

## **Rund A. Abu-Zurayk**

### **Personal details**

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### **Education**

**PhD** Mechanical and Aerospace Engineering, Queen's University Belfast – UK- 2009. Thesis title: “The Effect of Processing On Structure and Properties of Polypropylene/Clay Nanocomposites”

**M.Sc.** Chemical Engineering - University of Jordan- 2004

**B.Sc.** Chemical Engineering- University of Jordan- 2001

### **Job Positions**

**Vice Director** 05/2014-15/07/2022, 11/2024-present, Hamdi Mango Center for Scientific Research, The University of Jordan

**Associate Researcher** 05/2017-present, Research on Materials Engineering and Nanotechnology

**Director** 01/2018-09/2023, Nanotechnology Center, The University of Jordan

**Assistant Researcher** 03/2013-05/2017, Hamdi Mango Center for Scientific Research, The University of Jordan

**Researcher** 09/2011-02/2013, Hamdi Mango Centre for Scientific Research, The University of Jordan

**Research Fellow** 02/2009-5/2011, School of Mechanical and Aerospace Engineering- Queen's University Belfast – UK

**Standardization Engineer** 08/2002-08/2005- Jordan Institution For Standards and Metrology- Standardization Department – Jordan

As a researcher at the University of Jordan, I lead various research groups focusing on materials and nanotechnology. Our groundbreaking work involves developing nanomaterials for polymer nanocomposites, with a specific emphasis on water and wastewater treatment through photocatalytic degradation, adsorption, and polymeric membrane filtration. My expertise also extends to utilizing functionalized nanomaterials for targeted drug delivery to cancer cells and as potent antimicrobial agents.

### **Supervision of postgraduate students**

1. **Ayat Bozeya:** The Effect of Carbon Nanotubes Functionalization On Structure And Properties Of Pol / Carbon Nanotube Nanocomposites- **PhD in Chemistry.**
2. **Aya Khalaf:** Heterogeneous photocatalysis treatment of textile wastewater by nano- $M_2Zr_2O_7$  particle **M.Sc. in Chemistry.**
3. **Noura Mohammad:** Phenol adsorption on biochar prepared from the empty pine fruit shells. **M.Sc. Chemistry**
4. **Nour Alnairat:** Antifouling Green Membrane for Brackish Water Treatment- **M.Sc. in Chemistry**
5. **Dina Alfagawi:** The Effect of Nanoclay Structure on the Properties of Electrospun Cellulose Acetate **M.Sc in Chemistry**
6. **Rahaf Al Qatarneh:** A Novel Approach to Preparing a Potential an Anti-Inflammatory by Using MANNA Sweets & OKRA Fruit – **M.Sc. in Chemistry**
7. **Nihal Almohtaseb:** Chromium Cr (Vi) Adsorption on Biochar Prepared from Empty Pine Fruit Shell its Activated Form – **M.Sc. in Chemistry.**
8. **Manar Rabbaa':** In Vitro Studies on Curcumin-Loaded Multiwalled Carbon Nanotubes Antioxidant Activities and Cytotoxicity Against the Pancreatic Panc-1, Lung A549, Liver Hepg-2, and Colorectal Hct116 Cancer Cell Lines– **PhD in Biology.**
9. **Fatima Enaya:** Arginine-Glycine-Aspartic (RGD) peptide-Guided siRNA-Loaded Lipidic-Based Nanoparticles for Silencing of IL-6 Receptor in Triple Negative Breast Cancer -**PhD in Biology.**
10. **Radi Al Rashed:** Performance of PV Panels using Nanopolymers- **M.Sc. in Mechanical Engineerin**
11. **Sojoud Al Yousef:** A Comparative Analysis of Two Polyvinylidene Fluoride (PVDF) Membranes Preparation Methods for Enhanced Water Treatment Efficiency- **M.Sc. in Chemical Engineering**
12. **Maha Abu Diak:** Development and Characterization of Photocatalytic CuO-MWCNTs Coated PVD Membranes for Wastewater Treatment- **M.Sc. in Chemical Engineering**
13. **Rawan Al Jundi:** Robust Surface Modified Mixed Matrix Nano Fiber Membrane for Phamacutical Wastewater Treatment By Membrane Distillation- **M.Sc. in Chemical Engineering**
14. **Hadeel Al Hussaini:** Chitosan Functionalized Multi-Walled Carbon Nanotubes as Nanocarriers for Delivery of Berberine in Cancer Cells - **M.Sc. in Pharmacy**
15. **Siham Al Ghannam:** Invading Cancer Cells with Quercetin Using Nanotechnology (In Vitro By Multi Walled Carbon Nanotubes) - **M.Sc. in Pharmacy**
16. **Diana Al Sawaris:** Prevention of Biofilm Formation on Surgical Sutures Using-Silver Nanoparticles and Antibiofilm Compounds- **M.Sc. in Pharmacy**
17. **Ruba Al Muhaisen:** Physiological Responses of Micropropagated Chenopodium Quinoa Willd Under Different Induced Abiotic Stresses and Effect of Silver Nanoparticles- **PhD in Agriculture**
18. **Tamara Al Qudah:** Effect of nanoparticles on in vitro propagation and secondary metabolites profiling in the endangered wild Origanum petraeum Danin- **PhD in Agriculture**
19. **Shahed Altahhan:** Effect of Silver Nanoparticles on The Growth Of Wild Mint (Ziziphora Tenuior ) In Vitro Propagated Under Salinity and Drought Stresses- **M.Sc. in Agriculture**
20. **Hala Mansour:** Biostimulant influence of selenium nanoparticles on squash powdery mildew (Podospharea xanthii)- **M.Sc. in Agriculture**

## Publications

1. **Abu-Zurayk, R.**, Alnairat, N., Waleed, H., Khalaf, A., Abu-Dalo, D., Bozeya, A., & Afaneh, R. (2025). Dual-Mode Integration of a Composite Nanoparticle in PES Membranes: Enhanced Performance and Photocatalytic Potential. *Nanomaterials*, 15(14), 1055.
2. Siam, A. M., **Abu-Zurayk, R.**, Siam, N., Abdelkheir, R. M., & Shibli, R. (2025). Forest Tree and Woody Plant-Based Biosynthesis of Nanoparticles and Their Applications. *Nanomaterials*, 15(11), 845.
3. **Abu-Zurayk, R.**, Walvekar, R., Choo, H. *et al.* 3D printed polymeric membranes for oil/water separation: a comprehensive review. *Prog Addit Manuf* (2025). <https://doi.org/10.1007/s40964-025-01153-x>
4. **Abu-Zurayk, R.**, Alnairat, N., Waleed, H., Al-Khaial, M. Q., Khalaf, A., Bozeya, A., Abu-Dalo, D., Al-Yousef, S., & Afaneh, R. (2025). Polyvinylidene Fluoride (PVDF) and Nanoclay Composites' Mixed-Matrix Membranes: Exploring Structure, Properties, and Performance Relationships. *Polymers*, 17(8), 1120.
5. Mohusaien, R., Shibli, R., **Abu-Zurayk, R.**, Tahtamouni, R., & Al-Qudah, T. S. (2024). Silver nanoparticles enhance the mitigation of osmotic stress in *Chenopodium quinoa* microshoots grown under in vitro osmo-stressing conditions. *Brazilian Journal of Biology*, 84, e286851.
6. Al-Sawalmih, A., Al-Bataineh, Q. M., **Abu-Zurayk, R.**, Tavares, C. J., Eitzkorn, J., Foadian, F., & Telfah, A. (2024). Optical, electrical and structural properties of iron doped zinc oxide nanostructures. *Journal of Materials Science: Materials in Electronics*, 35(17), 1159.
7. Hudaib, B., Al-Qudah, Z., **Abu-Zurayk, R.**, Waleed, H., & Omar, W. (2024). Fabrication of blended cellulose acetate/poly-pyrrole ultrafiltration membranes for crude oil wastewater separation. *Case Studies in Chemical and Environmental Engineering*, 9, 100692.
8. Rabba'a, M., **Abu-Zurayk, R.**, Abu-Irmaileh, B., Mallouh, S. A., & Bustanji, Y. (2024). In vitro studies on curcumin-loaded multiwalled carbon nanotubes antioxidant activities and cytotoxicity against Hep G-2 liver cancer cell lines. *Journal of Applied Pharmaceutical Science*.
9. **Abu-Zurayk, R.**, Alnairat, N., Bozeya, A., Khalaf, A., & Abu-Dalo, D. (2024). Enhanced Properties of PVDF Membranes Using Green Ag-Nanoclay Composite Nanoarchitectonics. *Materials Research Express*.
10. Al-Khaial, M. Q., Chan, S. Y., **Abu-Zurayk, R. A.**, & Alnairat, N. (2024). Biosynthesis and Characterization of Zinc Oxide Nanoparticles (ZnO-NPs) Utilizing Banana Peel Extract. *Inorganics*, 12(4), 121.
11. Al-Sawarees, D. K., Darwish, R. M., **Abu-Zurayk, R.**, & Masri, M. A. (2024). Assessing silver nanoparticle and antimicrobial combinations for antibacterial activity and biofilm prevention on surgical sutures. *Journal of Applied Microbiology*, 135(4), 1xae063.
12. Telfah, A., **Abu-Zurayk, R.**, Al-Bataineh, Q. M., Tavares, C. J., Foadian, F., & Eitzkorn, J. (2024). Optical and electrical analysis of polyethylene oxide/disodium hexachloroplatinate complex composite films. *Journal of Applied Polymer Science*, e54980.
13. Bozeya, A., Makableh, Y. F., Al-Mezead, L. A., & **Abu-Zurayk, R.** (2024). Wet ball milling and hot press for the preparation of UHMWPE/modified MWCNTs nanocomposite with enhanced mechanical and thermal properties. *Polymer Bulletin*, 81(2), 1707-1727.
14. Ahmad Telfah, Qais M. Al-Bataineh, Ahmad A. Ahmad, **Rund Abu-Zurayk**, Carlos J. Tavares, Johannes Eitzkorn, Farzad Foadian, (2024), "Organic mixed ion-electron conductive composite films based on polyacrylic acid/polyaniline", *Organic Electronics*, Volume 124.

15. Al Bawab, A., Bozeya, A., Makableh, Y. F., Khalaf, A., & **Abu-Zurayk, R. (2023)**. Enhanced thermal and structural properties of UHMWPE/CNT nanocomposite sheets prepared by using melt compounding technique. *Polymer Bulletin*, 80(11), 12433-12445.
16. **Abu-Zurayk, R. A.**, Hamadneh, I., Al-Tae, B. J., Al-Kayed, M. F., & Al-Dujaili, A. H. (2023). Adsorption of Pb (II) and Cr (III) ions and p-chlorophenol on polymethylmethacrylate-organobentonite Nanocomposite. *Polymer Bulletin*, 1-22.
17. Alanazi, Abdulaziz A., Fahad Abdulaziz, Mohammed Alyami, Satam Alotibi, Salah Sakka, Saida Abu Mallouh, **Rund Abu-Zurayk**, and Mazen Alshaaer. "The Effect of Full-Scale Exchange of Ca<sup>2+</sup> with Zn<sup>2+</sup> Ions on the Crystal Structure of Brushite and Its Phase Composition." *Biomimetics* 8, no. 4 (2023): 333.
18. Abu-Dalo, M. A., Bozeya, A., Sawalmeh, Z., Albiss, B., Alnairat, N., & **Abu-Zurayk, R. (2023)**. Antifouling polymeric nanocomposite membrane based on interfacial polymerization of polyamide enhanced with green TiO<sub>2</sub> nanoparticles for water desalination. *PeerJ Analytical Chemistry*, 5, e26.
19. Bustanji, Y., Taneera, J., Semreen, M.H., Abu-Gharbieh, E., El-Huneidi, W., Faris, M.A.I.E., Alzoubi, K.H., Soares, N.C., Albustanji, B., Abuhelwa, A.Y. and **Abu-Zurayk, R., 2023**. Gold Nanoparticles and Breast Cancer: A bibliometric Analysis of the Current State of Research and Future Directions. *OpenNano*, p.100164..
20. **Abu-Zurayk, R.**, Alnairat, N., Khalaf, A., Ibrahim, A. A., & Halaweh, G. (2023). Cellulose acetate membranes: Fouling types and antifouling strategies—A brief review. *Processes*, 11(2), 489.
21. Al-Bataineh Q, Telfah M, **Abu-Zurayk R**, Benchaabane A, Tavares C, Telfah A, Nano-SnO<sub>2</sub>/polyaniline composite films for surface plasmon resonance, *Materials Chemistry and Physics*, Volume 293, **2023**.
22. Al-Bataineh, Q. M., Telfah, A. D., Ahmad, A. A., Bani-Salameh, A. A., **Abu-Zurayk, R.**, & Hergenröder, R. E/Z reversible photoisomerization of methyl orange doped polyacrylic acid-based polyelectrolyte brush films. *Journal of Applied Polymer Science*, e53138. **2022**
23. Shibli, R., Mohusaien, R., **Abu-Zurayk, R.**, Qudah, T., & Tahtamouni, R. Silver Nanoparticles (Ag NPs) Boost Mitigation Powers of Chenopodium Quinoa (Q6 Line) Grown under In Vitro Salt-Stressing Conditions. *Water*, 14(19), 3099. **2022**.
24. Hudaib, B., **Abu-Zurayk, R.**, Waleed, H., & Ibrahim, A. A. Fabrication of a Novel (PVDF/MWCNT/Polypyrrole) Antifouling High Flux Ultrafiltration Membrane for Crude Oil Wastewater Treatment. *Membranes*, 12(8), 751. **2022**.
25. Fontananova, E., Tocci, E., **Abu-Zurayk, R.**, Grosso, V., Meringolo, C., Muzzi, C., ... & Di Profio, G.. An environmental-friendly electrostatically driven method for preparing graphene oxide composite membranes with amazing stability in aqueous solutions. *Journal of Membrane Science*, 655, 120587, **2022**.
26. Al-Qudah, T., Mahmood, S. H., **Abu-Zurayk, R.**, Shibli, R., Khalaf, A., Lambat, T. L., & Chaudhary, R. G.. Nanotechnology Applications in Plant Tissue Culture and Molecular Genetics: A Holistic Approach. *Current Nanoscience*, 18(4), 442-464, **2022**.
27. **Abu-Zurayk, R.**, Barboiu, M. D., Gotzias, A., Kouvelos, E., Mahmoudi, H., Roualdes, S., & Tocci, E.. Special issue on International Conference on Water and Energy (ICWE21) Hassiba Benbouali University of Chlef, Algeria on 25-27 May 2021 Foreword. *DESALINATION AND WATER TREATMENT*, 255, 1-3, **2022**
28. AL-Mohusaien, R. M., Shibli, R. A., **Abu-Zurayk, R. A.**, & Tahtamouni, R. . An Outlook on the Chenopodium Quinoa Willd (Quinoa) Plant and the Role of the in Vitro Culture and Nanotechnology in Mitigation of Salinity Stress: A Review. *Jordan Journal of Agricultural Sciences*, 18(1), 17-27. **2022**

29. Bozeyya, A.; Makableh, Y.F.; **Abu-Zurayk, R.**; Khalaf, A.; Al Bawab, A. Thermal and Structural Properties of High Density Polyethylene/Carbon Nanotube Nanocomposites: A Comparison Study, *Chemosensors*, 9, 136, **2021**
30. Hudaib B , Al-Shawabkeh A , Omar W, Al-Zoubi H , **Abu-Zurayk R**, Removal of high-concentration sulfate ions from industrial wastewater using low-cost modified Jordanian kaolin, *Desalination and Water Treatment*, 231, 359–366, **2021**
31. Alnairat, N.; Abu Dalo, M.; **Abu-Zurayk, R.**; Abu Mallouh, S.; Odeh, F.; Al Bawab, A. Green Synthesis of Silver Nanoparticles as an Effective Antibiofouling Material for Polyvinylidene Fluoride (PVDF) Ultrafiltration Membrane. *Polymers*, 13, 3683, **2021**
32. **Abu-Zurayk, R.**, Khalaf, A., Abbas, H. A., Nasr, R. A., Jamil, T. S., & Al Bawab, A. Photodegradation of Carbol Fuchsin Dye Using an  $\text{Fe}_2\text{-xCu}_x\text{Zr}_{2-x}\text{W}_x\text{O}_7$  Photocatalyst under Visible-Light Irradiation. *Catalysts*, 11(12), 1473, **2021**.
33. **Abu-Zurayk R**, Qtaishat MR, Al Bawab A, Desalination Membranes: Characterization Techniques, *Membrane Desalination*, 229-249, **2020**
34. **Abu-Zurayk R.**, Hamadneh I, Al Dujaili H, "Preparation and Characterization of Polyethylene/Cellulose Composite with Diatomite and Bentonite as Fillers", *Polymer-Plastics Technology and Materials*, 59(5): 546-554, **2020**
35. I Hamadneh, **RA Abu-Zurayk**, AH Al-Dujaili, Removal of phenolic compounds from aqueous solution using  $\text{MgCl}_2$ -impregnated activated carbons derived from olive husk: the effect of chemical structures", *Water Science and Technology* 81 (11), 2351-2367, **2020**
36. Abbas HA, Nasr RA, **Abu-Zurayk R**, Al Bawab A, Jamil TS, "Decolourization of crystal violet using nano-sized novel fluorite structure  $\text{Ga}_2\text{Zr}_{2-x}\text{W}_x\text{O}_7$  photocatalyst under visible light irradiation, *Royal Society open science* 7 (3), 191632, **2020**
37. Moqbel S, **Abu-Zurayk R**, Bozeyya A, Alsisan R, Al Bawab A. Assessment of sustainable recycling at The University of Jordan. *International Journal of Sustainability in Higher Education*. **2020**.
38. Al Bawab A, Al-Hunaiti A, Abu Mallouh S, Bozeyya A, **Abu-Zurayk R**, Hussein T. Contamination of plants, soil, and building stones at a Roman heritage archaeological site in an urban area. *Fresenius Environmental Bulletin*. **2020**.
39. Jaffal A , **Abu- Zurayk R** , Al-Hussein M., "Two-Step Approach Based on Solution Mixing and Hot Compaction for CNT/HDPE Nanocomposite Preparation", *Int. J. Electrochem. Sci.*, 14, 6489-6499, **2019**
40. Al Bawab A, Bozeyya A, Abu-Mallouh S, Daqour I, **Abu-Zurayk R**, "The Dead Sea Mud and Salt: A Review of Its Characterization, Contaminants, and Beneficial Effects", *IOP Conference Series: Materials Science and Engineering* 305 (1), 012010, **2018**
41. Al Bawab A, Bozeyya A, Abu-Mallouh S, Daqour I, **Abu-Zurayk R**, "The Dead Sea Mud and Salt: A Review of Its Characterization, Contaminants, and Beneficial Effects", *IOP Conference Series: Materials Science and Engineering* 92 (1), 012010, **2018**
42. Al Bawab A, Ghannam N, **Abu-Zurayk R**, Odeh F, Bozeyya A, Abu Mallouh S, Al-Rawashdeh N, Abu-Dalo M, "Olive mill wastewater remediation by granular activated carbon impregnated with active materials", *Fresenius Environmental Bulletin* 27 (4), 2118-2126, **2018**

43. Mohammed N., **Abu-Zurayk R.**, Hamadneh I, .Al-Dujaili A., "Phenol adsorption on biochar prepared from the pine fruit shells: Equilibrium, kinetic and thermodynamics studies", *Journal of Environmental Management*, 226, 377-385, **2018**.
44. Al Bawab A., Al-Omari R., Abd-Allah R., Bozeya A., **Abu-Zurayk R.A.**, Odeh F. " The Application of a Modified Sol-Gel Silica Coating for the Protection of Corroded Roman Soda-Lime-Silica Glass: An Experimental and Analytical Study". In: Kouli M., Zezza F., Kouli D. (eds) 10th International Symposium on the Conservation of Monuments in the Mediterranean Basin. *MONUBASIN 2017*. Springer, Cham
45. **Abu-Zurayk R.** , Bozeya A. , Abu-Irmaileha B. , Abu-Mallouha S. , Al-Bawab A., Al-Dujailia A., "Assessment of Some Heavy Metals in the Dead Sea Mud and Treatment Optimization", *Soil and Sediment Contamination An International Journal*, 26(4), 364-376, **2017**.
46. Hanandeh A., **Abu-Zurayk R.**, Hamadneh I, Al-Dujaili A., "Characterization of biochar prepared from slow pyrolysis of Jordanian olive oil processing solid waste and adsorption efficiency of  $Hg^{2+}$  ions in aqueous solutions", *Water Science & Technology*, 74(8): 1899-1910, **2016**.
47. **Abu-Zurayk R.** "Interfacial interactions between polyethylene matrix and clay layers in polyethylene/clay nanocomposites", *IOP Conf. Series: Materials Science and Engineering* 92, **2015**.
48. Hamadneh I, **Abu-Zurayk R.**, Abu-Irmaileh B, Bozeya A, Al-Dujaili A, "Adsorption of Pb (II) on raw and organically modified Jordanian bentonite", *Clay Minerals*, 50: 485–496, **2015**.
49. **Abu-Zurayk R.**, Al Bakain R , Hamadneh I, Al-Dujaili A, "Adsorption of Pb(II), Cr(III) and Cr(VI) from aqueous solution by surfactant-modified diatomaceous earth: Equilibrium, kinetic and thermodynamic modeling studies", *International Journal of Mineral Processing*, 140:79-87, **2015**.
50. Al Bakain R, **Abu-Zurayk R.**, Hamadneh I, Khalili F, Al-Dujaili A, " A study on removal characteristics of o-, m-, and p-nitrophenol from aqueous solutions by organically modified diatomaceous earth", *Desalination And Water Treatment* 56(3):826-838, **2015**.
51. **Abu-Zurayk R.**, Harkin-Jones E, "The influence of processing route on the structuring and properties of HDPE/clay nanocomposites". *Polymer Engineering and Science* 52, 2360–2368, **2012**.
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53. **Abu-Zurayk R.**, Harkin-Jones E, Hornsby P, McNally T. "An Investigation of Process-Material Interactions in the Manufacture of HDPE/Clay Nanocomposite". *Hybrid Materials 2011*, Strasbourg, France, 6-10 March **2011**
54. Shen Y, Harkin-Jones E, Xie S, **Abu-Zurayk R.**, McNally T, Hornsby P, Patel R, Benkreira H, Khan A, Coates P , "Tailored Structuring and Biaxial Deformation Behaviour of Polyethylene Terephthalate – Clay Nanocomposites", *PPS-26*, Banff, Canada, 4-8 July **2010**.

55. **Abu-Zurayk R**, Harkin-Jones E, McNally T, Menary G, Martin P, Armstrong C, McAfee M “Structure-Property Relationships In Biaxially Deformed Polypropylene Nanocomposites”-Composites Science And Technology 70, 1353-1359, **2010**
56. **Abu-Zurayk R**, Harkin-Jones E, McNally T, Menary G, Martin P, Armstrong C. “Biaxial deformation behavior and mechanical properties of a polypropylene/clay nanocomposite”-Composites Science and Technology 69, 1644–1652, **2009**
57. Xu B, Leisen J, Beckham HW, **Abu-Zurayk R**, Harkin-Jones E, McNally T, “Evolution of Clay Morphology in Polypropylene/Montmorillonite Nanocomposites upon Equibiaxial Stretching: A Solid-State NMR and TEM Approach” Macromolecules, 42, 8959–8968, **2009**.
58. Harkin-Jones E, Figiel L, Spencer P, **Abu-Zurayk R**, Al-Shabib W, Chan V, Rajeev R, Soon K, Buckley P, Sweeney J, Menary G, Armstrong ., Assender H, Coates P, Dunne F, McNally T, Martin P “Performance enhancement of polymer nanocomposites via multiscale modelling of processing and properties”, *Plastics, Rubber & Composites; Macromolecular Engineering*, 37, 113-123, **2008**