle real-world challenges with social impact. She worked on supply chain analytics, dynamic inventory allocation and cloud storage traffic problems at Amazon and Microsoft. During her time as an affiliate of the Data Science Institute at Columbia University, she accumulated further experience building fast machine learning frameworks and adaptive machine learning in cybersecurity through collaborations with Google and Sandia National Labs. She also created and built health care solutions for the Columbia University Irving Medical Center. Additionally, Sakr is engaged in foster care matching through her work at Graham Windham in New York and designing machine learning algorithms for unemployment reduction through her collaboration with the J-PAL program and an Egyptian startup. As a current Data Science Program Advisory Board member, she plays a significant role in steering AUC's new bachelor's program in data science. In 2020, she founded the Data Science Hub, which applies cutting-edge data science techniques in interdisciplinary areas such as education, healthcare, fintech and economics.

## Mastering Data Science

AUC's data science program is the first of its kind in Egypt. Preparing students to meet the rising global demand for data scientists, SSE provides students with the opportunity to explore the fields of probability, statistics, mathematics, machine learning, databases and modern programming languages such as R and Python. Through a multidisciplinary approach, the program provides students with the tools to analyze data and extract knowledge that can be used to make critical decisions across both the public and private sectors.

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Alumni lead careers as top engineers, innovative program developers, astute mathematicians and physicians, visionary architects and groundbreaking researchers in spheres such as artificial intelligence, sustainability and biomedical science.

22

undergraduate  
majors and minors

29

graduate  
programs

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# Health Studies

AUC is one of only two universities in Egypt featuring an institute of global health and human ecology, and SSE is the only school to accept nonmedical students to this major. The program enables students to pursue a number of graduate programs, including a Master of Public Health (MPH) and a curriculum for a PhD in applied sciences. The school offers an interdisciplinary experience focused on exploring sustainable solutions to real-world challenges. Through the MPH program, students are exposed to the various social, behavioral, policy and regulatory dimensions of the public health space. By fostering critical thinking, leadership and decision-making skills, the program prepares students to become skilled practitioners ready to meet both regional and global needs in the areas of health, disease identification, mitigation and prevention.

## Alumni Spotlight

**Rana el Kaliouby '98, '00**

**Computer Science  
CEO and Founder,  
Affectiva; AUC Trustee**

AUC alumna Rana el Kaliouby is a pioneer in artificial emotional intelligence, using emotion-recognition software and analytics to serve humanity as the CEO of an international organization.



## UNDERGRADUATE PROGRAMS

### MAJORS

Actuarial Science  
Architectural Engineering  
Biology  
Chemistry  
Computer Engineering  
Computer Science  
Construction Engineering  
Data Science  
Electronics and Communications Engineering  
Mathematics  
Mechanical Engineering  
Petroleum Engineering  
Physics

### MINORS

Architectural Design  
Biology  
Chemistry  
Computer Science  
Design of Interior Spaces  
Electronics  
Mathematics  
Petroleum Engineering  
Physics

## GRADUATE PROGRAMS

Architecture (MSc)  
Biotechnology (MSc)  
Chemistry (MSc)  
Computer Science (MSc)  
Computing (MComp)  
Construction Engineering (MEng)  
Construction Engineering (MSc)  
Electronics and Communications Engineering (MEng)  
Electronics and Communications Engineering (MSc)  
Electronics and Communications Engineering - Management of Technology (MEng)  
Environmental Engineering (MSc)  
Environmental Systems Design (MSc)  
Global Public Health (MSc)  
Mechanical Engineering (MEng)  
Mechanical Engineering (MSc)  
Nanotechnology (MSc)  
Petroleum Engineering (MEng)  
Petroleum Engineering (MSc)  
Physics (MSc)  
Robotics, Control and Smart Systems (MEng)  
Robotics, Control and Smart Systems (MSc)  
Sustainable Development (MSc)  
Sustainable Development (Dual Degree)  
Applied Sciences (PhD)  
Engineering (PhD)  
Computer Science (Diploma)  
Food Chemistry (Diploma)  
Sustainable Development (Diploma)  
Physics (Diploma)





### Faculty Spotlight **Hanadi Salem '83, '87**

Professor of Materials and Manufacturing and Chair of the Department of Mechanical Engineering Hanadi Salem is the founder and director of the Additive Manufacturing Centennial Lab, spearheading additive manufacturing research, development and benchmarking both in Egypt and the region. Salem was the first to establish wire arc additive manufacturing (WAAM), an integrated system for the repair and manufacturing of metallic parts, in Egypt and the Middle East. She is also credited with founding the nanotechnology master's program at AUC and co-founding both the University's Yousef Jameel Science and Technology Research Center and the Egyptian National Nanotechnology Network.

*"Manufacturing is undergoing a massive shift. A technology called additive manufacturing, or 3D printing, is revolutionizing the industry, from motor vehicles and consumer products to medicine, the military, gas and oil, and aerospace. We're seeing breakthroughs every day in fields such as robotics, biomedical engineering, machine learning, architecture and so many more."*

*Professor and Chair, Department of Mechanical Engineering; University Senate Chair*

## Embodying Excellence

Trust in SSE's proven quality education and international recognition



ABET-accredited programs at SSE: computer science, actuarial science, biology, construction engineering, computer engineering, electronics and communications engineering, mechanical engineering and Petroleum and Energy Engineering

AUC's chemistry program is accredited by the Canadian Society for Chemistry (CSC). AUC's architectural engineering bachelor's program received validation from the UNESCO-UIA Charter for Architectural Education.

ABET accreditation provides global recognition of a university's high-quality programs, giving students access to unique study-abroad opportunities and granting graduates a competitive edge in the international job market. Graduates of ABET-accredited engineering programs are eligible to register as professional engineers in many countries around the world, including the United States, Canada and Australia, after passing the required examinations.

The Accreditation Board for Engineering and Technology (ABET) is an agency that accredits programs in the fields of applied and natural science, computing, engineering and engineering technology, recognizing a university's commitment to continuous improvement and superior standards.





## Alumni Spotlight

### Madina Mahmoud '12, '18

#### Chemistry

Madina Mahmoud received the 2019 Eni Young Talents from Africa Award for her research on “a new future for water,” which explores advanced desalination of saltwater for reuse in irrigation or for livestock purposes. She is now continuing her research as a PhD student in Italy under the supervision of Adham Ramadan '91, professor and dean of graduate studies, and Amal Esawi '89, '90, professor and associate dean for graduate studies and research.



The National Authority for Quality Assurance and Accreditation of Education (NAQAAE) is a government entity committed to upholding quality education standards in Egypt.



# A Launchpad for Lifelong Learning

# Break down classroom walls and transcend textbook learning

Programs that emphasize critical thinking, social responsibility and community engagement, preparing students to distinguish themselves as well-rounded global citizens

Platforms for experimentation and practical application of theory, including specialized labs and opportunities to collaborate with expert faculty on research

A learning environment that enables students to apply skills to tackle real-world challenges through immersive class assignments, capstone projects and connections to leading figures in the sciences and engineering sectors

“

Our method would be cost-effective, noninvasive — based on a blood sample — and derived from microRNA sequencing, the most specific and sensitive data marker available. This work is urgently needed. The impact would be immediate and powerful.

Asma Amleh  
Associate Professor, Department of Biology  
On developing a more effective screening test for ovarian cancer

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# Cultivating Curiosity

## Dive into research as an undergraduate student

Opportunities for inquisitive thinking across all levels of the University community through participation in international conferences hosted on campus, collaboration with expert faculty and access to specialized labs

Students have presented at conferences, competitions and venues around the globe, such as the EGYPS Women in Energy Conference, the SensUs biosensor competition, the Omnicom Media Group MENA Inter-University Challenge and the NASA International Space Apps Challenge

Platforms for students to engage in original research or creative work, including the *Undergraduate Research Journal (URJe)*, specialized workshops and online resources and the Newsletter for Undergraduate Research

Funding opportunities to support undergraduate cocurricular research activities and additional support provided by the Office of Undergraduate Research

Access to 13 research centers in fields such as sustainability, engineering and nanoelectronics

## EURECA Conference

An annual conference for Excellence in Undergraduate Research, Entrepreneurship and Creative Achievement (EURECA), offering undergraduate students a space to highlight their innovative work and celebrate the value of research across all discipline.

## A Day in the Life of an SSE Student

**Nada Hussein Habib**

**Electronics and  
Communications  
Engineering Sophomore**

Hometown: Port Said,  
Egypt

9:00 am

Wake up and head out from the University Residences to grab breakfast at Tabali

10:00 am

First class of the day: Statistics with Professor Ahmed Samer Ezzeldin

11:30 am

Next stop: Introduction to Psychology, a required course as part of AUC's Core Curriculum, with Professor Noha Maarouf

1:00 pm

Assembly hour: No courses are offered during this period, giving students a chance to gather for a quick chat in Bartlett Plaza or catch up on course work. Nada often likes to find herself a nook in the AUC Library to



## Alumni Spotlight

### Sara Halawa '11, '14

#### Applied Sciences, Specialization in Biotechnology

Sarah received the L'Oréal-UNESCO For Women in Science International Award for her PhD dissertation, which focuses on the genetics and epigenetics of cardiovascular diseases. She undertook her research as part of a joint venture between AUC and the Magdi Yacoub Global Heart Foundation.



work on her assignments or attend a meeting with the Help Club, a student organization dedicated to leading community service.

2:00 pm  
Back to class: Differential Equations with Professor Youssef H. Youssef

4:00 pm  
Quick stop at the Student Union market for much-needed snacks

4:30 pm  
Robotics Club meeting  
The AUC Robotics Club is well known for taking home awards at various regional and

international competitions, like the Remotely Operated Vehicle (ROV) and the Student Mechanism and Robot Design Competition.

6:00 pm  
Back to the University Residences to connect with

friends or get some studying in at the dorms. When she has some free time, Nada likes to venture off campus to wander through New Cairo or grab a coffee with friends at a nearby mall.



### **Faculty Spotlight** **Khaled Tarabieh**

Associate Professor and Associate Chair in the Department of Architecture Khaled Tarabieh is helping AUC pioneer green architecture in Egypt, leading initiatives to incorporate environmentally friendly elements into campus buildings and spreading sustainability learning through design studios. He leads the Building Sciences Lab and supports the development of the University's yearly carbon footprint report in collaboration with the sustainability office, helping to benchmark AUC's emission of greenhouses against international entities and recommend better sustainability practices. With years of experience as a professional architect, Tarabieh has led sustainability practices across Egypt and the University. He initiated the LEED lab at AUC in collaboration with the U.S. Green Building Council and integrated the knowledge of vernacular architecture, earth construction and local materials into his class. Tarabieh also teaches the multidisciplinary online diploma program for professionals, Pro-Green.

*"AUC's initiatives have heavily encouraged ground-up tactics to minimize energy use in the community. AUC leads by example, continuing to explore all green campus life to encourage the community to create a positive impact nationally and globally."*

*Khaled Tarabieh  
Associate Professor and Associate Chair,  
Department of Architecture*

# Turning Theory into Impact

Collaborate with AUCians  
across all disciplines to  
serve your community

## Center for Applied Research on the Environment and Sustainability (CARES)

The Center for Applied Research on the Environment and Sustainability (CARES) is an interdisciplinary hub dedicated to promoting sustainability across a diversity of environments in Egypt and the MENA region. Through its education and training programs, CARES offers countless opportunities for students to apply theoretical research and explore critical issues like natural resource management, climate change, renewable energy and sustainable agriculture.





## Other Centers

**Engineering and Science Services (ESS)** With well-equipped labs, modern computer facilities and highly qualified professors, ESS offers unparalleled training and services for practicing engineers and health professionals in Egypt and the Middle East.

**Yousef Jameel Science and Technology Research Center (YJ-STRC)** Attracting high-caliber scholars from around the world, YJ-STRC enables a variety of technology-oriented projects, hosting research groups focused on a range of fields, from environmental research to biotechnology.

**Center of Nanoelectronics and Devices (CND)** Founded as a joint research center between AUC and Zewail City of Science and Technology, researchers at the CND leverage nanotechnology to build solutions to tackle diseases, facilitate water purification, enhance food production and produce renewable energy.



### **Faculty Spotlight** **Mohamed Salama**

Visiting Associate Professor in the Institute of Global Health and Human Ecology Mohamed Salama contributed to establishing the Egyptian Network for Neurodegenerative Disorders (ENND). He is currently working on studying the interaction between genes and the environment during neurodegeneration, exploring new models for neurodegenerative disorders and developing novel biomarkers for early detection of brain damage.



# A Host of Possibilities: Scholarships and Fellowships

Building a community of motivated leaders and lifelong learners

AUC prioritizes the recruitment of outstanding and ambitious students, regardless of their financial circumstances.



“

AUC gave me the tools that helped accelerate my learning through actuarial exams and learning on the job. At AUC, we pride ourselves that we learned how to learn. I believe that we stop living the moment we stop learning, and, therefore, the ability to learn is a skill that not only helped me but continues to contribute to my development on a daily basis.

Sarah Mazhar '09  
Actuarial Science

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AUC prioritizes the recruitment of outstanding and ambitious students, regardless of their financial circumstances.

115 named scholarships

More than \$100 million raised to support scholarships and fellowships since the 1970s

Around 3,000 students per year receive a form of financial assistance

Institutional and sponsored fellowships based on both merit and need

Guidance on funding opportunities and aid for all students

### Alumni Spotlight

**Laila Ziko (MSc '13, PhD '19)**

**Biotechnology  
Adjunct Assistant Professor,  
Department of Biology**

Now an adjunct faculty member in AUC's Department of Biology, Laila Ziko previously won the Innovators Under 35 MENA award, presented by MIT Technology Review Arabia and Dubai Future Foundation. Under the supervision of renowned biology professor Rania Siam, Ziko's research focused on screening microbes living in harsh conditions from deep Red Sea areas — up to 2,200 meters below sea level — for antibacterial and anticancer effects. Her research has major implications for the development of new antibiotics and cancer chemotherapeutics to tackle the global health issue of antibiotic resistance and cancer chemotherapy resistance.







# AUC: Egypt's Global University

For more than 100 years, The American University in Cairo (AUC) has stood as Egypt's global University, home to an international student body marked by diverse areas of academic interest and professional aspirations.

We are committed to building a culture of creative expression and leadership, as well as fostering an environment that encourages students to form deep connections with their communities and think critically and innovatively in order to tackle the world's most pressing challenges.

Delve into a transformative experience of self-discovery, inquiry and one-of-a-kind liberal arts education. The journey starts here at AUC.

The Middle East and North Africa's (MENA) leading English-language higher-education institution

Located in the cultural and intellectual center of the Arab world

Accredited in the USA and Egypt

9 centennial labs dedicated to tackling everything from innovation and education to technology and architecture

The only higher education institution outside of North America to be featured in The Princeton Review's Guide to Green Colleges as one of the most environmentally responsible universities for 6 years

AUC welcomed its first female student, Eva Habib El Masri '31, more than 40 years before Princeton and other U.S. universities started admitting female students

Has hosted internationally celebrated artists and renowned figures like Helen Keller, Noam Chomsky and Hillary Clinton

80+ student organizations — ranging from student government to special interest clubs and student-run publications — for AUCians to engage on campus and in their community

The Greek Campus is home to Egypt's first Downtown technology and innovation hub

First University in the region to implement a cocurricular transcript

First University in the region to offer a blended degree, in partnership with MIT and Abdulla Al Ghurair Foundation for Education

200+ partnerships with entities like Harvard University and King's College London

260-acre campus in New Cairo designed by an international team of architects and ranked as the top green campus in Africa

First University in the region to produce a Carbon Footprint Report, serving as a model for other institutions across the Arab world

University-based startup accelerator and incubator AUC Venture Lab has accelerated more than 200 startups and created more than 8,000 jobs

10:1 student-to-faculty ratio

100+ years serving Egypt and the world

Almost 7,000 students from more than 60 countries

48% faculty from Egypt; 52% from the United States and other countries

Largest English-language academic library in Egypt

Around 43,000 active alumni making their mark in over 130 countries around the world as part of NGOs, multinational corporations and foundations, and academic institutions

Five schools: Business, Global Affairs and Public Policy, Humanities and Social Sciences, Sciences and Engineering, Continuing Education


Tahrir Cultural Center in AUC's iconic Tahrir Square campus





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**How to Apply**  
**[www.aucegypt.edu/admissions](http://www.aucegypt.edu/admissions)**  
**[sse.aucegypt.edu](http://sse.aucegypt.edu)**

 **The American  
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