AYMAN FAKHRY

Biocatalysis & Protein Engineering | Natural Product Chemistry | Pharmaceutical Sciences

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PROFILE

PhD-awarded researcher (degree awarded from the University of Bradford (UK)) with expertise in biocatalysis, protein engineering, molecular biology, and natural product chemistry. Current research experience includes substrate-enzyme engineering of certain Fe(II)/2-oxoglutarate-dependent hydroxylases and arginine-modifying enzymes for non-natural substrate scope. Co-author of two 2026 papers in Chemical Communications and ACS Catalysis and named inventor on two UK patent applications arising directly from enzyme-substrate co-engineering and protein engineering work. In addition to wet-lab experience in biocatalysis, protein engineering, and molecular biology, scientific background includes also structural analytical skills (NMR, MS, chromatography) built during doctoral and master's research in natural product chemistry

KEY STRENGTHS

- Enzyme engineering track record: co-engineering of substrates and enzymes, such as Fe(II)/2OG-dependent hydroxylases, arginine-modifying enzymes, and other members from different families of enzymes (work is in progress for profiling patent(s)/drafted for publication/in the reviewing stage) to extend the biocatalytic scope of such enzymes to accept non-natural substrates — directly transferable to engineering enzymes for industrial purposes.
- Recent high-impact, first-tier publications (2026): Chemical Communications and ACS Catalysis, both on engineering the active site of certain enzymes and screening a wide scope of non-natural potential substrates to provide valuable non-canonical amino acids in regio- and stereoselective manners.
- IP generation: named inventor on two UK patent applications (on peptide tags and biological production of methacrylic acid/esters), demonstrating applied, industry-relevant protein engineering and biocatalysis output.
- Full-stack biocatalysis skill set: enzymology, protein engineering, molecular biology, chromatography, NMR spectroscopy and mass spectrometry, gained across a PhD in biochemistry and prior MSc in pharmaceutical sciences and natural product chemistry.
- Proven teaching and mentorship: progressed from Demonstrator to Teaching Assistant to Lecturer at Assiut University, alongside supervising student researchers at both Assiut University and the University of Bradford.

WORK EXPERIENCE

Lecturer of Natural Product Chemistry — **Mar 2026 – Present**
Pharmacognosy Department, Faculty of Pharmacy, Assiut University, Egypt

Research Support Assistant — **Mar 2025 – Jul 2025**
School of Chemistry & Biosciences, University of Bradford, UK

PhD Student — **Oct 2020 – Jul 2025**
School of Chemistry & Biosciences, University of Bradford, UK

Teaching Assistant (on study leave; concurrent with Bradford appointment above) — **Mar 2019 – Feb 2026**
Pharmacognosy Department, Faculty of Pharmacy, Assiut University, Egypt

MSc Student — **Mar 2014 – Feb 2019**
Pharmacognosy Department, Faculty of Pharmacy, Assiut University, Egypt

Demonstrator — **Dec 2013 – Feb 2019**
Pharmacognosy Department, Faculty of Pharmacy, Assiut University, Egypt

EDUCATION AND TRAINING

PhD, School of Chemistry & Biosciences, University of Bradford, UK **Oct 2020 – Jul 2025**

Thesis: "A Promiscuous Path to Novel Guanidines: Arginine-Modifying Enzymes as Key Synthetic Players"

- Specialised in biocatalysis, enzymology, natural product chemistry, protein engineering, molecular biology, chromatography, NMR spectroscopy, and mass spectrometry.

MSc, Pharmaceutical Sciences, Faculty of Pharmacy, Assiut University, Egypt **Mar 2014 – Feb 2019**

Thesis: "Pharmacognostical Study of Gmelina philippensis Cham., Family Lamiaceae, Cultivated in Egypt"

- Specialised in natural product chemistry, chromatography, NMR spectroscopy, mass spectrometry, botany, plant taxonomy, and biological activity evaluation.

BSc, Pharmaceutical Sciences, Faculty of Pharmacy, Assiut University, Egypt **Sep 2008 – Jun 2013**

- Main courses include pharmaceutics, pharmacognosy, organic chemistry, inorganic chemistry, analytical chemistry, medicinal chemistry, biochemistry, physics, pharmacology, microbiology, public health, and physiology.

PUBLICATIONS

- Marwa Ismail; **Ayman Fakhry**; Wahid Hamaway; Eman M. Elkafoury; Numrah Nisar; Tom Swift; Richard Telford; Refaat B. Hamed. “Active-Site Recognition Enables Hydroxylation of a Fluorine-Deactivated C–H Bond in 6,6,6-Trifluoro-L-norleucine”. *Chemical Communications*, 62 (60): 15048–15052 (2026)
- Marwa Ismail; **Ayman Fakhry**; Wahid Hamaway; Tom Swift; Refaat B. Hamed. “Breaking the *N*-Alkyl Barrier: Enzyme−Substrate Co-Engineering of Fe(II)/2-Oxoglutarate-Dependent Hydroxylases for *N*-Heterocyclic Amino Acids”. *ACS Catalysis*, 16 (13): 12632–12644 (2026).
- **Ayman Asem** *(now publishing as Ayman Fakhry)*; Hanan S.M. Farghaly; Anber F. Mohammed; Wesam S. Qayed; Iman SA. Khallaf; Amany S. Ahmed; Hanaa M. Sayed. “Phytochemical Investigation, Molecular Docking Studies and DFT Calculations on the Antidiabetic and Cytotoxic Activities of *Gmelina philippensis* Cham”. *Journal of Ethnopharmacology*, 303: 115938 (2023).
- **Ayman Asem** *(now publishing as Ayman Fakhry)*; Iman Khallaf; Amany Ahmed; Hanaa Sayed. “Botanical Profiling of *Gmelina philippensis* Cham., Cultivated in Egypt”. *Bulletin of Pharmaceutical Sciences. Assiut*, 41(1): 55-80 (2018).

Note: publications from 2018 and 2023 were published under the author's earlier legal name, Ayman Asem.

PATENT APPLICATIONS

- **Ayman Fakhry**; Refaat Hamed; Marwa Ismail. “PEPTIDE TAGS”. Patent Number WO/2026/185542 (2026).
- Refaat Hamed, Nabangshu Sharma, Mohamed Ismail, **Ayman Fakhry**, David Johnson, Graham Eastham, Stephen Cartman. “PROCESS FOR THE BIOLOGICAL PRODUCTION OF METHACRYLIC ACID AND/OR ESTERS THEREOF”. Patent Number WO/2026/185544 (2026).

INVITED SEMINARS

- "Biocatalytic Studies on New Amidinotransferases Involved in Saxitoxin Biosynthesis," School of Chemistry & Biosciences Seminar Series, University of Bradford (2023).
- "Cilantroversy," Pharmacognosy Department, Assiut University (2018).
- "Botanical Study and DNA Profiling of *Gmelina philippensis* Cham.," Pharmacognosy Department, Assiut University (2018).
- "Chemical and Biological Studies on *Gmelina philippensis* Cham.," Pharmacognosy Department, Assiut University (2018).

CONFERENCES & WORKSHOPS

- Assiut University Third Student Research Symposium (2019) — supervised and evaluated student poster presentations.
- Assiut University Second Student Research Symposium (2018) — supervised student poster presentations.
- Assiut University First Student Research Symposium (2017) — attendee.
- Assiut University Tenth International Pharmaceutical Sciences Conference (2016) — poster presentation: "Phytochemical Investigation of *Gmelina philippensis* Cham., Family Verbenaceae, Cultivated in Egypt."
- Assiut University Ninth International Pharmaceutical Sciences Conference (2014) — attendee.
- "How to Cope with Scientific Writing" workshop, Faculty of Pharmacy, Assiut University (2015).
- Assiut University Biochem Society's First Workshop (2015).

SKILLS & LANGUAGES

- **Biocatalysis & Enzymology:** Enzyme activity assays, substrate screening, protein engineering, enzyme–substrate interaction studies, protein stability studies.
- **Molecular Biology:** PCR, molecular cloning, plasmid construction, site-directed mutagenesis, Golden Gate Assembly, recombinant DNA techniques.
- **Protein Biochemistry:** Recombinant protein production, protein purification, SDS-PAGE, protein characterisation.
- **Analytical Techniques:** HPLC, LC-MS, FPLC, flash chromatography, NMR spectroscopy, mass spectrometry, Marfey's analysis.
- **Software:** ChemDraw, MestReNova, TopSpin, SnapGene, GeneDoc, PyMOL, EndNote, ReadCube, Microsoft Office & Adobe.
- **Leadership & Communication:** Mentored and supervised student researchers at Assiut University and University of Bradford; regular presenter to student and scientific audiences.
- **Languages:** Arabic (native), English (IELTS Band 7).