



## Curriculum Vitae

### Mohammad Al-Shannag

#### Personal Information

**Place of birth:** Irbid, Jordan  
**Date of birth:** 14, January, 1972  
**Marital status:** Married with two sons and two daughters  
**Nationality:** Jordanian  
**Current Address:** **Jordan Uranium Mining Company (JUMCO)**  
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#### ملخص السيرة الذاتية:

يحمل الدكتور محمد الشناق رتبة الأستاذية في الهندسة الكيميائية من الجامعة الأردنية وقد حصل عام 2002 على درجة الدكتوراه في الهندسة الكيميائية من جامعة روفيرا وفيرجيلي الإسبانية بتقدير ممتاز مع مرتبة الشرف، وعلى درجتى البكالوريوس والماجستير في الهندسة الكيميائية من جامعة العلوم والتكنولوجيا الأردنية.

والدكتور الشناق معار حالياً لشركة تعدين اليورانيوم الأردنية مديراً عاماً لها منذ عام 2019، حيث خططت الشركة ومنذ توليه إدراتها خطوات هامة وأساسية في تقدم سير مشروع اليورانيوم الأردني، والتي تمثلت بشكل رئيسي بالإشراف على عملية تصميم وتشغيل المصنع الريادي بنجاح لإنتاج الكعكة الصفراء وفقاً للمعايير العالمية، وتأسيس مختبرات تعدينية وتحليلية تم تجهيزها بأحدث الأجهزة الآلية لتكون رافداً للشركة وللصناعات التعدينية في المملكة، إضافة لذلك فقد أشرف الدكتور الشناق على إعداد دراسة الجدوى الاقتصادية الأولية لمشروع اليورانيوم الأردني في منطقة وسط الأردن، وإعداد دراسة تقييم الأثر البيئي للمشروع.

والدكتور الشناق هو ممثل الأردن في مجموعة اليورانيوم الدولية والنظير الأردني لعدة مشاريع تقنية وإقليمية لدى الوكالة الدولية للطاقة الذرية، حيث ساهمت هذه المشاريع في رفد مختبرات شركة تعدين اليورانيوم الأردنية بأحدث الأجهزة الآلية وتوفير العديد من الأنشطة الفنية لتدريب الكوادر البشرية الأردنية، ويشارك الدكتور الشناق في العديد من الاجتماعات والمؤتمرات العالمية التي تعقد برعاية الوكالة الدولية للطاقة الذرية.

من ناحية أخرى، عمل الأستاذ الدكتور الشناق رئيساً لقسم الهندسة الكيميائية في الجامعة الأردنية للعام الجامعي 2017-2018 ورئيساً لقسم الهندسة الكيميائية في جامعة الملك خالد/السعودية خلال الفترة 2009-2011، حيث ساهم في تأسيس قسم الهندسة الكيميائية

من حيث وضع الخطة الدراسية لتخصص الهندسة الكيميائية وتجهيز المختبرات العملية ، وقد كلف بأن يكون رئيساً لقسم الهندسة الكيميائية في جامعة البلقاء التطبيقية لثلاثة أعوام ومساعداً لعميد كلية الهندسة خلال الفترة 2004-2011م.

وعلى مستوى البحث العلمي، فإن الاهتمامات العلمية للدكتور الشناق تتضمن الموضوعات التالية: التعدين، وظواهر الانتقال، وعمليات الفصل، وتحسين الخلط في العمليات الكيميائية، ومعالجة المياه، والطاقة، وقد نشر عشرات الأبحاث العملية والنظرية في مؤتمرات عالمية ومجلات علمية معروفة جيداً في مجال الهندسة الكيميائية، وقد كان رئيس اللجنة العلمية في مؤتمر الاردن الدولي السابع للهندسة الكيميائية، إضافة إلى تحكيمه لعدد كبير من الأبحاث في مجلات علمية متخصصة في مجال الهندسة الكيميائية.

وعلى المستوى الأكاديمي، يدرس الأستاذ الدكتور الشناق مساقات متنوعة في تخصص الهندسة الكيميائية كمساق عمليات الفصل، والعمليات الموحدة، وميكانيكا الموائع، والتحليل العددي التطبيقي، وبحوث العمليات، والديناميكا الحرارية، وانتقال الحرارة والكتلة، وأسس الهندسة الكيميائية، والتحكم بالعمليات.

إضافة لذلك، فقد شارك الأستاذ الدكتور الشناق بعضوية عدة لجان علمية وإدارية في جميع المؤسسات والجامعات التي عمل بها، وقد كان عضواً في لجان مناقشة العديد من الرسائل الجامعية لمرحلي الدكتوراة والماجستير.

ومما يجدر ذكره، بأن تعدد المؤسسات والجامعات والمدارس الهندسية التي درس أو عمل بها الدكتور الشناق قد منحتة -وبحمد الله- خبرة واسعة في مجال إدارة المشاريع الصناعية، إضافة إلى مهارات الاتصال متعددة اللغات.

#### **University Education:**

##### **Ph.D. Degree in Chemical Engineering:**

**University:** University of Rovira i Virgili (URV), Tarragona, Catalonia, Spain and University of Virginia, Virginia, USA.

**Period:** 1998-2002

**Dissertation Title:** Experimental and Numerical Investigation of the Flow in a Toroidal Cavity.

**Supervisors:** Prof. Francesc Giralt and Dr. Joan Herrero

##### **M.Sc. Degree in Chemical Engineering:**

**University:** Jordan University of Science and Technology (JUST), Irbid, Jordan.

**Period:** 1995-1998

**Dissertation Title:** Theoretical Investigation of Multicomponent Separation Problems by Membrane Distillation.

**Supervisors:** Prof. Fawzi Banat and Prof. Fahmi Abu Al-Rub

##### **B.Sc. Degree in Chemical Engineering:**

**University:** Jordan University of Science and Technology (JUST), Irbid, Jordan.

**Period:** 1990-1995

**Graduation Project:** Design of Urea Production Plant

#### **Academic and Administrative Experience:**

##### **Academic Ranks:**

**Sep, 2016– Present:** Full professor, Chemical Engineering Department, School of Engineering, The University of Jordan, Amman, Jordan.

**Sep, 2013– Aug, 2016:** Associate Professor, Chemical Engineering Department, School of Engineering, The University of Jordan, Amman, Jordan.

**Sep, 2011– Aug, 2013:** Associate Professor, Department of Chemical Engineering, Faculty of Engineering Technology, Al-Balqa Applied University, Amman, Jordan.

**Oct, 2009– Aug 2011:** Associate Professor (SABBATICAL LEAVE), Chemical Engineering Department, Faculty of Engineering, King Khalid University, Abha, Saudi Arabia.

**Oct, 2008– Sep, 2009:** Associate Professor, Department of Chemical Engineering, Faculty of Engineering Technology, Al-Balqa Applied University, Amman, Jordan.

**Feb, 2003– Sep, 2008:** Assistant Professor, Department of Chemical Engineering, Faculty of Engineering Technology, Al-Balqa Applied University, Amman, Jordan.

**Oct, 1998 – Sep, 2002:** Research and Teaching Assistant, Chemical Engineering Department, ETSEQ, Rovira i Virgili University, Tarragona, Catalonia, Spain.

**Feb, 2001 – June, 2001** Research visiting PhD-student, Mechanical and Aerospace Engineering Department of University of Virginia, Charlottesville, Virginia, USA.

**Sep, 1995 – May, 1998** Teaching Assistant, Chemical Engineering Department, Jordan University of Science and Technology, Irbid, Jordan.

#### **Administrative Positions:**

**Oct, 2019 – Present:** General Manager of Jordan Mining Uranium Company (JUMCO), Amman, Jordan.

**Oct, 2019 – Present:** Representative of the Government of Jordan in the Joint OECD/NEA-IAEA Uranium Group, IAEA.

**Oct, 2019 – Present:** Counterpart of Jordan for the International Atomic Energy Agency (IAEA) in the technical cooperation project entitled: "Enhancing the National Capabilities in Exploiting Uranium Ores in a Safe and Environment Friendly Manner-JOR2017", IAEA.

**Oct, 2019 – Present:** Counterpart of Jordan for the International Atomic Energy Agency (IAEA) in the technical cooperation project entitled: "Developing Detailed Engineering and Complete Feasibility Study for Uranium Extraction from Local Ores-JOR2016", IAEA.

**Oct, 2019 – Present:** Counterpart of Jordan for the International Atomic Energy Agency (IAEA) in the technical cooperation project entitled: "Enhancing Capabilities in Extracting Uranium from Local Ores on a Pilot Scale Level -JOE2014", IAEA.

**Oct, 2019 – Present:** Counterpart of Jordan for the International Atomic Energy Agency (IAEA) in the technical cooperation project entitled: "Extracting Uranium from Local Ores JOR2011", IAEA.

**Oct, 2019 – Present:** Counterpart of Jordan for the International Atomic Energy Agency (IAEA) in the Interregional project INT2022: Supporting Capacity Building in Member States for Uranium Production and Safety of Naturally Occurring Radioactive Material Residue Management, IAEA.

**Oct, 2019 – Present:** Counterpart of Jordan for the International Atomic Energy Agency (IAEA) in the Interregional project INT2020: Enhancing Capacity Building to Promote Successful Decommissioning and Environmental Remediation Projects, IAEA.

**Sep, 2017 – Sep, 2018:** Chairman of the Chemical Engineering Department, School of Engineering, The University of Jordan, Amman, Jordan.

**Sep, 2011 – Sep, 2012:** Chairman of Department of Chemical Engineering, Faculty of Engineering Technology, Al-Balqa Applied University, Amman, Jordan.

**Oct, 2009 – Aug, 2011:** Chairman of Chemical Engineering Department, Faculty of Engineering, King Khalid University, Abha, Saudi Arabia.

**Oct, 2007 – Sep, 2008:** Dean assistant for Associate Degree Program, Faculty of Engineering Technology, Al-Balqa Applied University, Amman, Jordan.

**Oct, 2006 – Sep, 2007:** Dean assistant for Development, Planning, and Community Services, Faculty of Engineering Technology, Al-Balqa Applied University, Amman, Jordan.

**Sep, 2004 – Sep, 2006:** Chairman of Department of Chemical Engineering, Faculty of Engineering Technology, Al-Balqa Applied University, Amman, Jordan.

#### **Teaching Experience:**

- **Undergraduate Courses:** Separation processes; Unit Operations; Fluid mechanics; Mass Transfer; Chemical Engineering Principles (1); Chemical Engineering Principles (2); Numerical Analysis; Process Dynamics and Control; Chemical Engineering Thermodynamics I & II; Process Optimization; Industry and Environment; Principles of General Safety; Risk and Hazardous Management, Queuing Theory; Chemical Engineering Thermodynamics Lab.; Fluid Mechanics Lab.; Physical Chemistry Lab.; Chemical Engineering Lab. (1).

- **Graduate Courses:** Advanced Transport Phenomena; Advanced Thermodynamics.

#### **Master Degree Theses Supervision:**

1. Supervisor of the thesis entitled: "Treatment of Battery Factories Wastewater Using Electrocoagulation: "Kinetic Study and Process Performance ", Student: Mohammad Waleed Al-Hawari, Mechanical/Chemical Engineering Departments, The University of Jordan, Status: Finished, 2015.

2. Supervisor of the thesis entitled: "Treatment of Wastewater from Jordanian Ink Making Factories Using Electrocoagulation Technique", Student: Aseel Yousef Sarhan, Chemical Engineering Departments, The University of Jordan, Status: Finished, 2017.
3. Co-supervisor of the thesis entitled: "Yeast Wastewater Treatment in Jordan Using Effective Physical and Chemical Methods", Student: Feras Mohammad Al-Amayreh, Civil Engineering Department, The University of Jordan, Status: Finished, 2017.
4. Supervisor of the thesis entitled: "Treatment of Desalination Processes Reject Brine Solutions using Electrocoagulation (EC) Process", Student: Heba Mahmoud Talafha, Civil Engineering Department, The University of Jordan, Status: Finished, 2018.
5. Co-supervisor of the thesis entitled: "Enhancement of Mixing in Lid Driven Bio-reactor with Continuous Flow from the Inlet and Outlet Ports", Student: Sahar Nasrallah, Chemical Engineering Department, Jordan University of Science and Technology, Status: Finished, 2018.

#### **Scientific/Technical Committees Memberships:**

1. Member of High Qualification and Accreditation Committee, Jordan Engineers Association, 2015-Present.
2. Member of Conference Organization Committee, 7th Jordan International Chemical Engineering Conference (JICHe 07), 4-6 Nov, 2014.
3. Chairman of Conference Scientific Committee, 7th Jordan International Chemical Engineering Conference (JICHe 07), 4-6 Nov, 2014.
4. Member of Examination Committees for four master degree theses in chemical engineering, Jordan University of Science and Technology, 2004-2007.
5. Member of Examination Committees for three master degree theses in chemical engineering, University of Jordan, 2013.
6. Member of Examination Committee for doctorate degree thesis in chemical engineering, Rovira i Virgili University, Spain, 2013.
7. Member of Chemical Engineering Graduation Project Prize, Jordan Engineers Association, 2014 and 2017.
8. Member of Chemical Engineering Scientific Committee, Professional Qualification and Accreditation Council (PQAC), Jordan Engineers Association, 2013-present.

#### **Professional Memberships:**

1. Member of Jordan Engineers Association (JEA), Amman, Jordan.
2. Member of Jordanian Chemical Association (JCA), Amman, Jordan.
3. Member of American Institute of Chemical Engineers (AIChE), USA.
4. Member of Jordan Anti-Drugs Society, Amman, Jordan.
5. Member of Jordan Environment Society, Amman, Jordan.
6. Member of Sum Charity Association, Irbid, Jordan.

#### **Professional Certifications:**

1. Consultant Engineer in Engineering Education, Professional Qualification and Accreditation Council (PQAC) Jordan Engineers Association, 2013.
2. Management of Training, National Training of Trainers Institute, Jordan, 2005.
3. Working Toward Program Accreditation, Prince Naif Institute for Research and Consulting Services, Saudi Arabia, 2009.
4. Equipment for Engineering Education, G.U.N.T Company, Germany, 2010.

#### **Honors and Award:**

1. Supervisor of Chemical Engineering Graduation Project of the second prize, Jordan Engineers Association, 2013.
2. Research scholarship, German Research Agency (DFG), Institute of Thermo-Fluid-Dynamic, Technical University of Hamburg, Germany, 2007.
3. Prized of the top ten students in Irbid Secondary Schools with the highest score in chemistry course of Al-Tawjihi Level, Jordanian Chemical Association (JCA), Jordan, 1990.

## Language Ability:

**Arabic:** Mother-tongue language

	<u>Writing</u>	<u>Reading</u>	<u>Speaking</u>
<b>English:</b>	Excellent	Excellent	Excellent
<b>Spanish:</b>	Very Good	Very good	Very good

## Keynote Speech; Training Courses; Scientific Meetings, Scientific Visits; Workshops:

1. Trainer of training course on Chemical Engineering for Non-Chemical Engineers organized by EcoMan Consultancy, Solutions and Training Company; Kuala Lumpur; Malaysia; 2011.
2. Participant in the Training course of Modeling and Simulation of Power Plant Cycle, University of Applied Sciences, Erasmus Plus Programme of the European Union, Hoxter, 11-14 September, 2018.
3. Head of the scientific visit delegation to heap leach gold mine of Demir EXPORT Mining Company, Sivas, Türkiye, 12-13 November, 2019.
4. Head of the Scientific visit delegation to heap leach gold mine of Scientific visit Tüprag Mining Company KIŞLADAĞ GOLD MINE, UŞAK, Türkiye, 11-12 November, 2019.
5. Member of IAEA interregional training course on leadership and management for safety, hosted through the Rosatom Technical Academy, Moscow, Russian Federation; 15-19 November 2021.
6. Member of IAEA technical cooperation for coordination meeting for new and on-going Jordanian projects organized by IAEA, Vienna, Austria; 14-18 February 2022.
7. Speaker at IAEA International Conference on Safety and Security of Radioactive Sources: Accomplishments and Future Endeavours, Vienna, Austria, 20- 24 June 2022.
8. Head of IAEA Technical cooperation scientific visit on Ion-Exchange Separation Research Institute, Ege University, Izmir, Türkiye, 5-9 September 2022.
9. Head of IAEA Technical cooperation scientific visit to heap leach POLİMETAL Gold mine Lidya Madencilik Mining Company, Balıkesir, 21-23 September 2022.
10. Member of IAEA Interregional Training Course on Integrated Management System, Leadership and Safety Culture Lemont, United States of America, 24 October-4 November 2022.
11. Member of 58th Meeting of the Joint OECD/NEA–IAEA Uranium Group organized by IAEA, Vienna, Austria 22-24 February 2023.
12. Scientific Chairperson and Speaker at IAEA International Symposium on Uranium Raw Material for the Nuclear Fuel Cycle: Innovation for Sustaining Future Resources and Productions (URAM-2023), Vienna, Austria, 8-12 May, 2023.
13. Member of IAEA annual meeting of the Regulatory Forum for Safety of Uranium Production and Naturally Occurring Radioactive Materials, IAEA, Vienna, Austria, 24-28 July 2023.
14. IAEA technical scientific visit on environmental protection (process water decontamination, chemical recovery, and wastewater reuse), Solingen, Germany, 18-22 September 2023.
15. Member of Jordan Delegation participated in Kazakhstan Energy Week/Kazenergy Eurasian Forum – 2023, Astana, Kazakhstan, 3-6 October, 2023.
16. Member of Arab experts meeting to develop executive plans for the Arab strategy for the peaceful uses of atomic energy until 2020, Arab Atomic Energy Agency, Tunisia, 14-16 November, 2023.
17. Keynote speaker at IAEA Technical Meeting on the Characterization of Radioactive Waste, IAEA, Vienna, Austria, 27 Nov-01 Dec 2023.
18. Head of Jordan Uranium Mining Company (JUMCO) delegation to participate in the Future Minerals Forum, Riyadh, Saudi Arabia, 10-11 January, 2024.
19. Member of 59th Meeting of the Joint OECD/NEA–IAEA Uranium Group organized by IAEA, Paris, France, 14-16 February 2024.
20. Member of coordination Meeting for Jordan new projects for TC cycle 2024-2025 organized by IAEA, Vienna, Austria, 20-22 February 2024.
21. Keynote speaker on Uranium Mining in Jordan: An Attractive Investment Opportunity, Workshop organized by the Ministry of Energy and Mineral Resources on the reality and prospects of minerals used in clean energy technologies in Arab countries, Amman, Jordan 7-9 May, 2024.

22. Keynote speaker on Uranium Mining in Jordan: An Attractive Investment Opportunity, XI International Scientific and Practical Conference sponsored by Kazatomprom: Development of the Uranium and Rare Metals Industry, Kazak-British Technical University (KBTU), Almaty-Kazakhstan 16-18 May 2024.
23. Member of IAEA annual meeting of the Regulatory Forum for Safety of Uranium Production and Naturally Occurring Radioactive Materials, IAEA, Vienna, Austria, 3-7 June 2024.

#### Research Experience:

**Research interests:** Transport Phenomena; Thermodynamics; Wastewater treatment; Energy.

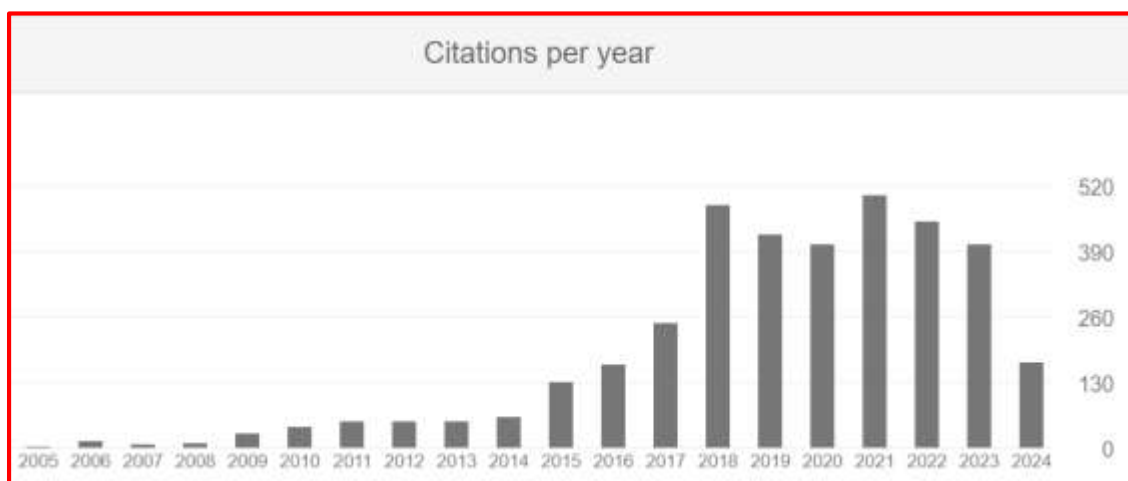
#### Funded Projects:

1. "Utilization of Sludge in Jordan Paper and Cardboard Factories", funded by Industrial Development Bank, Faculty-For-Factory (FFF) Program, Amman, Jordan, 2009.
2. "Energy Saving in the High Quality Company", funded by Industrial Development Bank, Faculty-For-Factory (FFF) Program, Amman, Jordan, 2008.
3. "Particle Image Velocimetry Measurements in Complex Flow Fields", funded by DFG, the German Research Agency, in collaboration with the institute of ThermoFluidDynamic, Technical University of Hamburg, Hamburg, Germany, 2007.

**ORCID ID:** <https://orcid.org/0000-0003-0085-2089>

#### Google Scholar:

Citation indices	All	Since 2019
Citations	4047	2520
h-index	35	26
i10-index	49	41



#### SCOPUS:

2,575

Citations by 2,109 documents

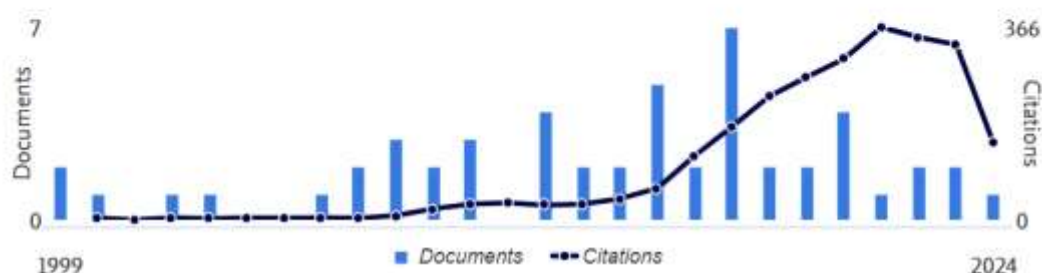
52

Documents

28

h-index [View h-graph](#)

## Document &amp; citation trends



## ResearchGate:

## Overall publications stats

2,295

Research Interest Score

↗ +4.6 last week

58,738

Reads ⓘ

↗ +165 last week

3,323

Citations

↗ +12 last week

890

Recommendations

↗ +4 last week

Research Interest Score: 2,295 +4.60



## Score breakdown

- 57.75% Citations
- 9.15% Recommendations
- 19.46% Full-text reads
- 13.64% Other reads

Research Interest Score ————— 2,295

Citations ————— 3,323

h-index ————— 33

**Chemical Engineering Instrumentations and packages:** Particle Image Velocimetry (PIV); Laser Doppler Velocimetry (LDV); Computational Fluid Dynamic (CFD) packages: FLUENT, our CUTEFLOWS code; Chemical Engineering Packages: HYSYS, CHEMCAD; Post-processing Software's: Tecplot, SigmaPlot, etc.

## Refereeing in ISI International Journals:

I have reviewed many articles in ISI Journals with impact factor (I.F.) according to the year 2020 as follows:

1. **Journal of Hazardous Materials**, Elsevier, I.F. = 10.588
2. **Applied Energy**, Elsevier, I.F. = 9.746
3. **Desalination**, Elsevier, I.F. = 9.501
4. **Separation and purification Technology**, Elsevier, I.F. = 7.312
5. **Energy**, Elsevier, I.F. = 7.147
6. **Process Safety and Environmental Protection**, Elsevier, I.F. = 6.158
7. **Journal of Industrial and Engineering Chemistry**, Elsevier, I.F. = 6.064
8. **International Journal of Hydrogen Energy**, Elsevier, I.F. = 5.816
9. **Journal of Analytical and Applied Pyrolysis**, Elsevier, I.F. = 5.541
10. **Arabian Journal of chemistry**, Elsevier, I.F. = 5.165

11. **Biochemical Engineering Journal**, Elsevier, I.F. = **3.978**
12. **The Korean Journal of Chemical Engineering**, Springer, I.F. = **3.309**
13. **Separation Science and Technology**, Taylor & Francis, I.F. = **2.475**
14. **Environmental Engineering Science**, Mary Ann Liebert, I.F. = **1.907**
15. **Desalination and Water Treatment**, Taylor & Francis, I.F. = **1.150**

#### Journal Publications:

1. Zakaria Al-Qodah, **Mohammad Al-Shannag**, Banan Hudaib, Walid Bani-Salameh, Enhancement of dairy wastewater treatment efficiency in batch chemical-assisted solar-powered electrocoagulation-adsorption system, *Case Studies in Chemical and Environmental Engineering*, 9, 1-12, 2024.
2. Zakaria Al-Qodah, Radwan Dweiri, Maimonah Khader, Soleen Al-Sabbagh, **Mohammad Al-Shannag**, Saif Qasrawi, Mahmoud Al-Halawani, Processing and characterization of magnetic composites of activated carbon, fly ash, and beach sand as adsorbents for Cr (VI) removal, *Case Studies in Chemical and Environmental Engineering*, 7, 1-11, 2023.
3. Nabaa S. Alsaedy, Raghad F. Almilly, **Mohammad Al-Shannag**, Testing of a Potentially Used Antiseptic Consists of Povidon Iodine, Hydrogen Peroxide and Aloe Vera, *Iraqi Journal of Chemical and Petroleum Engineering*, 24, 105-112, 2023.
4. Bani-Melhem, Khalid, Abeer Al Bsoul, Zakaria Al-Qodah, Nada Al-Ananzeh, Muhammad Rasool Al-Kilani, **Mohammad Al-Shannag**, and Walid Bani-Salameh, "Impact of a Sand Filtration Pretreatment Step on High-Loaded Greywater Treatment by an Electrocoagulation Technique", *Water*, 15, no. 5, 2023.
5. Mohammad Alnaief, Arwa Sandouqa, Ibrahim Altarawneh, **Mohammad Al-Shannag**, Malek Alkasrawi, Zayed Al-hamamre, "Adsorption Characteristics and Potential of Olive Cake Alkali Residues for Biodiesel Purification", *Energies*, 14, 1-16, 2021.
6. Zakaria Al-Qodah, Muhammad Tawalbeh, **Mohammad Al-Shannag**, Zaid Al-Anber, Khalid Bani-Melhem, "Combined electrocoagulation processes as a novel approach for enhanced pollutants removal: A state-of-the-art review", *Science of The Total Environment*, 744, 1-14, 2020.
7. Tareq Salameh, Muhammad Tawalbeh, **Mohammad Al-Shannag**, Motasem Saidan, Khalid Bani Melhem, Malek Alkasrawi, "Energy saving in the process of bioethanol production from renewable paper mill sludge", *Energy*, 196, 1-9, 2020.
8. Arwa Sandouqa, **Mohammad Al-Shannag**, Zayed Al-Hamamre, "Biodiesel purification using biomass-based adsorbent manufactured from delignified olive cake residues", *Renewable Energy*, 151, 103-117, 2020.
9. Abeer Al-Bsoul, **Mohammad Al-Shannag**, Muhammad Tawalbeh, Ahmed A Al-Taani, Walid K Lafi, Amani Al-Othman, Mohammad Alsheyab, "Optimal conditions for olive mill wastewater treatment using ultrasound and advanced oxidation processes", *Science of The Total Environment*, 700, 1-10, 2020.
10. Zakaria Al-Qodah, **Mohammad Al-Shannag**, "On the Performance of Free Radicals Combined Electrocoagulation Treatment Processes", *Separation & Purification Reviews*, 48, 143-158, 2019.
11. Zakaria Al-Qodah, **Mohammad Al-Shannag**, Khalid Bani-Melhem, Eman Assirey, Mohd Adib Yahya, Ali Al-Shawabkeh, "Free radical-assisted electrocoagulation processes for wastewater treatment", *Environmental Chemistry Letters*, 16, 695-714, 2018.
12. Balsam Mohammad, **Mohammad Al-Shannag**, Mohammad Alnaief, Lakhveer Singh, Eric Singsaas, Malek Alkasrawi, "Production of multiple biofuels from whole camelina material: A renewable energy crop", *BioResources*, 13, 4870-4883, 2018.
13. Zakaria Al-Qodah, **Mohammad Al-Shannag**, Mamdouh Al-Bosoul, Ivan Penchev, Hamed Al-Ahmadi, Khaled Al-Qodah, "On the performance of immobilized cell bioreactors utilizing a magnetic field", *Reviews in Chemical Engineering*, 34, 385-408, 2018.
14. Khalid Bani-Melhem, **Mohammad Al-Shannag**, Dheaya Alrousan, Salman Al-Kofahi, Zakaria Al-Qodah, Muhammad Rasool Al-kilani, "Impact of Soluble COD on Grey water Treatment by Electrocoagulation Technique", *Desalination and Water Treatment*, 89, 101-110, 2017.
15. Zakaria Al-Qodah, **Mohammad Al-Shannag**, Mohd Adib Yahya, "On the performance of bioadsorption processes for heavy metal ions removal by low cost agricultural and natural by-products bioadsorbent: a review", *Desalination and Water Treatment*, 87, 339-357, 2017.
16. Zakaria Al-Qodah, **Mohammad Al-Shannag**, "Heavy metal ions removal from wastewater using electrocoagulation processes: a comprehensive review", *Separation Science and Technology*, 52, 2649-2676, 2017.

17. Zakaria Al-Qodah, **Mohammad Al-Shannag**, Abdulaziz Amro, Eman Assirey, Mustafa Bob, Khalid Bani-Melhem, Malek Alkasrawi, "Impact of surface modification of green algal biomass by phosphorylation on the removal of copper (II) ions from water", *Turkish Journal of Chemistry*, 41, 190-208, 2017.
18. Zakaria Al-Qodah, **Mohammad Al-Shannag**, M Al-Busoul, I Penchev, Wasim Orfali, "Immobilized enzymes bioreactors utilizing a magnetic field: A review", *Biochemical Engineering Journal*, 121, 94-106, 2017.
19. **Mohammad Al-Shannag**, Zakaria Al-Qodah, Mansour Nawasreh, Zayed Al-Hamamreh, Khalid Bani-Melhem, Malek Alkasrawi, "On the performance of Ballota undulata biomass for the removal of cadmium(II) ions from water", *Desalination and Water Treatment*, 67, 223-230, 2017
20. Zayed Al-Hamamre, Motasem Saidan, Muhanned Hararah, Khaled Rawajfeh, Hussam E. Alkhasawneh, **Mohammad Al-Shannag**, "Wastes and biomass materials as sustainable-renewable energy resources for Jordan", *Renewable and Sustainable Energy Reviews*, 67, 295-314, 2017.
21. Malek Alkasrawi, Zayed Al-Hamamre, **Mohammad Al-Shannag**, Md Joynal Abedin, Eric Singaas , "Conversion of paper mill residuals to fermentable sugars", *Bioresources*, 11(1), 2287-2296, 2016.
22. Raghu Gurram, **Mohammad Al-Shannag**, Samuel Knapp, Tapas Das, Eric Singaas and Malek Alkasrawi, "Technical Possibilities of Bioethanol Production from Coffee Pulp: A Renewable Feedstock", *Clean Technologies and Environmental Policy*, 18, 269-278, 2016.
23. Zakaria Al-Qodah, **Mohammad Al-Shannag**, Khalid Bani-Melhem, Eman Assirey Kholoud Alananbeh, Nahla Bouqellah, "Biodegradation of olive mills wastewater using thermophilic bacteria", *Desalination and Water Treatment*, 56, 1908-1917, 2015.
24. Raghu Nandan Gurram, **Mohammad Al-Shannag**, Nicholas Joshua Lecher, Shona M. Duncan, Eric Lawrence Singaas, Malek Alkasrawi, "Bioconversion of paper mill sludge to bioethanol in the presence of accelerants or hydrogen peroxide pretreatment", *Bioresource Technology*, 192, 529-539, 2015.
25. Zakaria Al-Qodah, **Mohammad Al-Shannag**, Eman Assirey, Wasim Orfali, Khalid Bani-Melhem, Kholoud Alananbeh, Nahla Bouqellah, "Characteristics of a novel low density cell-immobilized magnetic supports in liquid magnetically stabilized beds", *Biochemical Engineering Journal*, 97, 40-49, 2015.
26. Khalid Bani-Melhem, Zakaria Al-Qodah, **Mohammad Al-Shannag**, Ahmad Qasaimeh, Mohammed Rasool Qtaishat, Malek Alkasrawi, "On the performance of real grey water treatment using a submerged membrane bioreactor system", *Journal of Membrane Science*, 476, 40-49, 2015.
27. **Mohammad Al-Shannag**, Zakaria Al-Qodah, Khalid Bani-Melhem, Mohammed Rasool Qtaishat, Malek Alkasrawi, "Heavy metal ions removal from metal plating wastewater using electrocoagulation: kinetic study and process performance", *Chemical Engineering Journal*, 260, 749-756, 2015.
28. **Mohammad Al-Shannag**, Zakaria Al-Qodah, Kholoud Alananbeh, Nahla Bouqellah, Eman Assirey, Khalid Bani-Melhem, "COD reduction of baker's yeast wastewater using batch electrocoagulation", *Environmental Engineering and Management Journal*, 13, 3153-3160, 2014.
29. Zakaria Al-Qodah, Abeer Al-Bsoul, Eman Assirey, **Mohammad Al-Shannag**, "Combined ultrasonic irradiation and aerobic biodegradation treatment for olive mills wastewaters", *Environmental Engineering and Management Journal*, 13, 2109-2118, 2014.
30. **Mohammad Al-Shannag**, Khalid Bani-Melhem, Zaid Al-Anber, Zakaria Al-Qodah, "Enhancement of COD-Nutrients Removals and Filterability of Secondary Clarifier Municipal Wastewater Influent Using Electrocoagulation Technique", *Separation Science and Technology*, 48 (4), 673-680, 2013.
31. Zaid Ahmed Al-Anber, Munther Issa Kandah, **Mohammad Al-Shannag**, Zakaria Al-Qodah, Abdullah Abu-Shaqra, "Isobaric vapor-liquid equilibria of binary system ethyl acetate + ethyl benzene + lithium bromide", *Journal of Thermal Analysis and Calorimetry*, 112 (2), 953-959, 2013.
32. **Mohammad Al-Shannag**, "Mass transport enhancement in annular-shaped lid-driven bioreactor", *Bioprocess Biosystems Engineering*, 35, 875-884, 2012.
33. **Mohammad Al-Shannag**, Walid Lafi, Khalid Bani-Melhem, Fawzi Gharagheer, Oqlah Dhaimat, "Reduction of COD and TSS from paper industries wastewater using electro-coagulation and chemical coagulation", *Separation Science and Technology*, 47 (5), 700-708, 2012.
34. Mohammad Al-Hassan, Hisham Mujafet, **Mohammad Al-Shannag**, "An Experimental Study on the Solubility of a Diesel-Ethanol Blend and on the Performance of a Diesel Engine Fueled with Diesel-

Biodiesel-Ethanol Blends”, *Jordan Journal of Mechanical and Industrial Engineering*, Hashemite University, 6(2),147-153, 2012.

35. **Mohammad Al-Shannag**, “Energy Savings in Alkyd-Resin and Aqueous-Emulsion Processes Using a Heat-Integrated Cycle”, *Journal of the University of Chemical Technology and Metallurgy*, 47 (1), 31-36, 2012.
36. Walid .K. Lafi, Mohammad Al-Anber, Zaid A. Al-Anber, **Mohammad Al-Shannag**, Adnan Khalil, “Coagulation and Advanced Oxidation Processes in the Treatment of Olive Mill Wastewater (OMW)”, *Desalination and Water Treatment*, 24, 251-256, 2010.
37. B. Shannak, R. Damseh, M. Al-Odat, **M. Al-Shannag**, and A. Azzi, “Two-Phase Flow through Corrugated U-Tube”, *Journal of Mechanical Engineering Science: Part C*, 224(11), 2408-2417, 2010.
38. M. Matouq, O. Al-Ayed, Z. Al-Anber, **M. Al-Shannag**, N. Kloub, T. Tagawa, S. Aljbou, “Wastewater Treatment Resulted from Oil Shale Retorting at High Frequency Ultrasound Waves with Chemical elemental analysis”, *Energy Sources, Part A*, 32, 1878–1884, 2010.
39. Walid K. Lafi, Benbella Shannak, **Mohammad Al-Shannag**, Zaid Al-Anber, Mohammad Al-Hasan, “Treatment of olive mill wastewater by combined advanced oxidation and biodegradation”, *Separation and Purification Technology*, 70 (2), 141-146 ,2009.
40. Shannak Benbella, **Mohammad Al-Shannag**, Zaid A. Al-Anber , "Gas-Liquid Pressure Drop in Vertical Internally Wavy 90° Bend", *Experimental Thermal and Fluid Science*, 33 (2), 340-347, 2009.
41. Fares Al Momani, Mo’ayyad Shawaqfah, Ahmad Shawaqfeh, **Mohammad Al-Shannag**, "Impact of fenton and ozone on oxidation of wastewater containing nitroaromatic compound", *Journal of Environmental Sciences*, 20, 675–682, 2008.
42. Mohammed A. Matouq, Zaid A. Al-Anber, Tomohiko Tagawa, Salah Aljbou, **Mohammad Al-Shannag**, "Degradation of dissolved diazinon pesticide in water using the high frequency of ultrasound wave", *Ultrasonics Sonochemistry*, 15 (5), 869–874, 2008.
43. **Mohammad Al-Shannag**, Zakaria Al-Qodah, Joan Herrero, Joseph A.C. Humphrey, Francesc Giralt, "Using a wall-driven flow to reduce the external mass-transfer resistance of a bio-reaction system", *Biochemical Engineering Journal*, 39 (3), 554-565, 2008.
44. **Mohammad Al-Shannag**, Mohammed Matouq, Zaid Al-Anber, "Simulation of Surfactant-Oil-Solvent Ternary System: Mean Field Theory", *Asian Journal of Chemistry*, 20(5), 4021-4030, 2008.
45. Z. Al-Qodah, W. K. Lafi, Z. Al-Anber, **M. Al-Shannag**, A. Harahsheh, "Adsorption of methylene blue by acid and heat treated diatomaceous earth", *Desalination*, 217, 212-224, 2007.
46. Z. Al-Qodah, **M. Al-Shannag**, "Application of magnetically stabilized fluidized beds for cell suspension filtration from aqueous solutions", *Separation Science and Technology*, 42 (2), 421-438, 2007.
47. Z. Al-Qodah, **M. Al-Shannag**, "Separation of yeast cells from aqueous solutions using magnetically stabilized fluidized beds", *Letters in Applied Microbiology*, 43 (6), 652-658, 2006.
48. Joseph Humphrey, Joshua Cushner, **Mohammad Al-Shannag**, Joan Herrero, and Francesc Giralt, “Shear-Driven Flow in a Toroid of Square Cross-Section”, *Journal of Fluid Engineering*, 125 (1), 130-137, 2003.
49. **Mohammad Al-Shannag**, Joan Herrero, Joseph Humphrey, and Francesc Giralt, "Effect of Radial Clearance on the Flow between Corotating Disks in Fixed Cylindrical Enclosures", *Journal of Fluid Engineering*, 124 (3), 719-727, 2002.
50. Fawzi Banat, **Mohammad Al-Shannag**, "Recovery of Dilute Acetone-Butanol-Ethanol (ABE) Solvents from Aqueous Solutions via Membrane Distillation", *Bioprocess Engineering*, 23: 643-649, 2000.
51. Fawzi Banat, Fahmi Abu Al-Rub, Rami Jumah, **Mohammad Al-Shannag**, "Modeling of Desalination Using Tubular Direct Contact Membrane Distillation Modules", *Separation Science and Technology*, 34(11), 2191-2206, 1999.
52. Fawzi Banat, Fahmi Abu Al-Rub, Rami Jumah, **Mohammad Al-Shannag**, "Application of Stefan-Maxwell Approach to Azeotropic Separation by Membrane Distillation", *Chemical Engineering Journal*, 73 (1), 71-75, 1999.
53. Fawzi Banat, Fahmi Abu Al-Rub, Rami Jumah, **Mohammad Al-Shannag**, "On the Effect of Inert Gases in Breaking the Formic Acid-Water Azeotrope by Gas-Gap Membrane Distillation", *Chemical Engineering Journal*, 73 (1): 37-42, 1999.
54. Fawzi Banat, Fahmi Abu Al-Rub, Rami Jumah, **Mohammad Al-Shannag**, "Theoretical Investigation of Membrane Distillation Role in Breaking the Formic Acid-Water Azeotropic Point: Comparison between

fickian and Stefan-Maxwell-Based Models", *International Communications in Heat and Mass Transfer*, 26 (6), 879-888, 1999.

55. Fawzi Banat, Fahmi Abu Al-Rub, **Mohammad Al-Shannag**, "Modeling of Dilute Ethanol-Water Mixture Separation by Membrane Distillation", *Separation & Purification Technology*, 16(2), 119-131, 1999.
56. Fahmi Abu Al-Rub, Fawzi Banat, **Mohammad Al-Shannag**, "Theoretical Assessment of Dilute Acetone Removal from Aqueous Streams by Membrane Distillation", *Separation Science and Technology*, 34(14), 2817-2836, 1999.
57. Fawzi Banat, Fahmi Abu Al-Rub, **Mohammad Al-Shannag**, "Simultaneous Removal of Acetone and Ethanol from Aqueous Solutions by Membrane Distillation: Prediction Using the Fick's and the Exact and Approximate Stefan-Maxwell Relations", *Heat and Mass Transfer Journal*, 35(5), 423-431, 1999.

#### International Conference Publications:

1. **Mohammad Al-Shannag**, Uranium Mining in Jordan: An attractive Investment Opportunity, XI International Scientific and Practical Conference Development of the Uranium and Rare Metal Industry, Kazak-British Technical University (KBTU), Almaty-Kazakhstan, 2024.
2. **Mohammad Al-Shannag**, "Jordan Uranium Project: Toward Commercial Production", International Symposium on Uranium Raw Material for the Nuclear Fuel Cycle URAM-2023, IAEA, Vienna, Austria, 2023.
3. **Mohammad Al-Shannag**, Mohammad Alnaief, Hussein Allaboun, Brett Moldovan, Khaled Toukan, "Overview of the Development of the Central Jordan Uranium Project", ALTA 2022 International Annual Metallurgical Conference, 2022.
4. Omar Al Farah, Malek Alkasrawi, Emad Abdelsalam, Tareq Salameh, **Mohammad Al-Shannag**, "Concentrated Solar Power: Technology and Potential in Jordan", 2022 Advances in Science and Engineering Technology International Conferences (ASET), 2022.
5. Diala Siam, Malek Alkasrawi, Emad Abdelsalam, Tareq Salameh, Hamzah Nawafah, **Mohammad Al-Shannag**, "Hydro Power Production in Jordan: Possibilities and Challenges", 2022 Advances in Science and Engineering Technology International Conferences (ASET), 2022.
6. Khalid Bani-Melhem, **Mohammad Al-Shannag**, "Improving Grey Water Treatment by Integrating Electrocoagulation Technique with Adsorbent Materials", 3rd International Conference on Integrated Environmental Management for Sustainable Development, Sousse, Tunisia, May 2-5, 2018.
7. Mohammad Al-Shannag, **Khalid Bani-Melhem**, "Reducing the disturbances of the volumetric loading rates by applying an electrical direct current field: Another advantage of the submerged membrane electro-bioreactor", Euromembrane Conference, Aachen, Germany, September 6-10, 2015.
8. **Mohammad Al-Shannag**, Zayed Al-Hamamre, Malek Alkasrawi, "Conversion of Biomass Feedstock to Biofuels in Jordan: Technical and Economic Study", Jordanian Scientists and Technologist Abroad Network Conference (JOSTA), Amman, Jordan, August 12-13, 2015.
9. Walid K. M. Bani Salameh, Hesham Ahmad, **Mohammad Al-Shannag**, "Treatment of Olive Mill Wastewater by Electrocoagulation Processes and Water Resources Management", World Academy of Science, Engineering and Technology Conference, Marrakech, Morocco, April 8-9, 2015.
10. **Mohammad Al-Shannag**, "A New Approach for Kinetic Modelling of El-Lajjun Oil Shale Extracted Kerogen", 32nd Oil Shale Symposium, Colorado, USA, October 15-17, 2012.
11. **Mohammad Al-Shannag**, "Production of ethanol from recycled paper sludge using hydrolysis followed by fermentation", The Third International Renewable Energy Congress, Hammamet, Tunisia, December 20-22, 2011.
12. **Mohammad Al-Shannag**, "Enhancement of immobilized-enzyme performance using wall-driven cavity", International Conference on Applications and Design in Mechanical Engineering, Kangar, Perlis, Malaysia, October 25-26, 2007.
13. **Mohammad Al-Shannag**, Dolors Puigjaner, Joan Herrero, Francesc Giralt, Joseph A. C. Humphrey, Carles Simó, "Mixing enhancement by secondary structures in shear or buoyancy driven confined flows", 7<sup>th</sup> World Congress of Chemical Engineering, Incorporated the 5<sup>th</sup> European Congress of Chemical Engineering, Glasgow, Scotland, July 10-14, 2005.

14. D. Puigjaner, **M. Al-Shannag**, J. Herrero, F. Giralt, J.A.C. Humphrey, C. Simó, "How first principles can help in the design of new or conventional stirred reactors. Mixing enhancement by secondary structures", Jordan International Chemical Engineering Conference V, Amman, Jordan, September 12-14, 2005.
15. Joseph A. C. Humphrey, Joshua Cushner, Ranga Sudarsan, **Mohammad Al-Shannag**, Joan Herrero, and Francesc Giralt, "Experimental and Numerical Investigation of the Shear-Driven Flow in a Toroid of Square Cross-Section", 2nd International Symposium on Turbulence and Shear Flow Phenomena, Royal Institute of Technology (KTH), Stockholm, Sweden, June 27-29, 2001.

#### References:

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