Dhafer Almakhles

ASSOCIATE PROFESSOR | **IEEE SENIOR MEMBER**

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Current Positions

Head of the Department Since Aug 2019

Electrical Engineering, Prince Sultan University

Director Since May 2017

Research, Development and Innovation Unit, Prince Sultan University

Founder and Leader Since Jan 2019

Renewable Energy Research Lab, Prince Sultan University

Associate Professor Since Aug 2016

College of Engineering, Prince Sultan University

Education

University of Auckland (Ranked 1st and Leading University in NZ) Jan 2011 – Sep 2015

PhD in Electrical and Electronics Engineering *Auckland, New Zealand*

University of Auckland Jun. 2009 – July 2010

Master's in Electrical and Electronics Engineering *Auckland, New Zealand*

King Fahd University of Petroleum and Minerals Feb 2001 – Feb 2006

Bachelor's in Electrical Engineering *Dhahran, Saudi Arabia*

Experience

Prince Sultan University Riyadh, Saudi Arabia

Head of the Electrical Engineering Department *Aug 2019 – Present*

- Design, implement, and attune departmental mission and objectives in line with institutional vision, mission, and values of PSU.
- Conduct periodic assessment and evaluation of department performance to improve curriculum, quality of instruction, enhance student achievements, etc.
- Preparing the annual departmental reports cued to quality standards and program accreditation.
- Recruit and recommend qualified teaching staff and provide a departmental orientation of new faculty members.
- Provide a supportive academic environment for all faculty members by encouraging faculty to participate in professional development, produce research, and participate in approved extracurricular activities inside and outside the campus.
- Offer academic advising and consultation to students.
- Provide professional leadership in the department; represent the department, college, and institution in approved local and international conferences, workshops, seminars, meetings, and events and actively participate in the same.
- Monitor and ensure compliance with standards for quality assurance, continuous improvement, and accreditation related to the program.

Director of the Research, Development, and Innovation Unit *May 2017 – Present*

- Supervise the preparation of forms and advertisements for the initial submission of proposals and presenting temporal schedules for it.
- Work as a contact point with the Secretariat of the Supervisory Committee of the RDIA Sending suitable detailed research projects to the Secretariat of the Supervisory Committee of RDIA
- Follow up on the accepted projects to ensure that the goals are achieved and projects are received on time.
- Set the plans, strategies, programs, and scientific projects, and arranged the Priorities of approved projects programs for Prince Sultan University in the light of the directions and Priorities of the National Plan for Science and Technology
- Recognize the opportunities in the international conventions, then invest and develop them into projects and programs with specific characteristics and goals.

- Developed policies that enable researchers to take advantage of scientific and technical assistance, research awards, training, consulting, and others, which are offered by unions and organization and international scientific organizations.
- Arranged with other developing programs in the University to ensure intellectual property rights to the researchers, and the registration of patents, announcement of the prizes, and marketing of research results to the industrial Institutions
- Supervision for organizing workshops, seminars, and conferences.
- Prepare annual reports on the achievements and the progress of work.

The University of Auckland Auckland, New Zealand
Teaching Assistant in Electrical and Computer Engineering Department *June 2012 – Nov 2015*

- Aided in the classroom when conducting curriculum-based group lessons.
- Planning and organizing laboratories for groups of 40+ undergraduate students.
- Closely adhered to laboratory plans and kept students motivated, engaged, and focused.
- Worked one-on-one with students with challenging behavior during the experiments.
- Leading other teaching assistants in maintaining a positive, calm attitude and a soft voice, and encourage this attitude and voice in others working in the laboratory.
- Assist senior/master students in designing, modeling, and simulation various Control Systems such as the inductive power transfer (IPT) and capacities power transfer (CPT) with more focus on the controller and power converter part and in the realization/implementation of the controller and PWM using, MATLAB/Simulink and C/VHDL for Microcontroller/FPGA design.
- Guide master students in writing their Master's thesis and research papers.

Saudi Electricity Company Dhahran, Saudi Arabia
Control and Instrumentation Engineer at Quryyah Power Plant *Dec. 2006 – April 2008*

- Designing, installing, and developing new control systems, e.g., Experion PKS C200 DCS by Honeywell, Mark VI by GE, and PLC Allen Bradley.
- Testing, maintaining, and modifying the existing smart sensors.
- Analyzing data and presenting findings in written reports.
- Liaising with suppliers and contractors.

Educational Reform, Consultation, Review, and Accreditation Experience

Chair | *Education and Training Evaluation Commission (NCAAA - ETEC)* Saudi Arabia

- Leading experienced members of academic team in writing the specialized national framework of qualifications, including knowledge learning units and specialized learning outcomes for Electrical Engineering programs.

Member | *Education and Training Evaluation Commission (NCAAA - ETEC)* Saudi Arabia

- Member of an experienced academic team in writing the national framework of qualifications and learning outcomes for Engineering programs.

Chair of the Accreditation Review Panel | *Education and Training Evaluation Commission (NCAAA - ETEC)* Saudi Arabia

- BSc. Electrical Engineering Program at Albaha University, Al Baha, Feb 2022
- MSc Electrical Engineering Program at King Khaled University, Abha, March 2023

Member of the Accreditation Review Panel | *Education and Training Evaluation Commission (NCAAA - ETEC)* Saudi Arabia

- BSc. Electrical Engineering Program at Jouf University, December 2020
- BSc. Electrical Engineering Program at Majma'ah University, November 2020
- MSc. Electrical Engineering Program at King Saud University, March 2021
- BSc. Electrical Engineering Program at University of Business and Technology, Feb 2021
- BSc. Electrical Engineering Program at Qassim University, May 2022
- BSc. Electrical Engineering Program at Qassim University, Oct 2022
- BSc. Electrical Engineering Program at Northern Border University, Feb 2023
- MSc. Information Technology Program at King Abdulaziz University, Dec 2023

Consultant for Accreditation Eligibility | *Education and Training Evaluation Commission (NCAAA - ETEC)* Saudi Arabia

- BSc. Electrical Engineering Program at University of Business and Technology, Jan 2021
- PhD. Program In Urban and Regional Planning Program at Imam Abdulrahman Bin Faisal University, Jan 2021
- BSc. Urban and Regional Planning Program at Imam Abdulrahman Bin Faisal University, Feb 2021
- BSc. Networking Program at Jazan University, June 2021
- BSc. Architecture Program at Albaha University, Dec 2021
- BSc. Electrical Engineering Program at Qassim University, April 2022
- BSc. Graphics Design at Dar Al Uloom University, Nov 2021
- MSc. Architecture Program at King Saud University, Nov 2021
- MSc. Electrical Engineering Program at Prince Sattam University, Mar 2023
- MSc. Chemical Engineering Program at King Khalid University, Oct 2023
- MSc. Safety and Fire Prevention Engineering Program at King Khalid University, Oct 2023
- BSc. Civil Engineering Program at Shaqra University, July 2023

Funded Projects

Principle Investigator | *The establishment of Renewable Energy Research Lab (REL)* Cost: 673,000 SAR

Funded by *Prince Sultan University* Status: completed, Aug 2019 – May 2022

The main goal *is establishing a research lab committed to advancing renewable energy technologies to satisfy the national energy demands and environmental goals.*

- ***Result 1:*** Conducted high-quality scientific research in the field of renewable and sustainable energy to meet the requirements of society; more than 150 papers were published in top-tier journals.
- ***Result 2:*** Utilized the allocated resources to direct and unify the research efforts of Prince Sultan University faculty members by applying their diverse expertise and bringing it to the field of Renewable Energy; SEVEN products range between Third and Sixth Technology Readiness Levels (TRL).
- ***Result 3:*** Increased the impact of Prince Sultan University research and help the members in their professional development.

Principle Investigator | *A new Multilevel inverter suits rooftop PV-fed grid-tied system* Cost: 30,000 SAR

Funded by *Prince Sultan University* Status: completed, May 2022 – May 2023

The main goal *is to design a single-stage multilevel inverter suits rooftop PV-fed grid-tied system.*

- ***Result 1:*** A multilevel inverter embedded in rooftop PV-fed grid-tied system which meets Fourth TRL.
- ***Result 2:*** The results were published in scientific report journal *Nature-Springier*.

Member | *An Examination of Learning Outcomes Performance using Advanced Analytical Model* Cost: 30,000 SAR

Funded by *Prince Sultan University* Status: completed, Aug 2021 – Aug 2022

The main goal *was proposing an effective examination methodology for assessing learning outcomes Performance using an advanced analytical model considring case study from engineering and business colleges*

- ***Result 1:*** The results were published in ISI paper

Principle Investigator | *Robust nonlinear control trajectory for Internet of Drone (IoD)* Cost: 299,400 SAR

Funded by *Prince Sultan Defence Studies and Research* Status: on-going, Jan 2024 – Jan 2025

The main goal *is to propose various algorithms such as Model Predictive Control (MPC) and Sliding Mode to robustly control algorithms over the Internet.*

Co-Principle Investigator | *Unmanned Ground Vehicles for Disaster Management and Recovery* Cost: 300,000 SAR

Funded by *Prince Sultan Defence Studies and Research* Status: on-going, Jan 2024 – Jan 2025

The main goal *is to develop Python Sensor Development/AI/ML/App, image processing, communication systems, Broker messaging, prototype model including Robotic Tanks, Sonic and laser sensors implementation on Microprocessor and Micro Controllers for unmanned ground vehicles for disaster management and recovery.*

Co-Principle Investigator | *Wireless Power Transfer for Charging Drone* Cost: 30,000 SAR

Funded by *Prince Sultan University* Status: on-going, Jan 2024 – Jan 2025

The main goal *is to design a Wireless Power Transfer System to charge the drone bases using a PV solar source.*

PROFESSIONAL ASSOCIATIONS

Membership Organizations

IEEE and Saudi Engineering Association

- Senior member of IEEE, Since 2020
- Member of IEEE, 2015-2020
- Member of Saudi Engineering Association, Since 2016

Associations in Journals and Conferences

Editorial Board and Organized Special Issues/Session

- Publication Chair IEEE sponsored International Conference On Human-Centered Cognitive Systems (HCCS 2022) 17th December 2023, hosted by Nanjing Section Zhejiang University of Science and Technology.
- Guest editorial: Highly efficient and reliable power converters for microgrid applications, Front. Energy Res., 12 January 2023, Sec. Smart Grids
- Associate editorial of Adaptive, Robust, and Fault Tolerant Control, since Jan. 2022, Sec. Frontiers in Control Engineering
- SS07: DC-DC Power Conversion: Innovations in Typologies, Control Strategies, and Diverse Applications, 50th Annual Conference of the IEEE Industrial Electronics Society (IES), 3-6 Nov. 2024, Chicago. https://www.iecon-2024.org/
- Special Session: Advances in DC-DC Converters and Control Techniques for Sustainable Energy, 6th Global Power, Energy, and Communication Conference, Budapest/HUNGARY, June 4-7, 2024.https://gpecom.org/2024/
- Special Session: S8 - Power Electronics for Wind-Pv-Fuel Energy Conversion And Control Schemes, International Conference On Compatibility, Power Electronics And Power Engineering (Cpe-Powereng 2023), JUNE 14 – 16, 2023, Nordic Hotel Forum, Tallinn, Estonia. https://taltech.ee/en/cpe-powereng2023/special-sessions
- Special Session: SS009: DC-DC Power Converters- New Circuits, Control, and Applications, IECON 2023 is the 49th Annual Conference of the IEEE Industrial Electronics Society (IES), 16-19 Oct. 2023, Singapore.https://www.iecon2023.org/
- Guest Editors (2022) for MDPI Processes Journal's Special Issue on "Robust Control Techniques and State Estimation in Dynamic Systems."
- Member of the Editorial Board of the Journal of Advances in Applied Computational Mathematics Since 2018
- Topic Associate Editor for Frontiers in Mechanical Engineering, Oct. 2016
- Topic Associate Editor for Machine Learning for Connected and Autonomous Mobility, Frontiers in Transportation Systems, June 2020
- Member of the International Advisory Board at 1st International Conference on Smart Energy and Advancement in Power Technologies (ICSEAPT 2021), 6th-8th September 2021, Organized by Department of Electrical Engineering National Institute of Technology, Jamshedpur, India.
- Member of the International Advisory Board at International Conference on Power Electronics and Renewable Energy Applications (IEEE PEREA,2020, Kerala-India).
- Special Session: Hybrid Power Converters and Control Strategies for Integration of Renewable, Annual Conference of the IEEE Industrial Electronics Society (IECON 2021), Toronto, Canada
- Member of the International Advisory Committee, "7th International Conference on, "Electrical Energy Systems - ICEES 2021," Sivasubramaniya Nadar College of Engineering, Chennai, India, Sri, 11-13 Feb. 2021.
- Book Editor of DC Microgrids Advances, Challenges, and Applications, Wiley-Scrivener, USA., 2023.
- Member of Unmanned Systems Track Committee at the First International Conference of Smart Systems and Emerging Technologies (SMARTTECH)- 3-5 Nov. 2020, Organized by Prince Sultan University, Riyadh, Saudi Arabia.

Prince Sultan University

Institutional Committee Membership

- Member of Prince Sultan University - United Nation Development Program Committee, Since Jan. 2024
- Member of committee the establishment of Space and Aviation Science Technology College, Since Oct. 2023
- Member of the higher committee of the impact ranking UI green-metric world university ranking, Since Sep. 2023
- Chair of the committee of the impact ranking UI green-metric world university ranking - SDG 7: Affordable and Clean Energy, Since Sep. 2023
- Chair of the committee of the impact ranking UI green-metric world university ranking - SDG 13: Climate Action, Since Sep. 2023
- Member of the grievance board committee, Since Jan. 2023

- Member of the digital universities MENA 2023 steering committees: contents and scientific committee, Sep. 2022
- Member of the research integrity and ethics committee, since Sep. 2020
- Member of Examination Control Committee for the academic year 2016/2017
- Member of the University Ranking 2030 Steering Committee, Since Sep. 2020
- Member of the Academic Advising Committee, since Sep. 2018
- Member of the Institutional Personnel Affairs Committee, Since Oct. 2017
- Member of the Research and Innovation Committee, Since Sep. 2021

Prince Sultan University College of Engineering

College and Program Committee Membership

- Chair of the program research committee, 2016 - 2020
- Member of quality assurance committee since 2016
- Chair of students activities committee since 2020
- Chair of the recruitment committee since 2019
- Chair of Teaching Award Committee – College of Engineering, 2018/2019

Prince Sultan University College of Engineering

Councils and Advisory Boards

- Member of the Engineering College Council, since 2018
- Member of the Engineering College Advisory Board, since 2018
- Chair of Communication and Networks Department Council, since Sep. 2019
- Chair of Communication and Networks Department Advisory Board, since Sep. 2021
- Chair of Teaching Award Committee – College of Engineering, in 2018/2019

Professional Certificates (Selected)

- Higher Education Professional Certificates - Prince Sultan University
- Quality Assurance Practitioner - Education and Training Evaluation Commission
- Google Project Management - Ongoing
- IBM Product Management Ongoing
- IBM Data Analytics - Ongoing

Technical Skills

Languages: MATLAB, Simulink, HDL coder, C-coder, PLCs programming using Function blocks, LaTeX, Multisim Simulation-in-Loop, Altera Design with Quartus and Modelsim, Python
Technologies: Honeywell - Experion PKS C200, FPGA Development Experience, Instruments installation, Dspace Hardware-in-Loop, Typhoon Hardware-in-Loop

Achievement, Awards and Recognistions

* Led the Electrical Engineering program to be one of the top-ranked programs in the region according to shanghai ranking (2022 and 2023). **Check:** https://www.shanghairanking.com/
* Led the Electrical Engineering program in achieving the full National Acceptations by ETEC-NCAAA.
* International Steering and Expert Member – Ranking, SDGs, and Policy
* Top 2% of the Scientist in the world, 2021-22, 2022-23.
* Distinguished Researcher Award by Prince Sultan University, 2019-20, 2020-21, 2021-22, 2022 - 23.
* Best presentation award for the paper entitled “Primary-Switched-Inductance Single-Ended Converter for E-Vehicles Applications” at the IEEE 3rd Global Power, Energy and Communication Conference (IEEE GPECOM2021).
* Best Paper Award at IEEE GPECOM2020, 2nd Global Power, Energy and Communication Conference (IEEE GPECOM2020) for the paper entitled “Novel Hybrid High Gain Converter: Combination of Cuk and Buck-Boost Structures with Switched Inductor doe DC Microgrid.”
* Invited by King Abdullah University of Science and Technology (KAUST) to Participate in Winter Enrichment Programs for 2015 and 2016.

* Served as a review panellist to closely read, analyze and evaluate several research proposals submitted to King Abdulaziz City for Science and Technology (KACST).
* Invited by Ministry of Education- Saudi Arabia to participate in International Exhibition and Conference on Higher Education– 2011
* Achieved the Academic Outstanding Performance Awards by Saudi Cultural Mission for 2009 and 2010.
* Scholarship for Doctor of Philosophy degree (2011-2016) - the University of Auckland, Auckland, New Zealand, by The Higher Education Ministry of Saudi Arabia.
* Scholarship for Master's degree (2008-2010) - the University of Auckland, Auckland, New Zealand, by The Higher Education Ministry of Saudi Arabia.
* Top 10% Reviewers, on Publons, in the Engineering field in the world (2018).
* 2nd top reviewer, on Publons, for Prince Sultan University, Saudi Arabia (2018).
* Served as a reviewer for many top journals and reputable conferences including IEEE Transaction on Control of Network Systems, IEEE Sensors, Journal IEEE Transactions on Systems, Man and Cybernetics, IET Power Electronics, IEEE Transactions on Control Systems Technology International Journal of Control IEEE Transactions on Industrial Electronics, IEEE American Control Conference IEEE Transactions on Circuits and Systems: Brief Express II Control Engineering Practice, Journal of Systems Science and Complexity, IEEE Transactions on Fuzzy Systems, IEEE Conference on Decision and Control, IEEE Control Systems Letters International, IEEE European Control Conference, Journal of Systems Science

Research Publications

I have more than 200 published works in top journal papers, conferences, books, and book chapters;

Check: G GoogleScholar.net/DhaferAlmakhles

Thesis:

Almakhles, Dhafer J. *Two-Level Dynamic Quantizers for Feedback Control Systems*. PhD thesis, ResearchSpace@ Auckland, 2016
www.Auckland.ac.nz/PhDDhafer

Patents:

1. Sridhar Vavilpalli, Umashankar Subramaniam, and **Almakhles, Dhafer** Jaber. Buck-chopper and bi-directional chopper for multilevel cascaded h-bridge inverters, August 24 2021. US Patent 11,101,742
2. Mahajan Sagar Bhaskar, **Almakhles, Dhafer** J, Umashankar Subramaniam, Sanjeevikumar Padmanaban, and Sakthivel Rathinasamy. Microgrid power supply system dc-dc converter and controlling method, January 25 2022. US Patent 11,233,452

Books:

1. Jiwei Wen, Alireza Nasiri, Sing Kiong Nguang, and **Almakhles, Dhafer** J. Non-monotonic approach to robust h8 control of multi-model systems, 2019
2. Mahajan Sagar Bhaskar, **Almakhles, Dhafer** J, Umashankar Subramaniam, Sanjeevikumar Padmanaban, and Sakthivel Rathinasamy. Microgrid power supply system dc-dc converter and controlling method, January 25 2022. US Patent 11,233,452

Selected Journal papers

1. **Almakhles, Dhafer** and Mahmoud Abdelrahim. Event-triggered dynamic quantization for nonlinear systems with one-bit data transmission. *IEEE Transactions on Automatic Control*, 2024
2. **Almakhles, Dhafer** and Mahmoud Abdelrahim. A novel one-bit dynamic quantizer for event-triggered control systems. *Information Sciences*, page 120113, 2024
3. **Almakhles, Dhafer** and Mahmoud Abdelrahim. Asynchronous dynamic quantization for nonlinear systems with one-bit data transmission. *Systems & Control Letters*, 181:105630, 2024
4. **Almakhles, Dhafer** J, Akshya K Swain, and Nitish D Patel. Stability and performance analysis of bit-stream-based feedback control systems. *IEEE Transactions on Industrial Electronics*, 62(7):4319–4327, 2014

5. **Almakhles, Dhafer** . Two-level quantised control systems: sliding-mode approach. *International Journal of Control*, 93(3):680–688, 2020
6. **Almakhles, Dhafer** . Sliding mode control as binary-based quantizers. *Asian Journal of Control*, 22(3):1090–1098, 2020
7. **Almakhles, Dhafer** J. Robust backstepping sliding mode control for a quadrotor trajectory tracking application. *IEEE Access*, 8:5515–5525, 2019
8. **Almakhles, Dhafer** J, Jagabar Sathik Mohamed Ali, Sanjeevikumar Padmanaban, Mahajan Sagar Bhaskar, Umashankar Subramaniam, and Rathinasamy Sakthivel. An original hybrid multilevel dc-ac converter using single-double source unit for medium voltage applications: Hardware implementation and investigation. *IEEE Access*, 8:71291–71301, 2020
9. **Almakhles, Dhafer** . The complex adaptive delta-modulator in sliding mode theory. *Entropy*, 22(8):814, 2020
10. **Almakhles, Dhafer** J, Jagabar Sathik Mohamed Ali, Sivakumar Selvam, Mahajan Sagar Bhaskar, and N Sandeep. Switched capacitor-based 13l inverter topology for high-frequency ac power distribution system. *IEEE Journal of Emerging and Selected Topics in Power Electronics*, 9(5):5883–5894, 2020
11. **Almakhles, Dhafer** , Chathura Wanigasekara, and Akshya Swain. Delta modulator based quantised state-feedback control of networked linear systems. *IEEE Access*, 10:48865–48874, 2022
12. **Almakhles, Dhafer** J and M Jagabar Sathik. Single-phase transformerless nine-level inverter with voltage boosting ability for pv fed ac microgrid applications. *Scientific reports*, 12(1):13442, 2022
13. **Almakhles, Dhafer** , Divya Navamani Jayachandran, Lavanya Anbazhagan, Marwa Hannachi, and Jagabar Sathik Mohamed Ali. Dynamic analysis of extendable hybrid voltage lift dc–dc converter for dc microgrid. *Processes*, 10(12):2652, 2022
14. **Almakhles, Dhafer** , Akshya K Swain, Alireza Nasiri, and Nitish Patel. An adaptive two-level quantizer for networked control systems. *IEEE Transactions on Control Systems Technology*, 25(3):1084–1091, 2016
15. S Harshavarthini, Subramaniam Selvi, R Sakthivel, and **Almakhles, Dhafer** J. Non-fragile fault alarm-based hybrid control for the attitude quadrotor model with actuator saturation. *IEEE Transactions on Circuits and Systems II: Express Briefs*, 67(11):2647–2651, 2020
16. S Harshavarthini, S Selvi, R Sakthivel, and **Almakhles, Dhafer** J. Finite-time consensus for power regulation of parallel pv grid-connected inverters. *IEEE Transactions on Circuits and Systems II-Express Briefs*, 67(11):2647–2651, 2020
17. Chathura Wanigasekara, Akshya Swain, **Almakhles, Dhafer** , and Lv Zhou. Design of delta–sigma-based pid controller for networked wind energy conversion systems. *IEEE Transactions on Industry Applications*, 58(1):879–889, 2021
18. Mustafa Alrayah Hassan, Chun-Lien Su, Josep Pou, Giorgio Sulligoi, **Almakhles, Dhafer** , Daniele Bosich, and Josep M Guerrero. Dc shipboard microgrids with constant power loads: A review of advanced nonlinear control strategies and stabilization techniques. *IEEE Transactions on Smart Grid*, 13(5):3422–3438, 2022
19. Neeraj Priyadarshi, MS Bhaskar, and **Almakhles, D**. A novel hybrid woade algorithm based mppt employed wecs for water pumping applications: Practical realization. *IEEE Transactions on Industrial Electronics*, 2023
20. Prabhakaran Koothu Kesavan, Umashankar Subramaniam, and **Almakhles, Dhafer** J. Reduced switch inverter fed sensorless pmsm drive with multistage mras speed estimator based on stator flux and electromagnetic torque. *IEEE Transactions on Transportation Electrification*, 2023
21. Mahmoud Abdelrahim and **Almakhles, Dhafer** . Observer-based control of inductive wireless power transfer system using genetic algorithm. *Processes*, 11(6):1859, 2023
22. Mahmoud Abdelrahim and **Almakhles, Dhafer** . Synthesis of state/output feedback event-triggered controllers for load frequency regulation in hybrid wind–diesel power systems. *Applied Sciences*, 13(17):9652, 2023

References

Available on Request