E'qab R. Almajali, Ph.D. (عقاب راتب المجالي)

Assistant Professor

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Education

- **Ph.D.** (Electrical Engineering), **University of Ottawa,** Ottawa, ON Canada **(August 2014). Thesis Title:** Reflectarray Antennas: Operating Mechanisms & Remedies for Problem Aspects. **Adviser:** Professor Derek A. McNamara. **GPA: 10/10.**
- **MASc** (Electrical & Computer Engineering), **University of Ottawa,** Ottawa, ON Canada **(January 2010). Thesis Title:** Contributions to the Design of Sub-Reflectarrays. **Adviser:** Professor Derek A. McNamara. **GPA: 10/10.**
- **Masters of Engineering** (Communications), **Mutah University,** Alkarak, Jordan **(June 2006). GPA: 92.56/100.**
- **B.Sc** (Electrical Engineering/Communications), **Mutah University,** Alkarak, Jordan **(June 2003). GPA: 89.7/100.**

Awards & Honors

- Prestigious NSERC Postdoctoral Fellowship Award (NSERC-PDF). This is a Canadian national competition and is a highly competitive one with a success rate around 10% (**February 2014**). It is awarded mainly on the research excellence.
- Prestigious NSERC Doctoral Award (NSERC-PGSD2). National competitive scholarship (the success rate is 20%) (**May 2012**).
- Ontario Graduate Student Scholarship (OGS). A provincial scholarship granted based upon academic and research excellence (**April 2012**) & (**April 2014**).
- Academic and Research Excellence award, University of Ottawa, School of Electrical Engineering & Computer Science (**Spring 2012**).
- Admission Scholarship, University of Ottawa (**Spring 2010**). It is awarded based on the academic excellence.
- Mutah University Academic Excellence Award (**Winter 2006**).

- Two times in the annual university honor list **2002**, **2003** and four times in the dean honor list (ranked 1st on the Electrical Engineering class of **2003** at Mutah University).
- Some of my research work has been recognised novel in the review "An Overview of Recent Antennas and Propagation Research Activities in Canada" that appeared in the IEEE Antennas & Propagation Magazine, December **2012**.

Career Details

(a) Academic Positions Held

- Assistant Professor, Department of Electrical Engineering, University of Sharjah, UAE, (09/2018- present)
- Full-Time Research Associate, School of Electrical Engineering & Computer Sciences, University of Ottawa, Canada, (01/2017-08/2017)
- Full-Time NSERC[1] Postdoctoral Fellow, Department of Electronics, Carleton University, Canada, (01/2015-01/2017)
- Full-Time Visiting Researcher, School of Electrical Engineering & Computer Sciences, University of Ottawa, Canada, (08/2014-01/2015)
- Teaching & Research Assistant, Electrical Engineering Department, University of Ottawa, Canada, (01/2009-04/2014)

Research

(a) Research Interests

- ✓ Development of printed electronics fabrication of laminated conductors for loss reduction in RF circuits and printed antennas.
- ✓ Development of 5G low-profile printed millimetre-wave antennas with enhanced performance for wireless communications.
- ✓ Development of microwave lenses, reflectarrays and frequency selective surfaces.
- ✓ Devise means for increasingly effective use of computational electromagnetics.
- ✓ Development of metasurface holograms.

[1] Natural Sciences and Engineering Research Council of Canada.

(b) Research Grants (Type of Grant, Role, Title of Project, Awarding Body, Grant Amount)

- ✓ Governmental Fund, Principle Investigator, Customized Spherical Near-Field Test Time Reduction for Wireless Basestation Antennas, Natural Sciences and Engineering Research Council of Canada (NSERC), 25000$

- ✓ Research Award, Applicant & Principle Investigator, Natural Sciences and Engineering Research Council of Canada (NSERC), Development of Low-Profile Printed Planar Holographic Antennas with High-Efficiency for High Gain Wireless Applications, 90000$

(c) Participation in Regional & International Conferences during the Past 6 Years

- ✓ The 17th International Symposium on Antenna Technology & Applied Electromagnetics (ANTEM'2016), Montreal/Canada, July 10-13, 2016.

- ✓ The IEEE International Symposium on Antennas and Propagation and URSI CNC/USNC Joint Meeting, Vancouver/Canada, July 19-25, 2015.

- ✓ The IEEE International Symposium on Antennas and Propagation, Chicago/USA, July 8-14, 2012.

- ✓ The 6th European Conference on Antennas and Propagation (EuCAP), Prague/Czech Republic, March 26-30, 2012.

- ✓ The IEEE International Symposium on Antennas and Propagation, Spokane/USA, July 3-8, 2011.

List of Publications

Publications in Refereed Journals:

a) Published Articles:

[J11] **E.Almajali**, D.J.Janse van Rensburg, D.A.McNamara, "Customized Spherical Near-Field Test Time Reduction for Wireless Basestation Antennas". IEEE Antennas Wireless Propagat. Letters, Vol. 18, pp.172-176, January **2019.**

[J10] **E.Almajali**, D. A. McNamara, "Angle of Incidence Effects in Reflectarray Antenna Design", IEEE Antennas & Propagation Magazine. Vol.58, No.5, pp.52-64, October **2017**.

[J9] G. Gosal, **E.Almajali,** M. Yagoub & D. McNamara, " Transmitarray Antenna Design Using Forward and Inverse Neural Network Modelling", IEEE Antennas Wireless Propagat. Letters, Vol.15, pp.1483 – 1486, February **2016**.

[J8] **E.Almajali**, D.A.McNamara, J.Shaker & R.Chaharmir, "Feed Image Lobes in Offset-Fed Reflectarrays: Diagnosis and Solution", *IEEE Trans. Antennas Propagation,* Vol.60, No.5, pp.216-226, January **2015**.

[J7] **E.Almajali,** D.A.McNamara, J.Shaker & R.Chaharmir, "Improved Dual-Feed Single-Beam Power Combining Reflectarray Antenna", *Electronic Letters*, Vol.49, No.25, pp.1595-1597, December **2014**.

[J6] **E.Almajali**, D.A.McNamara, J.Shaker & R.Chaharmir, "Grating Lobe Control in Dual-Feed Single-Beam Reflectarrays and Power Combiners", *IEEE Antennas Wireless Propagat. Letters*, Vol.12, pp.1268-1271, September **2013**.

[J5] **E.Almajali**, D.A.McNamara, J.Shaker & R.Chaharmir, "Beam Squint Suppression in Offset-Fed Reflectarrays", *IEEE Antennas Wireless Propagat. Letters*, Vol.12, pp.587-590, April **2013**.

[J4] **E.Almajali**, D.A.McNamara, J.Shaker & R.Chaharmir, "On Beam Squint in Offset-Fed Reflectarrays", *IEEE Antennas Wireless Propagat. Letters*, Vol.11, pp.937-940, August **2012**.

[J3] **E.Almajali**, D.A.McNamara, J.Shaker & R.Chaharmir, "Derivation and Validation of the Basic Design Equations for Sub-Reflectarrays", *IEEE Trans. Antennas Propagation,* Vol.60, No.5, pp.2336-2346, March **2012**.

b) Submitted & in Progress Articles:

[J2] Rifaqat Hussain, E**.Almajali** et al. "Split Ring Resonator (SRR) Loaded Multiband Frequency Agile Slot-based MIMO Antenna System" Submitted to the IEEE Transaction on Antennas and Propagat., manuscript ID is (AP1811-2048).

[J1] **E.Almajali,** J.Wight , et…allll "Improved Planar Holographic Antenna with Two-Layer Hologram & Integrated Feed", In preparation for submission to the IET Microwave, Antennas and Propagation Journal.

Book Chapters:

[B1] J.Shaker and **E.Almajali**, 'Reflectarray Antennas'. Chapter 8 of the Handbook of Reflector Antennas Feed Systems, Vol.I. Artech. (**2013**).

Publications in Conference Proceedings/Digests:

(Papers marked with an asterisk * were presented or will be presented by the applicant)

[C11]* E.Almajali & D.A. McNamara, "The Usefulness of Two-Dimensional (2D)Computational Electromagnetic Analysis", Proc. *Int. Conference on Electrical and Computing Technologies and Applications (ICECTA),* pp. 1 – 4, November **2017**.

[C10]* **E.Almajali**, A.Petosa, D.A. McNamara & J.Wight , "A Low Profile Planar Holographic Antenna with Two-Layer Hologram & Integrated Feed ", Proc. *17th Int. Symposium on Antenna Technology & Applied Electromagnetics (ANTEM'2010)*, Montreal, pp. 1 – 2, July **2016**.

[C9]* **E.Almajali**, A.Petosa, D.A. McNamara & J.Wight , "Observations on the Realisation & Performance of Low Profile Planar Holographic Antennas ", Proc. *17th Int. Symposium on Antenna Technology & Applied Electromagnetics (ANTEM'2010)*, Montreal, pp. 1 – 2, July **2016**.

[C8]* **E.Almajali** & D.A.McNamara, "Comments on the Size-Dependence of Focal Point Shift in Offset-Fed Reflectarrays", *IEEE International Antennas and Propagation Symposium Digest*, pp.2145 – 2146, Vancouver, Canada, July **2015**.

[C7]* **E.Almajali**, D.A.McNamara & J.Ethier , "Improving Sub-Reflectarray Antennas Performance Using Sub-Wavelength Inter-Element Spacing", *IEEE International Antennas and Propagation Symposium Digest*, pp.2147 – 2148, Vancouver, Canada, July **2015**.

[C6] **E.Almajali**, D.A.McNamara, A.Petosa & N.Gagnon, "Remarks on the Feasibility of Full-Wave Analyses of Printed Lens/Transmitarray Antennas", *IEEE International Antennas and Propagation Symposium Digest*, USA. pp.1268 – 1269, July **2014**.

[C5]* **E.Almajali**, D.A.McNamara, J.Shaker & R.Chaharmir, "An Investigation of Reflectarray Operation Using its Component Current Contributions", Proc. *6th European Conference on Antennas and Propagation*, Prague, Czech Republic, pp.1603 – 1607, March **2012**.

[C4]* **E.Almajali**, D.A.McNamara, J.Shaker & R.Chaharmir, "Observations on the Performance of Reflectarrays with Reduced Inter-Element Spacings", *IEEE AP-S Int. Symp*. *Digest*, Spokane, USA, pp.369 – 372, July **2011**.

[C3]* **E.Almajali** & D.A.McNamara, "An Accessible Two-Dimensional Moment Method Analysis for Composite Antenna Models", Proc. *14th Int. Symposium on Antenna Technology & Applied Electromagnetics (ANTEM'2010)*, Ottawa, pp. 1 – 4, July **2010**.

[C2]* **E.Almajali**, D.A.McNamara & D.Lee, "Using Electromagnetic Simulation Code *FEKO* as a Numerical Laboratory in Antenna Engineering", Proc.*14th Int. Symposium on Antenna Technology & Applied Electromagnetics (ANTEM'2010)*, Ottawa, pp. 1 – 4, July **2010**.

[C1] **E.Almajali**, D.A.McNamara, J.Shaker & R.Chaharmir, "Experimental Validation of Design Expressions for Sub-Reflectarrays", *Proc. 2009 Asia-Pacific Microwave Conference* (*APMC*), Singapore, pp.1859–1862, December **2009**.

Abstracts in Conference Proceedings / Digests:
(These references were conference presentations that appeared in print as abstracts only)

[A3]* **E.Almajali**, D.A.McNamara, J.Shaker and R.Chaharmir,"An Investigation of Beam Squint in Offset-Fed Reflectarrays", *URSI Radio Science Meeting Digest*, Chicago, USA, July **2012**.

[A2]* **E.Almajali**, D.A.McNamara, J.Shaker and R.Chaharmir," Feed-Image Lobes in Offset-Fed Reflectarrays", *URSI Radio Science Meeting Digest*, Chicago, USA, July **2012**.

[A1]* **E.Almajali**, D.A.McNamara, J.Shaker and R.Chaharmir,"A Detailed Examination of Reflectarray Operation Using a Two-Dimensional Moment Method Analysis", *URSI Radio Science Meeting Digest*, Toronto, Canada, July **2010**.

Teaching

(a) Summary of Courses Taught (Course Code, Course Name, Number of Times Taught, Evaluation)

At the University of Sharjah:

- ✓ ELG402205, Circuit Analysis II.
- ✓ ELG402202, Circuit Analysis I
- ✓ ELG402335, Field Analysis

At the University of Ottawa :

- ✓ ELG4188, Wave Propagation and Antennas, 4 times, Excellent.
- ✓ ELG3106, Electromagnetic Engineering, 4 times, Excellent.
- ✓ ELG3155, Introduction to Control Systems, 3 times, Excellent.

(b) Research Students Supervised/Trained

Level	Number of Trainees
Postdoctoral Fellows	NA
PhD Students	2
Master Students	2
Undergraduate Students	50

(c) Training (Training Activity, Training Institution, Country, Period)

- ✓ Training for obtaining the International Computer Driving License (ICDL), Mutah's University IT Centre, Jordan, (01/04-04/04).
- ✓ Using analog and digital electronics modules: MOSFET implementations of a) Analog: amplifiers, modulators, converters, and filters, b) Digital: Logic and memory, Mutah University, Jordan, (07/03-08/03).
- ✓ Using Finite-Element Boundary-Integral (FEBI) version of HFSS commercial code to lighten the computational burden of electrically large antennas, Canada Communication Research Centre, Canada, (07/2012).
- ✓ Using electromagnetic simulation commercial codes for Designing & analyzing RF circuits and Printed Antennas, University of Ottawa, Canada, (01/10-04/10).

Professional Activities & Services

(a) Membership of Conference Committees

(Name of the Committee, Role, Name of Conference, Place, Date)

- ✓ ANTEM conference chairing committee, chaired the session "Microwave and Millimetre-wave Antennas", the 17th International Symposium on Antenna Technology and Applied Electromagnetics, Montreal/Canada, July 2016.
- ✓ APS/URSI chairing committee, chaired the session "Recent Advances in Reflectarrays and Transmitarrays", the IEEE International Antennas and Propagation Symposium, Spokane/USA, July 2011.

(b) Service as Reviewer

Journals (Name of Journal, ISSN No., Publisher (since: MM/YY))

- ✓ IEEE Transactions on Antennas & Propagation (IEEE AP-T), 0018-926X, IEEE Antennas & Propagation Society (AP-S), (since: 01/2011)
- ✓ IEEE Antennas Wireless Propagation Letters (AWPL), 1536-1225, IEEE Antennas & Propagation Society (AP-S), (since: 02/2016)
- ✓ Electronic Letters (IET), 0013-5194, Institution of Engineering and Technology, (since: 05/2015)
- ✓ The International Journal of Microwave and Wireless Technologies, 1759-0787 (Print), 1759-0795 (Online), Cambridge University Press, (since: 08/2015).
- ✓ IEEE Antenna and Propagation Magazine, 1045-9243, IEEE Antennas & Propagation Society (AP-S), (since: 08/2016)

Conferences (Name of Conference, Place (City & Country), Date)

- ✓ The 8th European Conference on Antennas and Propagation (EuCAP), Hague/ Netherlands, 6-11 April 2014.

(c) Invited Presentations at Scientific Meetings/Workshops

(Title of Presentation, Name of Conference/Workshop, Place (City & Country), Date)

- ✓ An Investigation of Beam Squint in Offset-Fed Reflectarrays, URSI Radio Science Meeting, Chicago/USA, July 8, **2012**.
- ✓ Feed-Image Lobes in Offset-Fed Reflectarrays, URSI Radio Science Meeting, Chicago/USA, July 8, **2012**.
- ✓ Recent advances in Reflectarray antennas design and performance evaluation, IEEE Canadian National Capital Region Workshop on Recent Progress in Antenna Analysis and Design for Wireless Communications, Ottawa/Canada, Dec 6, **2012**.
- ✓ A Detailed Examination of Reflectarray Operation Using a Two-Dimensional Moment Method Analysis, URSI Radio Science Meeting, Toronto/Canada, July 5, **2010**.
- ✓ Surface waves in Frequency Selective Surface, Monthly Scientific Meeting at Communication Research Centre (CRC), Ottawa/Canada, April 20, **2010**.

(d) Service to Profession/Industry

(Name of Organization, Country, Role, Period (MM/YY-MM/YY))

- ✓ IEEE Antenna and propagation Society (AP-S), Canada, I manned the AP-S booth at the IEEE EMC-2016 exhibition, July 26-28, 2016.

- ✓ Institute of Electrical and Electronics Engineers (IEEE), Canada, Student Volunteer at the IEEE Antennas & Propagation Symposium that was held in Toronto, July 11-17 2010.

- ✓ Canada Communications Research Centre, Canada, Helped in investigating some problem aspects of multi-feed reflectarrays, (01/12-04/12).

- ✓ Institute of Electrical and Electronics Engineers (IEEE), Canada, Student Volunteer at the 14th International Symposium on Antenna Technology & Applied Electromagnetics (ANTEM'2010), July 5-9, 2010.

(e) Public Service

(Appointment, Organization, Period (MM/YY-MM/YY))

- ✓ Providing guidance and logistic help to newly admitted international undergraduate and graduate students. This includes helping students in securing housing, opening bank accounts and adapting to the new environment. University of Ottawa & Carleton University, (09/2011-09/2016).

- ✓ Offering free English tutorials to new international students, particularly those who come from Arab countries, to help them getting integrated with the surrounding English-speaking community, University of Ottawa, (09/2010-09/2014).

Membership of Professional Societies

- ✓ Institute of Electrical and Electronics Engineers (IEEE), member, (**11/2010**)
- ✓ IEEE Antenna & Propagation Society, member, (**11/ 2012**).
- ✓ IEEE Young Professionals, member, (**11/2014**).
- ✓ Jordan Engineers Association, member, (**07/2004**).

Hardware & Software Skills

- ✓ Very well versed in doing antenna measurements using NSI[2] near-field and far-field antenna test range facilities.
- ✓ Very well versed in using DW2000 to generate the physical layout of a wide-range of RF circuits and printed antennas.
- ✓ Very well versed in using several EM Commercial Codes: HFSS, FEKO, CST, ADS, and GRASP.
- ✓ Excellent user of Analog and Digital Electronics: MOSFET implementations of a) Analog: amplifiers, modulators, converters, and filters, b) Digital: Logic and memory.
- ✓ Computer Programming: C++, Matlab and Maple.
- ✓ Operating Systems: Microsoft Windows (ICDL) family and Linux.

[2] Near-field Systems Inc. (https://www.nearfield.com/)