

Mohammad Raja Al-Soeidat, Ph.D.

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Summary

Ph.D.-qualified Electrical Engineer specialising in Renewable Energy and Power Electronics, with extensive academic, research, and industrial experience. Currently Head of the Electrical and Communication Engineering Department at Al-Hussein Bin Talal University, Jordan. Research expertise spans renewable energy systems, power electronics, converter reliability, and energy storage. Demonstrated leadership in academic program development and institutional planning, with experience in curriculum design, alignment with the Jordanian National Qualifications Framework (NQF), and serving as a member of the preparatory committee for establishing the Technical College, contributing to the development of its academic programs and infrastructure.

328 citations, h-index 11 (Google Scholar) · 245 citations, h-index 9 and 24 publications (Scopus) — as of August 2026.

Employment History

Sep 2025 – Now	■ Head of Electrical and Communication Engineering Department , Al-Hussein Bin Talal University, Ma'an – Jordan
June 2023 – Sep 2025	■ Director of engineering workshops , Al-Hussein Bin Talal University, Ma'an – Jordan.
Feb 2023 – Now	■ Assistant Professor , Electrical Engineering and Renewable Energy departments, Al-Hussein Bin Talal University, Ma'an – Jordan.
Oct 2022 – Feb 2023	■ Lecturer , Electrical Engineering departments, Al-Hussein Bin Talal University, Ma'an – Jordan.
March 2022 – Jun 2022	■ Lecturer , Kent Institute Australia, Sydney, Australia.
Jan 2017 – Dec 2021	■ Senior Research Assistant , University of Technology Sydney, Sydney, Australia. ■ Casual Academic Staff Tutor and lab Assistant , University of Technology Sydney, Sydney, Australia.
June 2013 – Feb 2014	■ Radio Access Network Planning and Optimisation Engineer , Zain Company, Amman, Jordan.
May 2011 – Sep 2011	■ Image Processing Engineer , Kodak, Kings Dominion, Virginia, USA.

Education

2016 – 2020	■ Ph.D. in Electrical Engineering (Power Electronics and Renewable Energy) , University of Technology Sydney (UTS), Sydney, Australia. Thesis title: <i>Solar Power Generation Capability and Three-Port Converters for PV-Battery Powered Applications</i> . [Thesis]
2015 – 2016	■ Master of Engineering (Electrical Engineering) , The University of Sydney, Sydney, Australia. Thesis title: <i>Investigation into power quality of photovoltaic power system by studying of PV system under partial shading</i> . [Thesis]

Education (continued)

2008 – 2013

■ **B.Sc. Degree in Communications Engineering**, Al-Hussein Bin Talal University, Ma'an, Jordan.
Rating: *Excellent*.

Research Publications

Journal Articles

- 1 M. A. Alnaanah, M. H. S. Alrashdan, H. Hmeidi, and **M. Al-Soeidat**, "Ecg-based cardiac arrhythmia classification using coleeg open-source framework," *Journal of Electrical and Computer Engineering*, vol. 2026, no. 1, p. 3 193 410, 2026.  DOI: <https://doi.org/10.1155/jece/3193410>. eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.1155/jece/3193410>.
- 2 R. Alsua, **M. Al-Soeidat**, A. Salah, O. Alsodi, and D. D.-C. Lu, "Artificial intelligence in smart grids and power-electronic- interfaced microgrids: A systematic literature review of energy management, optimisation, and cybersecurity," *Energies*, vol. 19, no. 15, 2026, ISSN: 1996-1073.  DOI: [10.3390/en19153643](https://doi.org/10.3390/en19153643).
- 3 S. Feng et al., "Dual-port boost-integrated inverter with hybrid spwm-dpfm control for stand-alone applications," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, pp. 1–1, 2026.  DOI: [10.1109/JESTPE.2026.3719113](https://doi.org/10.1109/JESTPE.2026.3719113).
- 4 **M. Al-Soeidat**, G. Al-Shabaan, A. Salah, M. Alnaanah, and H. Khawaldeh, "Techno-economic optimisation of grid-connected pv under regulatory constraints: A university case study," *Results in Engineering*, vol. 32, p. 111 999, 2026, ISSN: 2590-1230.  DOI: <https://doi.org/10.1016/j.rineng.2026.111999>.
- 5 **M. R. Al-Soeidat**, H. A. Khawaldeh, K. Al Khalyfeh, D. D.-C. Lu, and M. A. Alkhalayfeh, "Reliability improvement of a three-port converter for standalone pv-battery applications," *CPSS Transactions on Power Electronics and Applications*, vol. 11, no. 2, pp. 201–210, 2026.  DOI: [10.24295/CPSSTPEA.2026.00007](https://doi.org/10.24295/CPSSTPEA.2026.00007).
- 6 A. Salah, M. Shalby, **M. Al-Soeidat**, and F. Alhomaidat, "Electric vehicle charging infrastructure with hybrid renewable energy: A feasibility study in jordan," *World Electric Vehicle Journal*, vol. 16, no. 10, 2025, ISSN: 2032-6653.  DOI: [10.3390/wevj16100557](https://doi.org/10.3390/wevj16100557).
- 7 K. M. Katubi, N. S. Shiong, M. Z. Pakhuruddin, M. A. Alkhalayfeh, S. A. Abubaker, and **M. R. Al-Soeidat**, "Over 35% efficiency of three absorber layers of perovskite solar cells using scaps 1-d," *Optik*, vol. 297, p. 171 579, 2024, ISSN: 0030-4026.  DOI: <https://doi.org/10.1016/j.ijleo.2023.171579>.
- 8 H. A. Khawaldeh, B. Shboul, M. Al-Smairan, **M. Al-Soeidat**, D. Lu, and F. Almomani, "Comparative energy and economic analysis of dish stirling engine and national grid electricity for residential building in mafrq, jordan," *Sustainability*, vol. 16, no. 14, 2024, ISSN: 2071-1050.  DOI: [10.3390/su16145945](https://doi.org/10.3390/su16145945).
- 9 H. A. Khawaldeh, **M. Al-Soeidat**, D. D.-C. Lu, and L. Li, "Accurate, fast and power efficient pv emulator based on hybrid passive and active circuits," *CPSS Transactions on Power Electronics and Applications*, vol. 7, no. 4, pp. 432–441, 2022.  DOI: [10.24295/CPSSTPEA.2022.00039](https://doi.org/10.24295/CPSSTPEA.2022.00039).
- 10 H. A. Khawaldeh, **M. Al-soeidat**, D. D.-C. Lu, and L. Li, "Simple and fast dynamic photovoltaic emulator based on a physical equivalent pv-cell model," *The Journal of Engineering*, vol. 2021, no. 5, pp. 276–285, 2021.  DOI: <https://doi.org/10.1049/tje2.12032>. eprint: <https://ietresearch.onlinelibrary.wiley.com/doi/pdf/10.1049/tje2.12032>.

- 11 H. A. Khawaldeh, **M. Al-Soeidat**, M. Farhangi, D. D.-C. Lu, and L. Li, "Efficiency improvement scheme for pv emulator based on a physical equivalent pv-cell model," *IEEE Access*, vol. 9, pp. 83 929–83 939, 2021.  DOI: [10.1109/ACCESS.2021.3086498](https://doi.org/10.1109/ACCESS.2021.3086498).
- 12 **M. R. Al-Soeidat**, H. Aljarajreh, H. A. Khawaldeh, D. D.-C. Lu, and J. Zhu, "A reconfigurable three-port dc–dc converter for integrated pv-battery system," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 8, no. 4, pp. 3423–3433, 2020.  DOI: [10.1109/JESTPE.2019.2941595](https://doi.org/10.1109/JESTPE.2019.2941595).
- 13 T. Cheng, **M. Al-Soeidat**, D. D.-C. Lu, and V. G. Agelidis, "Experimental study of pv strings affected by cracks," *The Journal of Engineering*, vol. 2019, no. 18, pp. 5124–5128, 2019.  DOI: <https://doi.org/10.1049/joe.2018.9320>. eprint: <https://ietresearch.onlinelibrary.wiley.com/doi/pdf/10.1049/joe.2018.9320>.
- 14 **M. Al-Soeidat**, T. Cheng, D. D.-C. Lu, and V. G. Agelidis, "Experimental study of static and dynamic behaviours of cracked pv panels," *IET Renewable Power Generation*, vol. 13, no. 16, pp. 3002–3008, 2019.  DOI: <https://doi.org/10.1049/iet-rpg.2019.0359>. eprint: <https://ietresearch.onlinelibrary.wiley.com/doi/pdf/10.1049/iet-rpg.2019.0359>.
- 15 **M. Al-Soeidat**, D. D.-C. Lu, and J. Zhu, "An analog bjt-tuned maximum power point tracking technique for pv systems," *IEEE Transactions on Circuits and Systems II: Express Briefs*, vol. 66, no. 4, pp. 637–641, 2019.  DOI: [10.1109/TCSII.2018.2865804](https://doi.org/10.1109/TCSII.2018.2865804).

Conference Proceedings

- 1 A. A. Salah, M. M. Shalby, and **M. R. Al-Soeidat**, "Design and development of a hybrid electric vehicle charging station in jordan," in *2024 4th International Conference on Smart Grid and Renewable Energy (SGRE)*, 2024, pp. 1–6.  DOI: [10.1109/SGRE59715.2024.10428957](https://doi.org/10.1109/SGRE59715.2024.10428957).
- 2 D. D.-C. Lu, H. Aljarajreh, and **M. Al-soeidat**, "Reliability assessment of selected boost-converter-based three-port dc/dc converters," in *2023 IEEE International Future Energy Electronics Conference (IFEEC)*, 2023, pp. 357–362.  DOI: [10.1109/IFEEC58486.2023.10458444](https://doi.org/10.1109/IFEEC58486.2023.10458444).
- 3 **M. Al-Soeidat**, H. Khawaldeh, and D. D.-C. Lu, "Investigation of photovoltaic panel degradation affected by dust in jordan," in *2023 IEEE International Future Energy Electronics Conference (IFEEC)*, 2023, pp. 322–326.  DOI: [10.1109/IFEEC58486.2023.10458569](https://doi.org/10.1109/IFEEC58486.2023.10458569).
- 4 H. A. Khawaldeh, **M. Al-soeidat**, D. D.-C. Lu, and L. Li, "Power loss reduction for pv emulator using transistor-based pv model," in *2022 IEEE Energy Conversion Congress and Exposition (ECCE)*, 2022, pp. 1–8.  DOI: [10.1109/ECCE50734.2022.9947650](https://doi.org/10.1109/ECCE50734.2022.9947650).
- 5 H. A. Khawaldeh, **M. Al-soeidat**, D. Dah-Chuan Lu, and L. Li, "Fast photovoltaic emulator based on pv-cell equivalent circuit model," in *2021 IEEE 12th Energy Conversion Congress & Exposition - Asia (ECCE-Asia)*, 2021, pp. 2121–2126.  DOI: [10.1109/ECCE-Asia49820.2021.9479298](https://doi.org/10.1109/ECCE-Asia49820.2021.9479298).
- 6 **M. Al-Soeidat**, H. Khawaldeh, D. D.-C. Lu, and J. Zhu, "A novel high step-up three-port bidirectional dc/dc converter for pv-battery integrated system," in *2020 IEEE Applied Power Electronics Conference and Exposition (APEC)*, 2020, pp. 3352–3357.  DOI: [10.1109/APEC39645.2020.9124295](https://doi.org/10.1109/APEC39645.2020.9124295).
- 7 H. A. Khawaldeh, H. Aljarajreh, **M. Al-Soeidat**, D. D.-C. Lu, and L. Li, "Performance investigation of a pv emulator using current source and diode string," in *2018 26th International Conference on Systems Engineering (ICSEng)*, 2018, pp. 1–5.  DOI: [10.1109/ICSENG.2018.8638207](https://doi.org/10.1109/ICSENG.2018.8638207).
- 8 **M. Al-Soeidat**, H. Khawaldeh, H. Aljarajreh, and D. Lu, "A compact three-port dc-dc converter for integrated pv-battery system," in *2018 IEEE International Power Electronics and Application Conference and Exposition (PEAC)*, 2018, pp. 1–6.  DOI: [10.1109/PEAC.2018.8590624](https://doi.org/10.1109/PEAC.2018.8590624).
- 9 **M. Al-Soeidat**, D. D.-C. Lu, and J. Zhu, "A more accurate analog voltage-based photovoltaic maximum power point tracking technique," in *2017 8th International Renewable Energy Congress (IREC)*, 2017, pp. 1–5.  DOI: [10.1109/IREC.2017.7926057](https://doi.org/10.1109/IREC.2017.7926057).

- 10 M. Al-Soeidat, A. Cembrano, and D. D.-C. Lu, "Comparing effectiveness of hybrid mppt algorithms under partial shading conditions," in *2016 IEEE International Conference on Power System Technology (POWERCON)*, 2016, pp. 1–6. DOI: [10.1109/POWERCON.2016.7754024](https://doi.org/10.1109/POWERCON.2016.7754024).

Research Interests

Electrical Engineering applications, renewable energy systems and reliability, power electronics, energy conversion systems, smart grids, electric vehicles, and energy storage systems.

Teaching

- Power Electronics and Drives
- Renewable Energy Systems
- Communication and Technology
- Engineering Mathematics
- Power Electronics
- Electric Circuits I
- Electric Circuits II
- Engineering Workshops
- Fundamentals of Electrical Power Systems
- Electrical and Electronic Principles

Skills

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| Languages | ■ Strong reading, writing and speaking competencies for English and Arabic. |
| Coding | ■ MATLAB, Python, $\LaTeX$. |
| Software | ■ HOMER, System Advisor Model (SAM), LTspice, KiCad, Altium Designer. |
| Hardware | ■ PCB design and soldering, Arduino and PIC microcontroller programming. |
| Misc. | ■ Academic research, teaching, training, consultation, program debugging, computer maintenance and software installation, $\LaTeX$ typesetting and publishing. |

Honours, Awards and Professional Development

Awards and Achievements

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| June 2025 | ■ International Mobility Grant (JAMIES Project) , Selected for a competitive academic mobility grant to undertake research and teaching activities within the Erasmus+ partner framework. Universidade do Algarve, Portugal. |
| 2024 | ■ Letter of Appreciation , for the development of the engineering workshops, Al-Hussein Bin Talal University. |
| 2019 | ■ People's Choice Winner – Poster Presentation , School of Electrical and Data Engineering Research Showcase Competition, University of Technology Sydney (UTS). |
| 2015-2020 | ■ Master's and Ph.D. Scholarship , Al-Hussein Bin Talal University, Jordan. |
| June 2014 | ■ Certificate of Appreciation , Jordan Engineers Association – Young Engineers Committee, for creative efforts in the scientific field, presented at the Sixth Creativity Forum, Amman. |
| 2012 | ■ Selected Participant, Stiftung Technology Award , for a project presented at TEDx Ma'an. |

Honours, Awards and Professional Development (continued)

- Nov. 2012  **Recipient, Al-Hussein Bin Talal University Honour Shield.**
- 2008-2013  **Multiple Certificates of Appreciation**, repeatedly named to the University Honour Board for sustained academic excellence.

Certification

- April 2026  **Workshop on the General Electricity Law 2025**, Jordan Engineers Association.
- Oct. 2025  **Training of Trainers Program (ToT) for The Energy Transition Unit**, Al-Hussein Bin Talal University, in collaboration with The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).
- Sep. 2025  **Training of Trainers (ToT) in Technical Education Development for Electric and Hybrid Vehicles**, Al-Balqa Applied University, in collaboration with Japan International Cooperation Agency (JICA).
- 2018  **FEIT Tutor Skills Course.**
- Oct. 2010  **International Computer Driving Licence (ICDL)**

Memberships

-  Member, Institute of Electrical and Electronics Engineers (IEEE) — Young Professionals, Industry Applications Society, Power Electronics Society.
-  Member, Jordan Engineers Association (JEA).
-  Member, Association of Energy Engineers (AEE).

Peer Review

Journals

-  IEEE Transactions on Industrial Electronics(15 reviews).
-  Soft Computing (1 review).

Conferences

-  2023 International Future Energy Electronics Conference (IFEEC) (8 reviews)
-  2026 IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT) (1 review).
-  International Conference on Intelligent Systems and Artificial Intelligence Applications (ISAA 2026) (4 review).

Service

- 2023-2025  **Member, Faculty of Engineering Council**, Al-Hussein Bin Talal University.
- 2024-2025  **Member, University Council**, Al-Hussein Bin Talal University.
-  **Member**, Committee for Instructions and Work Mechanisms of the Engineering Workshops Department, Al-Hussein Bin Talal University.
-  **Rapporteur**, Committee for Procurement, Installation, and Operation of EV Charging Stations and Equipment, Al-Hussein Bin Talal University.
-  **Member**, Committee for Converting University Heating Boilers to a Hybrid System, Al-Hussein Bin Talal University.
-  **Member**, Committee for the University's Renewable Energy Project, Al-Hussein Bin Talal University.

Service (continued)

- **Member**, Committee for Emergency Maintenance of the University's Old Artesian Well, Al-Hussein Bin Talal University.
- **Member**, Committee for Investigating Violations Committed by Faculty of Engineering Students, Al-Hussein Bin Talal University.
- **Additional Committee Service**, numerous department- and faculty-level committees, including study plans, academic advising, curriculum/specialisation development, and tenders, Al-Hussein Bin Talal University.

References

Available on Request