Mohamed Mahrous
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EDUCATION

PhD Electrical and Computer Engineering, Jan 2024 – Present
University of Toronto, Canada
Master of Science (Nanotechnology) **with Honors**, Feb 2020 – July 2023
The American University in Cairo (AUC), Egypt
Bachelor of Science (Double major; Chemistry and Physics), Sep 2012 - May 2016
University of Sohag, Egypt

WORK EXPERIENCE

Application Engineer (Internship), Pulsenics, Canada, July.2025 – Present

- Developing a novel algorithm for Pulsenics' online electrochemical analysis platforms to enhance diagnostics and system monitoring capabilities.

Graduate Teaching Assistant, University of Toronto, Canada, Jan.2024 – Present

- Winter 2024, Teaching Electricity and Magnetism laboratory - ECE221H1.
- Fall 2024, Teaching Mathematical Physics (Multivariable calculus) - MAT291H1.

Visiting Research Scholar, Johns Hopkins University, Baltimore - USA, Jul.2023 – Dec.2023

- Conduct research, collect and analyze data under the guidance of a postdoctoral. • Worked on the design of High Entropy Alloys

Assistant Lecturer, Universidade Nova de Lisboa, part time Sep.2022 – Dec.2022

- Teaching and facilitating student learning, involving delivering lectures for the Foundational Chemistry Course.

Research assistant, Energy Materials Laboratory-Computational subgroup, The American University in Cairo (AUC), Cairo - Egypt Nov.2018-Jul.2023

- Carrying out computational calculations and developing novel materials with new properties.
- Conduct ab initio simulations on molecular surface interaction for the design of novel functional materials for catalysis and sensors applications.
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Teaching Assistant, University of Prince Edward Island – Cairo campus, Oct.2018-Oct.2020

- General Chemistry course, and Sustainable Design.
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Quality control chemist, Quality Department, Pegas, Cairo - Egypt, Dec.2016-Oct.2018

- Monitored the quality of the products, testing parameters, working procedures, and performing audits on other departments.

Training and Workshops

Participated in ACC 2024 - American Automatic Control Council, Toronto, Canada 2024
Presented a poster and attended MRS Fall Meeting Conference, Boston, US, 2023
Green chemistry and climate change summer school, Ca'Foscari university in Venice, Italy, 2021
WHMIS 2015, University of Prince Edward Island, 2018
ISO systems and 6S, Pegas Egypt, 2016
In process Control (IPC), Sohag Company for Oil Hydrogenation and Detergents, 2015
Undergraduate research assistant, Egyptian center for theoretical physics, 2015

SKILLS

- Fluent in both spoken and written English, and Arabic (Mother Tongue).
- Excellent Microsoft office package.
- Computational calculations via Material studio, GULP, Quantum espresso, LAMMPS and VASP software.
- VESTA, Avogadro, XCrySDen software for materials Visualizations, and Origin Pro for data visualization.
- Moodle, Blackboard
- Imaging by scan electron microscope (SEM), EDX analysis
- Coding (C, and Python).
- Supervised Machine Learning.
- Ovito Software
- Molecular Dynamics simulations
- Molecular Mechanics simulations
- MPI

Publications

1. Abbas, W. A., Shaheen, B. S., Ghanem, L. G., Badawy, I. M., **Abodouh, M. M.,** Abdou, S. M., Zada, S., & Allam, N. K. (2021). Cost-Effective Face Mask Filter Based on Hybrid Composite Nanofibrous Layers with High Filtration Efficiency. In Langmuir (Vol. 37, Issue 24, pp. 7492–7502). American Chemical Society (ACS). https://doi.org/10.1021/acs.langmuir.1c00926

2. Sanad, M. F., Puente Santiago, A. R., Tolba, S. A., Ahsan, M. A., Fernandez-Delgado, O., Shawky Adly, M., Hashem, E. M., **Mahrous Abodouh, M.,** El-Shall, M. S., Sreenivasan, S. T., Allam, N. K., & Echegoyen, L. (2021). Co–Cu Bimetallic Metal Organic Framework Catalyst Outperforms the Pt/C Benchmark for Oxygen Reduction. The American Chemical Society (Vol. 143, Issue 10, pp. 4064–4073). American Chemical Society (ACS). https://doi.org/10.1021/jacs.1c01096

3. Elfarargy, R. G., Saleh, M. A., **Abodouh, M. M**., Hamza, M. A., & Allam, N. K. (2022). Graphitic Carbon Nitride Nanoheterostructures as Novel Platforms for the Electrochemical Sensing of the Chemotherapeutic and Immunomodulator Agent MTX. Biosensors (Vol. 13, Issue 1, p. 51). MDPI AG. https://doi.org/10.3390/bios13010051

4. Leil, R., **Abodouh, M. M.,** Javed, N., Sreekumar, S., Pacheco, H., Tarek, N., O'Carroll, D. M., & Allam, N. K. (2024). Untapped potential of scrap brass alloy: a new frontier in the use of brassbased photocathodes for stable and durable photoelectrochemical water splitting. In Energy Advances (Vol. 3, Issue 2, pp. 430–441). Royal Society of Chemistry (RSC). https://doi.org/10.1039/d3ya00534h

5. **Abodouh, M. M.,** Khedr, G. E. & Allam, N. K. (2024). Optimizing diamond's electronic band structure via defect engineering for enhanced HER and OER catalysis. International Journal of Hydrogen Energy vol. 61 922–933 (2024). https://doi.org/10.1016/j.ijhydene.2024.03.008

6. Hkiri, K., Mohamed, H. E. A., **Abodouh, M. M.** & Maaza, M. Experimental and theoretical insights into the adsorption mechanism of methylene blue on the (002) WO3 surface. Scientific Reports vol. 14 (2024). Nature https://doi.org/10.1038/s41598-024-78491-3