



Mena Nagy Adly Khalaf is a bioinformatics and artificial intelligence researcher specializing in machine learning for genomic and protein analysis. He holds a Master's and a Bachelor's degree in Computers and Information (Information Systems) from Assiut University, Egypt, where he graduated first in his class. His research focuses on AI-driven discovery of antimicrobial peptides and computational analysis of marine genomic data. He is currently a Research Assistant at CIIMAR (University of Porto), contributing to the EU-funded iCULTURE project by applying machine learning and bioinformatics to omics datasets from marine organisms. Mena has published in peer-reviewed journals, including a first-author publication in ACS Omega (impact factor 4.3, Q1 journal) and the International Journal of Advanced Computer Science and Applications, with an additional conference paper indexed in IEEE Xplore. He also has two manuscripts currently under revision: one in GigaScience on the computational discovery of antimicrobial peptides from brown algae using in silico approaches, and another in Bioinformatics (Oxford Academic) on hybrid deep learning models combining sequence and physicochemical features for robust antimicrobial peptide prediction. He has presented his research at international conferences, including the Blue Think Conference (Porto, 2025) and the International Conference of the Portuguese Society of Genetics (ISPG 2025), as well as at scientific events such as the Bioinformatics Open Day (BOD 2025), with upcoming participation in BOD 2026, where he presented an AI-driven pipeline for large-scale antimicrobial peptide discovery from marine algae. He previously served as an Assistant Lecturer at Assiut University, teaching bioinformatics and computer science courses, and delivered an invited seminar on Functional Omics to Master's students in Applications in Biotechnology and Synthetic Biology at the Faculty of Sciences of the University of Porto (FCUP).

Identification

Personal identification

Full name
Mena Nagy Adly Khalaf

Gender
Male

Birth date
1996/11/20

Citation names

Khalaf, Mena

Author identifiers

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Websites

<https://www.ciimar.up.pt/members/mena-nagy-adly-khalaf/> (Professional)

Knowledge fields

Exact Sciences - Computer and Information Sciences - Bioinformatics
Natural sciences - Biological Sciences - Marine Biology
Natural sciences - Biological Sciences - Biology

Languages

Language	Speaking	Reading	Writing	Listening	Peer-review
English	Advanced (C1)	Advanced (C1)	Advanced (C1)	Advanced (C1)	Advanced (C1)
Portuguese	Elementary (A2)	Elementary (A2)	Elementary (A2)	Elementary (A2)	Elementary (A2)
French	Beginner (A1)	Beginner (A1)	Beginner (A1)	Beginner (A1)	Beginner (A1)
Arab (Mother tongue)					

Education

	Degree	Classification
2020/09/01 - 2023/11/17 Concluded	M.S. in Computers and Information (Information Systems) (Master) Major in Information Systems Assiut University Faculty of Computers and Information, Egypt <i>"Prediction of Molecular Compound Structures Using Deep Learning." (THESIS/DISSERTATION)</i>	18 (Portuguese scale 0–20)
2015/09/01 - 2019/07/01 Concluded	B.Sc. in Computers and Information (Information Systems) (Bachelor) Assiut University Faculty of Computers and Information, Egypt <i>"RTM (Rent To Me) - An AI-Driven E-commerce System" (THESIS/DISSERTATION)</i>	18 (Portuguese scale 0–20)

Affiliation

Science

	Category Host institution/organization	Employer
2024/11/11 - Current	Research Assistant (Research) Universidade do Porto Centro Interdisciplinar de Investigação Marinha e Ambiental, Portugal	Universidade do Porto Centro Interdisciplinar de Investigação Marinha e Ambiental, Portugal

Teaching in Higher Education

	Category Host institution/organization	Employer
2020/02/11 - 2024/11/10	Assistant (University Teacher) Assiut University Faculty of Computers and Information, Egypt	Assiut University Faculty of Computers and Information, Egypt
2020/02/11 - 2024/11/10	Tutor (University Teacher) Assiut University Faculty of Computers and Information, Egypt	Assiut University Faculty of Computers and Information, Egypt

Projects

Grant

	Designation	Funders
2024/11/11 - Current	iCulture: A digital bio-platform and co-culture bioprocess to prospect and utilise macroalgae responsibly and sustainably 101082010 Researcher	Ongoing

Outputs

Publications

Conference paper	1	Mena Nagy A. Khalaf; Taysir Hassan A. Soliman; Sara Salah Mohamed. "ROD-WGAN hybrid: A Generative Adversarial Network for Large-Scale Protein Tertiary Structures". 2023. 10.1109/icca59364.2023.10401737
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Conference poster	1	Khalaf, Mena; Antunes, Agostinho. "FusionAMP: A Hybrid Sequence–Physicochemical Fusion Model for Antimicrobial Peptide Prediction". Paper presented in <i>Bioinformatics Open Days 2026</i> , 2026.
	2	Khalaf, Mena; Antunes, Agostinho. "Exploring the Genomic Potential of Macroalgae: A Bioinformatics Pipeline for Protein and Gene Discovery". Paper presented in <i>VI International Conference of the Portuguese Society of Genetics (ISPG)</i> , 2025.
Journal article	1	Khalaf, Mena; Antunes, Agostinho. "Safe-OmniAMP: Computational Detection of Antimicrobial Peptide Candidates from Brown Algae via In Silico Approaches". <i>Giga Science</i> (2026): Under revision
	2	Khalaf, Mena; Antunes, Agostinho. "Hybrid Sequence–Physicochemical Deep Learning for Robust Antimicrobial Peptide Prediction". <i>Bioinformatics - Oxford Academic</i> (2026): Under revision
	3	Mena Nagy A. Khalaf; Taysir Hassan A Soliman; Sara Salah Mohamed. "PLM-GAN: A Large-Scale Protein Loop Modeling Using pix2pix GAN". <i>ACS Omega</i> (2024): https://doi.org/10.1021/acsomega.3c05863 . 10.1021/acsomega.3c05863
	4	Mena Nagy A. Khalaf; Taysir Hassan A Soliman; Sara Salah Mohamed. "Generating Nature-Resembling Tertiary Protein Structures with Advanced Generative Adversarial Networks (GANs)". <i>International Journal of Advanced Computer Science and Applications</i> (2023): http://dx.doi.org/10.14569/ijacsa.2023.01408117 . 10.14569/ijacsa.2023.01408117
Thesis / Dissertation	1	"Prediction Of Molecular Compounds Structures Using Deep Learning". Master, Assiut University Faculty of Computers and Information, 2023.

Activities

Oral presentation

	Presentation title	Event name Host (Event location)
2025	Functional Omics for antimicrobial peptide discovery	Master in Applications in Biotechnology and Synthetic Biology – Functional Omics Seminar Faculty of Sciences of the University of Porto (FCUP) (Porto, Portugal)

Consulting

Activity description

Institution / Organization

2020/02/11 - 2024/11/10

Supervised numerous undergraduate students over four years in bioinformatics, machine learning, and AI applications. Provided academic mentoring, guided research projects, and assisted in supervising graduation theses focused on bioinformatics, computational biology, computer science and data science at Assiut University.

Assiut University Faculty of Computers and Information, Egypt

Course / Discipline taught

Academic session

Degree Subject (Type)

Institution / Organization

2020/02/11 - 2024/11/10

Taught undergraduate courses in Bioinformatics, Machine Learning, Data Science, Information Systems, and Computational Biology. Delivered lectures, supervised lab sessions, and guided students in research-based projects, integrating AI-driven methods and data analysis.

(Bachelor)

Assiut University
Faculty of Computers
and Information,
Egypt

2020/02/11 - 2024/11/10

Assisted in teaching the undergraduate course "Introduction to Bioinformatics," which provided foundational knowledge in the analysis of biological data using computational methods. Supported instruction and lab sessions covering sequence alignment, database searching, and biological data formats (FASTA, GenBank). Guided students in working with genomic and proteomic datasets and using basic bioinformatics tools such as BLAST and NCBI resources. Emphasized core concepts, practical skills, and the role of bioinformatics in modern biology.

Bioinformatics
(Bachelor)

Assiut University
Faculty of Computers
and Information,
Egypt

2020/02/11 - Current

Assisted in teaching the undergraduate course "Algorithms in Bioinformatics," focusing on algorithmic approaches to biological data analysis. Supported instruction and lab sessions involving sequence alignment, dynamic programming, and graph-

Bioinformatics
(Bachelor)

Assiut University
Faculty of Computers
and Information,
Egypt

based methods. Guided students in applying algorithms to genomic, proteomic, and medical datasets using real-world bioinformatics tools. Emphasized computational thinking and AI-enhanced techniques for solving biological problems.

2020/02/11 - Current	Assisted in teaching the undergraduate course "Scripting Languages in Bioinformatics," with a focus on using Python and other scripting tools for automating biological data analysis. Supported lab sessions involving data parsing, sequence manipulation, and tool integration. Guided students in writing scripts to process genomic, proteomic, and medical datasets, and in building custom pipelines for bioinformatics workflows. Emphasized hands-on problem solving and reproducibility in computational biology.	Scripting Language in Bioinformatics	Assiut University Faculty of Computers and Information, Egypt
2020/02/11 - Current	Assisted in coordinating and supporting the undergraduate course "Seminars in Bioinformatics," which engaged students in current research topics and emerging technologies in the field. Helped organize student presentations, provided feedback on scientific communication, and facilitated discussions on literature covering genomics, systems biology, AI in bioinformatics, and data ethics. Encouraged critical thinking, interdisciplinary dialogue, and exploration of real-world bioinformatics applications.	Seminars in Bioinformatics (Bachelor)	Assiut University Faculty of Computers and Information, Egypt
2020/02/11 - Current	Assisted in teaching the undergraduate course "Biological Databases," focusing on the structure, function, and use of key databases in bioinformatics. Supported lab sessions where students explored genomic,	Biological Databases (Bachelor)	Assiut University Faculty of Computers and Information, Egypt

proteomic, and structural databases such as NCBI, UniProt, and PDB. Guided students in retrieving, querying, and integrating biological data for research purposes. Emphasized database schema understanding, data formats (FASTA, GenBank), and the importance of data curation in biological research.

2020/02/11 - Current	Assisted in teaching the undergraduate course "Structural Bioinformatics," focusing on the analysis and modeling of macromolecular structures. Supported lab sessions involving 3D visualization, structure prediction, and evaluation using tools like PyMOL and SWISS-MODEL. Guided students in exploring protein folding, molecular interactions, and structure-function relationships. Emphasized the integration of structural data with biological context and computational techniques in bioinformatics.	Structural Bioinformatics (Bachelor)	Assiut University Faculty of Computers and Information, Egypt
2020/02/11 - Current	Assisted in teaching the undergraduate course "Computational Biology Techniques," focusing on the application of computational models and algorithms to understand biological systems. Supported lab sessions involving sequence alignment, network analysis, and simulation of biological processes. Guided students in using tools for modeling gene regulation, metabolic pathways, and biological networks. Emphasized systems-level thinking, data integration, and the use of computational approaches to explore complex biological questions.	Computational Biology Techniques (Bachelor)	Assiut University Faculty of Computers and Information, Egypt
2020/02/11 - Current	Assisted in teaching the undergraduate course "Databases," focusing on the principles of database design, modeling, and	Databases (Bachelor)	Assiut University Faculty of Computers and Information, Egypt

implementation. Supported lab sessions involving ER diagrams, relational schema, SQL querying, and normalization. Guided students in developing and managing databases using systems like MySQL and Oracle. Emphasized handling structured data across domains, including biomedical and geospatial datasets, and ensuring data integrity, security, and performance optimization.

2020/02/11 - Current	Assisted in teaching the undergraduate course “Advanced Project Management,” focusing on the application of project planning, execution, and evaluation techniques in information systems. Supported workshops and lab sessions on Gantt charts, risk analysis, budgeting, and agile methodologies. Guided students through case studies and project simulations involving real-world IT and bioinformatics projects. Emphasized teamwork, resource management, and project documentation using tools like Microsoft Project and Trello.	Advanced Project Management (Bachelor)	Assiut University Faculty of Computers and Information, Egypt
2020/02/11 - Current	Assisted in teaching the undergraduate course “Data Mining and Business Intelligence,” focusing on extracting meaningful patterns from large datasets and transforming data into actionable insights. Supported lab sessions involving classification, clustering, association rules, and predictive analytics using tools like WEKA, Orange, and Python. Guided students in applying techniques to business, biomedical, and environmental data. Emphasized real-world decision-making, data preprocessing, and model evaluation.	Data Mining and Business Intelligence (Bachelor)	Assiut University Faculty of Computers and Information, Egypt
2020/02/11 - Current	Assisted in teaching a course	Information System	Assiut University

module focused on distributed computing using Hadoop and Apache Spark. Supported lab sessions where students implemented big data workflows, managed HDFS, and developed data processing tasks using MapReduce and Spark APIs (PySpark). Guided students in handling large-scale datasets, building real-time and batch processing pipelines, and applying analytics techniques in distributed environments. Emphasized performance tuning, fault tolerance, and scalable data analysis.

Application Development (Bachelor)

Faculty of Computers and Information, Egypt

Scientific expedition

Activity description

Institution / Organization

2024/11/11 - Current

Currently researching at CIIMAR, Universidade do Porto, applying AI, deep learning, and machine learning in bioinformatics for genomic and omics data. Developing pipelines for large-scale processing, conducting phylogenetic analysis, and using AI models to explore genetic adaptations in macroalgae. Focusing on sustainable marine biotechnology, enhancing data interpretation for the iCulture project, and studying functional pathways, gene associations, and ecological interactions for predictive modeling and resource sustainability.

Universidade do Porto Centro Interdisciplinar de Investigação Marinha e Ambiental, Portugal

Distinctions

Award

2019

Annual Academic Excellence Award

Assiut University Faculty of Computers and Information, Egypt

Other distinction

2019

First Rank in Bachelor's Degree

Assiut University Faculty of Computers and Information, Egypt