GHASEB N. MAKHADMEH

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Makhadmeh, Ghaseb Naser - Author details - Scopus
Ghaseb Makhadmeh - Google Scholar



As a qualified physicist with a PhD in Medical Physics and Radiation Sciences- Biophysics (from one of the top 150 universities in QS ranking) and over a decade of experience in academia and industry, I specialize in applying advanced physics concepts to real-world challenges. Graduating first in my class during both my master's and bachelor's degrees, I have a solid academic foundation. My research in nanotechnology and medical applications, combined with extensive hands-on experience in optimizing concrete production, showcases my ability to blend theory with practical solutions. Additionally, I have published over 40 articles in top journals and two patents, further establishing my expertise and contributions to the field.

EXPERIENCE

2/2026 – PRESENT
ASSISTANT PROFESSOR, AL AL-BAYT UNIVERSITY, JORDAN
I taught most of physics courses, improved student outcomes, community services, and contributed to curriculum development.

9/2023 – 2/2026
ASSISTANT PROFESSOR, HORIZON UNIVERSITY COLLEGE, UNITED ARAB EMIRATE
I taught physics, improved student outcomes, community services, and contributed to curriculum development.

9/2021 – 8/2023
REASEARCHER, JORDAN UNIVERSITY OF SCIENCE & TECHNOLOGY, JORDAN
I led research in nanotechnology, advanced cancer treatments, published widely, and presented internationally, enhancing radiation science applications.

9/2017 – 8/2021
ASSISTANT PROFESSOR, (HEAD OF DEPARTMENT) AL GHAD INTERNATIONAL COLLEGE
I taught general physics, radiation physics and more courses related to the filed, improved student outcomes, community services, and contributed to curriculum development.

9/2016 – 8/2017
ASSISTANT PROFESSOR, AMMAN ARAB UNIVERSITY, JORDAN
I taught physics and mathematics courses, improved student outcomes, community services, and contributed to curriculum development.

9/2010 – 4/2012
LECTURER, UMM AL QURA UNIVERSITY, SAUDI ARABIA
I taught physics, improved student outcomes, community services, and contributed to curriculum development.

EDUCATION

9/ 2015

PHD, UNIVERSITY OF SCIENCE MALAYSIA (128 QS RANKING)

I completed my PhD in Medical Physics with distinction, specializing in cancer treatment using nanoparticles, leading to key publications in nanotechnology and biophysics.

Thesis Title: Encapsulated Natural and Synthetic Photosensitizers by Silica Nanoparticles for Photodynamic Therapy.

6/ 2010

MASTER, JORDAN UNIVERSITY OF SCIENCE & TECHNOLOGY (HONORED)

I completed my Master's in applied Physics with an excellent GPA of **88.9% (Excellent)**, graduating with honors and ranking first in my class.

Thesis Title: Artificial Semi-Rigid Tissue Sensitized with Natural Pigments: Effect of Photon Radiations.

6/ 2006

BACHELOR, JORDAN UNIVERSITY OF SCIENCE & TECHNOLOGY (HONORED)

I earned my BSc in Applied Physics with an excellent GPA of **85.3% (Excellent)**, graduating with honors and ranking first in my class. My studies focused on foundational and applied physics, preparing me for advanced research and applications in physics.

SKILLS

- Proficient in utilizing various online education platforms, including Big Blue Button, Microsoft Teams, WebEx, ZOOM, and Google Meet.
- Advanced Laboratory Techniques
- Team Leadership & Collaboration
- Microsoft Office.
- Internet Communication.
- Medical instrumentations.
- Technical Writing & Publications
- Problem-Solving in Physics

RESEARCH INTERESTS

- Nanobiotechnology
- Nanomaterials Synthesis
- Biophysics
- Photodynamic Therapy
- Surface Functionalization
- Radiation Therapy
- Nanoparticles Synthesis
- Particles Size Analysis
- Radiation Science

LANGUAGES

- Arabic as a Mother Language.
- English (Excellent: Reading, Speaking, Writing and Listening).
- Malay (Basics).

COURSES TAUGHT

- Physics 101
- Mathematics 101
- Radiation Physics & Instruments
- Principles of Nuclear Medicine
- Research Methodology
- Physics of Energy
- Physics 102
- Mathematics 102
- Radiation Biology & Safety
- Medical Physics
- Research Project
- Radiation Physics
- Physics 103
- Mathematics 103
- Principles of MRI
- Digital Imaging & Informatics
- General Science
- Physics Labs

PATENTS

- **Hybrid Ultrasound and Optical Imaging for Early Cancer Detection**: A patented system that integrates ultrasound and optical imaging techniques to improve the accuracy and early diagnosis of cancer by enhancing tissue contrast and localization of abnormalities.
- **Apparatus for Personalized Radiation Therapy Using AI-Driven Dosimetry**: A patented device that utilizes artificial intelligence to optimize radiation dose distribution tailored to individual patients, enhancing treatment precision, minimizing side effects, and improving overall outcomes in radiation therapy.

PUBLICATIONS

1. AlGharram, M., AlZoubi, T., Mouhtady, O., & **Makhadmeh, G. N.** (2026). Critical Crystallographic Interpretation of NaCl Powder XRD: From FCC Indexing to Coherence-Length Uncertainty. *Compounds*, *6*(3), 48.
2. AlGharram, M., AlZoubi, T., **Makhadmeh, G. N.,** & El Moll, H. (2026). Core Diffraction Signatures as a Reproducible XRD Method for Structural Identification and Microstructural Assessment of Body-Centered Cubic α-Fe. *Physchem*, *6*(3), 48.
3. Knight, M., Bienhoff, K., Ababneh, H. S., Abbasi, M., Dolatabadi, Z. A., Abbasifard, M., ... & Amedari, M. I. (2026). Measuring the composition and availability of human resources for health by sex in 204 countries and territories, 1990–2023, and workforce gaps for universal health coverage: a systematic analysis for the Global Burden of Disease Study 2023. *The Lancet Public Health*, *11*(9), e604-e629.
4. Carter, A., Zhang, M., Trejo, B. G., Verma, M., Brewer, E. D., Lasher, D., ... & Al Amiry, A. (2026). Global, regional, and national burden of HIV/AIDS, 1990–2023, with the estimated burden attributable to intimate partner violence and forecasted impacts of funding cuts through 2030: results from the Global Burden of Disease Study 2023. *The lancet HIV*.
5. Ledesma, J. R., Zhang, M., Liew, M. F., Dominguez, R. M. V., Whikehart, S. M. L., Verma, M., ... & Aldhahir, A. M. (2026). Global, regional, and national burden of tuberculosis and multidrug-resistant tuberculosis by HIV status, 1990–2023: a systematic analysis for the Global Burden of Disease Study 2023. *The Lancet infectious diseases*.
6. Ordak, M., & Et, A. (2026). Global burden of enteric infectious diseases, diarrhoeal diseases, and corresponding aetiologies, 1990-2023: a systematic analysis for the Global Burden of Disease Study 2023. *Lancet Infectious Diseases*.
7. **Makhadmeh, G. N.,** Abuelsamen, A., Al-Gharram, M., Ashames, A., Zyoud, S. H., Al-Akhras, M. A. H., ... & AlZoubi, T. (2026). Optimized Talaporfin-Encapsulated by Silica Nanoparticles for In-Vitro Photodynamic Therapy Against MCF-7 Cancer Cells. Chemical Physics Impact, 101048.
8. Kadhem, W., AlZoubi, T., Al Gharram, M., **Makhadmeh, G.,** Abuelsamen, A., AL-Diabat, A. M., ... & Zyoud, S. H. (2026). Sustainable optoelectronic architecture of polymer-based HTLs for high-performance CsSnI2Br perovskite solar cells. ChemPhysMater.

9. Aljarrah, K., Al-Akhras, M. A. H., **Makhadmeh, G.,** Abuelsamen, A., Al Gharram, M., Zyoud, S., ... & AlZoubi, T. (2026). Enhancing Photodynamic Therapy via Encapsulated Temoporfin by Silica Nanoparticles: A Red Blood Cell–Based Efficacy and Modeling Study. Photodiagnosis and Photodynamic Therapy, 105391.
10. Imheidat, M. A., Mhareb, M. H. A., Alnaimat, F., Aloufi, N. M., **Makhadmeh, G. N.,** Alsaeedi, A., ... & Alboqmi, S. (2025). The optimization of the mechanical, optical, structural, and shielding features of the heavy borosilicate glass system: Role of adding Nd2O3. Applied Radiation and Isotopes, 112389.
11. **Makhadmeh, G.,** Aljarrah, K., Al-Akhras, M. A. H., AlZoubi, T., Abuelsamen, A., Al Gharram. (2025). Tailored Size Control of Silica Nanoparticles for Drug Delivery: A Systematic Study of Synthesis Parameters. Chemical Physics Impact, 100914.
12. **Makhadmeh, G. N.,** AlZoubi, T., Zyoud, S. H., Al-Gharram, M., Mhareb, M. H. A., Noqta, O. A., & Abuelsamen, A. (2025). Optimizing photodynamic therapy: Talaporfin-encapsulated silica nanoparticles for red blood cell disruption in cancer treatment. Journal of Photochemistry and Photobiology A: Chemistry, 116356.
13. Alzoubi, F., Al-Gharram, M., AlZoubi, T., Al-Khateeb, H., Al-Qadi, M., Abu Noqta, O., **Makhadmeh, G. N.** (2025). Tailoring CuO/Polyaniline Nanocomposites for Optoelectronic Applications: Synthesis, Characterization, and Performance Analysis. Polymers, 17(10), 1423.
14. AlZoubi, T., Al-Gharram, M., **Makhadmeh, G. N.,** & Noqta, O. A. (2025). Comparative Analysis of Optoelectronic and Structural Characteristics in Electrochemically Synthesized Hybrid-Nanocomposites Based on PANI-CSA/Metal Oxide Nanoparticles. Physica B: Condensed Matter, 417380.
15. Abuelsamen, A., Alhawarri, M. B., Al-Thiabat, M. G., **Makhadmeh, G. N.,** AlZoubi, T., Alrimawi, B. H., & Khaleel, M. A. (2025). Theranostic Potential of Copper-64 ATSM Targeting MTHFD2: An In Silico Perspective on Hypoxia-Selective Imaging and Therapy. Cell Biochemistry and Biophysics, 1-19.
16. **Makhadmeh, G. N.,** Aljarrah, K., Al-Akhras, M. A. H., AlZoubi, T., Abuelsamen, A., Al-Gharram, M., Zyoud, S. H. AL-Diabat, A. M., Noqta, O. A. (2025). Tailored Size Control of Silica Nanoparticles for Drug Delivery: A Systematic Study of Synthesis Parameters. Chemical Engineering Research and Design. (Under Review)
17. Abuelsamen, A., **Makhadmeh, G. N.,** AlZoubi, T., Al-Gharram, M., Zyoud, S. H. (2025). Targeted Photodynamic Therapy of MCF-7 Breast Cancer Using Talaporfin Encapsulated by Silica Nanoparticles: An In Vitro Drug Delivery Study. Materials Journal. (Under Review)
18. Al-Akhras, M. A. H., Alebrahim, M. A., Rajjash, A. S. B., Hammouri, H. M., Mousa, M. S., AlZoubi, T., **Makhadmeh, G. N.**, & Tavares, C. J. (2025). Ancient and modern bone diagnosis: Towards a better understanding of chemical and structural feature alterations. Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, 125259.
19. Zyoud, S. H., Ashames, A., Zyoud, A. H., Prasad, A. R., Abdullah, C. A. C., Zyoud, S. H., **Makhadmeh, G. N.**, & Abdel-wahab, M. S. (2024). Advanced photodegradation and antimicrobial performance: A comparative study of Al/Ag-Co-doped ZnO synthesis via laser assist chemical bath. Materials Science and Engineering: B, 309, 117649.
20. Al-Gharram, M., AlZoubi, T., Noqta, O. A., & **Makhadmeh, G. N.** (2024). Comprehensive study of linear and nonlinear optical properties of polyaniline-Al2O3 nanocomposites for optoelectronic applications. Surfaces and Interfaces, 52, 104939.
21. Zyoud, S. H., Abdullah, C. A. C., Ashames, A., Hassan, N., Yahia, I. S., Zyoud, A. H., **Makhadmeh, G. N.**, & AlZoubi, T. (2024). Superior Photocatalytic Degradation of Pharmaceuticals and Antimicrobial Features of Iron-Doped Zinc Oxide Sub-Microparticles Synthesized via Laser-Assisted Chemical Bath Technique. Results in Engineering, 102875.
22. Mhareb, M. H. A., Hamad, M. K., Sayyed, M. I., Alshamari, A., Dwaikat, N., **Makhadmeh, G. N.**, ... & Alsuhybani, M. (2024). The impact of gamma-ray doses on structural, optical, and

mechanical features of tellurite glass modified with different oxides for use in radiation shielding field. Radiation Physics and Chemistry, 112090.
23. Alzoubi, F., Al-Gharram, M., AlZoubi, T., Noqta, O. A., **Makhadmeh, G. N.**, Al-Khateeb, H., & Al-Qadi, M. (2024). Advanced Electrochemical Synthesis and Characterization of Al2O3 Nanoparticles Embedded in Polyaniline Matrix for Optoelectronic Applications. Ceramics International.
24. AL-Diabat, A. M., Algadri, N. A., AlZoubi, T., Ahmed, N. M., **Makhadmeh, G. N.**, Abuelsamen, A., & Ali, A. M. A. (2024). Advancement in Embedding Pb Quantum Dots into a Porous-Si Matrix for Superior X-Ray Radiation Detection: An Extended Gate Approach. Radiation Measurements, 107183.
25. AlZoubi, T., Kadhem, W. J., Al Gharram, M., **Makhadmeh, G. N.**, Abdelfattah, M. A., Abuelsamen, A., ... & Mourched, B. (2024). Advanced Optoelectronic Modeling and Optimization of HTL-Free FASnI3/C60 Perovskite Solar Cell Architecture for Superior Performance. Nanomaterials, 14(12), 1062.
26. Al-Akhras, M. A. H., Al-Quraan, N. A., Abu-Aloush, Z. A., Mousa, M. S., AlZoubi, T., **Makhadmeh, G. N.**, & Donmez, O. (2024). Impact of magnetized water on seed germination and seedling growth of wheat and barley. Results in Engineering, 22, 101991.
27. Aljarrah, K., Al-Akhras, M. A. H., **Makhadmeh, G. N.**, AlZoubi, T., Abuelsamen, A., Zyoud, S. H., ... & Donmez, O. (2024). Boosting the In-Vitro Effectiveness of Photodynamic Therapy on MCF-7 Breast Cancer Cells with Encapsulated Malachite Green by Silica Nanoparticles. Results in Materials, 100582.
28. Abuelsamen, A., Mahmud, S., **Makhadmeh, G. N.**, AlZoubi, T., Al Diabat, A., Algadri, N. A., ... & Oglat, A. A. (2024). Pluronic F-127-coated ZnO nanoparticles as superior photosensitizers for effective bladder cancer photodynamic therapy: In-vitro evaluation. Journal of Drug Delivery Science and Technology, 95, 105550.
29. AL-Diabat, A. M., Algadri, N. A., AlZoubi, T., Ahmed, N. M., **Makhadmeh, G. N.**, Abuelsamen, A., ... & Ali, A. M. A. (2024). Synthesis of Al quantum dots on porous silicon as an effective radiation detector using extended gate technique. Results in Engineering, 21, 101973.
30. **Makhadmeh, G. N.**, AlZoubi, T., Aljarrah, A. M., Al Alami, J. H., & Zyoud, S. H. (2024). Enhancing Photodynamic Therapy Efficacy Through Silica Nanoparticle-Mediated Delivery of Temoporfin for Targeted Breast Cancer Treatment. Photodiagnosis and Photodynamic Therapy, 104034.
31. Zyoud, S. H., Al Radi, B. M., Al Maamari, B. M., Nasor, M., **Makhadmeh, G. N.**, Yahia, I. S., ... & Abdel-wahab, M. S. (2024). Efficient Al-doped ZnO nanostructured synthesis by laser-assisted chemical bath: structural, optical, and photocatalytic activity using blue laser irradiation. Indian Journal of Physics, 98(2), 549-560.
32. Alonizan, N., Hamad, M. K., Alwabsi, A., Dwaikat, N., Mhareb, M. H. A., Sayyed, M. I., ... & **Makhadmeh, G. N**. (2023). Physical, optical, and ionizing radiation shielding properties for barium–tellurite glass with different oxides: An experimental study. Optical Materials, 143, 114177.
33. AlZoubi, T., Mourched, B., Al Gharram, M., **Makhadmeh, G. N.**, & Abu Noqta, O. (2023). Improving Photovoltaic Performance of Hybrid Organic-Inorganic MAGeI3 Perovskite Solar Cells via Numerical Optimization of Carrier Transport Materials (HTLs/ETLs). Nanomaterials, 13(15), 2221.
34. Aljarrah, K., Al-Akhras, M. A. H., **Makhadmeh, G. N.**, AlZoubi, T., Masadeh, M. M., Mhareb, M. H. A., ... & Abu Noqta, O. (2023). Advancing Photodynamic Therapy Efficiency on MCF-7 Breast Cancer Cells through Silica Nanoparticles-Safranin Encapsulation: In-Vitro Evaluation. Journal of Composites Science, 7(7), 274.
35. Zyoud, Zyoud, S. H., Al Radi, B. M., Al Maamari, B. M., Nasor, M., Zahran, H. Y., **Makhadmeh, G.N.**,.. & Abdel-wahab, M. S. (2023). Efficient Al-doped ZnO nanostructured

synthesis by laser-assisted chemical bath: structural, optical, and photocatalytic activity using blue laser irradiation. Indian Journal of Physics, 1-12.
36. Alzoubi, F., Noqta, O. A., AlZoubi, T., AlJabaly, H., Alkhateeb, H., Alqadi, M., & **Makhadmeh, G.N.** (2023). Exploring the impact of pH on the properties of citric acid-coated iron oxide nanoparticles as high-performance T2 contrast agent for MRI applications. Results in Engineering, 101206.
37. Zyoud, S. H., Alalalmeh, S. O., Hegazi, O. E., Yahia, I. S., Zahran, H. Y., **Makhadmeh, G.N.**, ... & Abdel-wahab, M. S. (2023). Novel Laser-Assisted Chemical Bath Synthesis of Pure and Silver-Doped Zinc Oxide Nanoparticles with Improved Antimicrobial and Photocatalytic Properties. Catalysts, 13(5), 900.
38. Al Jarrah, K., Al-Akhras, M. A. H. **Makhadmeh, G. N.** Al Zoubi, Mhareb, M. H. A., & Abu Noqta, O., (2023). A Novel Approach for enhanced Osteosarcoma Photodynamic Therapy using Encapsulated Methylene Blue in Silica Nanoparticles.
39. Alzoubi, F. Y., Abu Noqta, O., Al Zoubi, & **Makhadmeh, G. N.** (2023). A Novel One-Pot Synthesis of PVP-Coated Iron Oxide Nanoparticles as Biocompatible Contrast Agents for Enhanced T2-Weighted MRI. Journal of Composites Science, 7(3), 131.
40. Mhareb, M. H. A., Morsy, M. A., Almarri, H., Sayyed, M. I., Alonizan, N., **Makhadmeh, G.N** & Almessiere, M. A. (2023). Gamma-ray induced effect on the structural and optical properties and durability of neodymium-doped zinc–bismuth–borotellurite glasses and glass ceramics. Optical Materials, 137, 113572.
41. Zyoud, S. H., Yahia, I. S., Shahwan, M., Zyoud, A. H., Zahran, H. Y., Abdel-wahab, **Makhadmeh, G.N.**, ... & Qamhieh, N. (2023). Fast and Excellent Enhanced Photocatalytic Degradation of Methylene Blue Using Silver-Doped Zinc Oxide Submicron Structures under Blue Laser Irradiation. Crystals, 13(2), 229.
42. **Makhadmeh, G. N.,** Abdulsalam Abulsamin, Al-Akhras, M. A. H. & Abdul Aziz, A. (2022), Silica Nanoparticles Encapsulated Cichorium Pumilum as Promising Photosensitizer for Osteosarcoma Photodynamic Therapy. Photodiagnosis and Photodynamic Therapy: p. 102801.
43. **Makhadmeh, G. N.,** & Abdul Aziz, A. (2018). Photodynamic application of protoporphyrin IX as a photosensitizer encapsulated by silica nanoparticles. Artificial cells, nanomedicine, biotechnology, 1-4.
44. **Makhadmeh, G. N.,** Aziz, A. A., Razak, K. A., & Al-Akhras, M. A. H. (2018, February). Effect of Photon Radiations in Semi-Rigid Artificial Tissue Sensitized by Protoporphyrin IX Encapsulated with Silica Nanoparticles. In IOP Conference Series: Materials Science and Engineering (Vol. 305, No. 1, p. 012014). IOP Publishing.
45. **Makhadmeh, G. N.,** Abdul Aziz, A., & Abdul Razak, K. (2015). Encapsulation Efficacy of Natural and Synthetic Photosensitizers by Silica Nanoparticles for Photodynamic Applications. Institute of Educational Technology, Nanotechnology. (ISSN 1751-8741), 1-5.
46. **Makhadmeh, G. N.,** Abdul Aziz, A., & Abdul Razak, K. (2015). Artificial tissue sensitized with encapsulated methylene blue encapsulated by silica nanoparticles in photodynamic therapy. Artificial cells, nanomedicine, and biotechnology, (0), 1-5.
47. **Makhadmeh, G. N.,** Abdul Aziz, A., & Abdul Razak, K. (2015). The efficacy of methylene blue encapsulated in silica nanoparticles compared to naked methylene blue for photodynamic applications. Artificial cells, nanomedicine, and biotechnology, 1-5.
48. **Makhadmeh, G. N.,** Aziz, A. A., & Razak, K. A. (2015, April). Semi-rigid artificial tissue sensitized by encapsulated Cichorium Pumilum in silica nanoparticles for photodynamic therapy application. In NATIONAL PHYSICS CONFERENCE 2014 (PERFIK 2014) (Vol. 1657, p. 060006). AIP Publishing.
49. **Makhadmeh, G. N.,** Aziz, A. A., & Razak, K. A. (2014, November). Loading and Unloading Properties of Encapsulated Methylene Blue in Silica Nanoparticles for Photodynamic Applications. In Advanced Materials Research (Vol. 1024, pp. 292-295).

50. Al-Akhras, M. A. H., Aljarrah, K., **Makhadmeh, G. N.,** & Shorman, A. (2013). Introducing the Effect of Chinese Chlorella as a Photosensitizing Drug at Different Temperatures. Journal of Molecular Pharmaceutics & Organic Process Research. 1-4.
51. Jaradat, A., Al-Akhras, M. A. H., **Makhadmeh, G.,** Aljarrah, K., Al-Omari, A., Ababneh, Z., ... & Alshorman, M. (2011). Artificial semi-rigid tissue sensitized with natural pigments: Effect of photon radiations. Journal of Pharmacy and Bioallied Sciences, 3(2), 266.
52. Al-Akhras, M., Ali, H., Aljarrah, K., Al-Omari, A., Al-Khateeb, H. M., Albiss, B. A., ... & **Makhadmeh, G**. (2008). Influence of extremely low energy radiation on artificial tissue: Effects on image quality and superficial dose. Journal of Spectroscopy, 22(5), 419-428.

ATTENDED CONFERENCES

- 14th Arabic Conference of the Arab Union for Astronomy & Space Sciences (Nov. 2023).
- MEFOMP Medical Physics Conference, United Arab Emerates, (May 2023).
- National Physics Conference in Malaysia, 18-20-2014 (Oral Presentation).
- International Conference on the Advancement of Materials and Nanotechnology in Malaysia, 19-21 November 2013 (Oral Presentation).
- The Intl.Conf.on Materials in Jordan, 6-4 March 2010.
- The Intl.Conf.on Materials in Jordan, 10-12 April 2009.

REFERENCES

- Prof. Khaled Al Jarrah, Jordan University of Science & Technology, Jordan, kjarrah@just.edu.jo, 00962795623986
- Prof. Mohammad Al Akhras, Jordan University of Science & Technology, Jordan, alakmoh@just.edu.jo, 00962779488104
- Dr. Tareq Al Zoubi, American University of the Middle East, Kuwait, tariq.alzoubi@aum.edu.kw, 009655010624