Mohamed Abdelkader

Research Assistant - Former Mechanical Quotation Engineer at Bühler Group
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Introduction

Academic Experience:

Detail-oriented Electrical Engineer and Research Assistant with extensive knowledge and hands-on experience in electrical engineering, materials science, nanofabrication, electrochemistry, and 3D printing. I am committed to advancing multidisciplinary research projects by actively participating in interdisciplinary initiatives. My academic work has focused on the integration of machine learning into materials science, FEM modeling, quantum computing, and advanced 3D printing techniques, all of which are aimed at addressing complex challenges and fostering innovative solutions. I collaborate with professionals in various fields to drive impactful research.

Industrial Experience:

In addition to my academic experience, I worked as a Mechanical Quotation Engineer at Bühler Group, ensuring alignment between technical solutions and customer requirements. My responsibilities included managing the quotation project from the project's kick-off until producing the quotation documents, offering suitable technical solutions for the projects, and ensuring the efficient execution and delivery of required industrial solutions in terms of the quotation documents, including the offered machines, prices, the delivery time, and the payment terms. I also gathered the required information for each quote to be produced correctly and to align with the customer's expectations.

Education

Master of Science in Mechanical and Materials Engineering, Vilnius Gediminas Technical University (VILNIUS TECH) - Technical University of Liberec
September 2018 - June 2020 • Vilnius (LT)-Liberec (CZ)
GPA: 4.0
Thesis: *The Use of Machine Learning in Orthotropic Materials Classification via Modal Analysis.* My research focused on integrating machine learning algorithms with material characterization techniques to classify and sort the different engineering materials according to their modal response.

Bachelor of Electrical Engineering (Electronics and Communications Engineering), Alexandria University
September 2013 - June 2018 • Alexandria, Egypt
GPA: 3.5
I graduated with honors, specializing in communication systems and electrical circuit design.

Work Experience

Mechanical Quotation Engineer *March 2024 – April 2025*
Bühler Group Prague, Czech Republic

At Bühler Group (Prague branch), I worked as a Quotation Engineer primarily for the Grain Quality and Supply (GQ) segment, ensuring that technical solutions aligned with customer requirements. My key responsibilities included:

- Selecting suitable technical configurations for various projects and managing associated costs.
- Managing the quotation process through different phases, coordinating with sales, engineering, freight, and services teams to meet customer needs.
- Gaining hands-on experience with tools such as Navigator, CRM, and DevOps.
- Developing project management skills and strengthening cross-departmental collaboration to deliver precise, task-specific quotations.

Research Assistant, Institute for Nanomaterials, Advanced Technologies, and Innovation, Technical University of Liberec
July 2019 - December 2024 • Liberec, Czech Republic
As a research assistant, I played a key role in several projects, including developing novel 3D glass printing techniques for automotive sensor applications and using micro-computed tomography to create digital twins of fibrous structures. My responsibilities included designing experiments, optimizing material properties, and developing prototypes for optical and electrochemical sensor applications. I also assisted in supervising student research projects.

Skills

- Electrochemistry & Electrochemical Biosensing: Screen-printed and microelectrode-based sensors; development of potentiometric pH sensors and metal-ion detection platforms; hands-on operation of PalmSens potentiostats (CV, OCP, EIS, chronoamperometry) for calibration, stability assessment, and data interpretation.
- MATLAB, Python, and machine learning (including physics-informed neural networks for electrochemical modelling).
- Experience with Optics, COMSOL Multiphysics, and Autodesk Inventor Professional.
- Skilled in ANSYS, 3D printing technologies, and nanomaterials processing.
- Solid understanding of materials science and nanofabrication.
- Basic understanding of electrical and electronics engineering principles.

Languages

Arabic (Native), Czech (Professional Working), English (Full Professional)

Certificates

- Image and Video Processing: From Mars to Hollywood with a Stop at the Hospital - Coursera

- Nanotechnology: A Maker's Course - Coursera
- Fundamentals of Materials Science - edX

Selected Projects

- Development of sound transmission methods over laser beams for secure communications. The project aimed to achieve ultra-secure communication links by transmitting sound signals over laser beams for defense and secure communications applications.
- MATLAB implementation of channel coding theorem for noise reduction in communication links. I developed algorithms to improve data transmission quality and reduce error rates in noisy communication environments.
- Innovated plastic optical fiber sensors for real-time liquid monitoring systems. This work focused on applying plastic optical fibers to detect changes in fluid levels in real-time applications, such as industrial monitoring applications.
- Glass 3D printing using directed energy deposition. This cutting-edge project introduced the concept of printing glass structures for optical sensors using advanced manufacturing techniques.

Publications

Journal Articles:

1. **Abdelkader, M.**; Tučkutė, S.; Pauliukaitė, R. **2025**. The use of physics-informed neural networks (PINNs) to map the Zn^{2+} nanoparticles diffusion in Swiss chard: an AI simplified modelling approach. *Chemija*, 36(3), 197–205.
2. **Abdelkader, M.**; Petrík, S.; Nestler, D.; Fijalkowski, M. **2024**. Ceramics 3D Printing: A Comprehensive Overview and Applications, with Brief Insights into Industry and Market, *Ceramics*, 7(1), 68–85. ISSN: 2571-6131.
3. Naeem, J.; **Abdelkader, M.**; et al. **2024**. Implementation of Numerical Model for Prediction of Temperature Distribution for Metallic-Coated Firefighter Protective Clothing, *Materials*, 4(4), 368–386. ISSN: 2673-8023.
4. **Abdelkader, M.**; Stanislav, P. **2023**. A facile optical sensor: Plastic optical fiber voids as a liquid level presence sensor, *Results in Optics*, 13, 100552.
5. **Abdelkader, M.**; Elmanzalawy, M.; Pauliukaite, R. **2022**. 3D Electrodes for Electrochemical Sensors: Review in Different Approaches. *IEEE Sensors Journal*.
6. **Abdelkader, M.**; Mazari, A.; Zafar, S. **2022**. Experimental Techniques to Obtain the Cross-Sectional Images of Textile Yarns. *Materials*, 15, 4726.
7. **Abdelkader, M. 2022**. MATLAB Algorithms for Diameter Measurements of Textile Yarns and Fibers through Image Processing Techniques. *Materials*, 15, 1299.
8. **Abdelkader, M.**; Noman, M. T.; Amor, N.; Petru, M.; Mahmood, A. **2021**. Combined Use of Modal Analysis and Machine Learning for Materials Classification. *Materials*, 14, 4270.
9. Mahmood, A.; Noman, M. T.; Pechočiaková, M.; Amor, N.; Petrů, M.; **Abdelkader, M.**; Militký, J.; Sozcu, S.; Hassan, S. Z. U. **2021**. Geopolymers and Fiber-Reinforced Concrete Composites in Civil Engineering. *Polymers*, 13, 2099.
10. Shehata, N.; Elnabawy, E.; **Abdelkader, M.**; Hassanin, A. H.; Salah, M.; Nair, R.; Ahmad Bhat, S.

2018. Static-Aligned Piezoelectric Poly (Vinylidene Fluoride) Electrospun Nanofibers/MWCNT Composite Membrane: Facile Method. *Polymers*, 10, 965.

11. Shehata, N. & **Abdelkader, M. 2018**. Impact of Electro-Magneto Concave Collector on the Characterizations of Electrospun Nanofibers. *Journal of Electronic Materials*. doi:10.1007/s11664-018-6359-6.

Conference Articles:

1. Farh, M., **Abdelkader, M.** & Gribniak, V. **2024**. Numerical simulation of fused filament fabrication process and tensile tests, *Annals of DAAAM and Proceedings of the International DAAAM Symposium*, Vienna, Austria: DAAAM International, roč. 35, č. 1, pp. 268–272. ISSN: 1726-9679.
2. **Abdelkader, M.** & Petrík, S. **2023**. Restoration of Textile Yarn Distorted Low-Resolution Micro Computed Tomography Cross Section Images: A MATLAB Restoration Algorithm. *NANOCON Conference Proceedings - International Conference on Nanomaterials*, TANGER Ltd, 2023, 6 pages. ISBN: 978-80-88365-15-0, ISSN: 2694-930X.
3. **Abdelkader, M.** & Petrík, S. **2022**. Low-cost optical fibers microscale grinding and polishing system: Towards open-source devices and systems, NANOCON 2022, Brno, Czech Republic: Conference Proceedings - NANOCON 2022, ISSN: 2694-930X.
4. **Abdelkader, M.** & Eldessouki, M. **2021**. Measuring the yarn's twist angle using an image processing technique, Nanofibers, Applications and Related Technologies – NART-2021, pp. 134–144, Istanbul, Turkey; Technical University of Istanbul.

Book Chapters:

1. Eldessouki, M. & **Abdelkader, M. 2019**. 'Computed Tomography for Fibrous Materials', Recent Trends in Fibrous Material Science, Liberec: OPS. 468–483.