

# Aya Abdelaziz

## Education

- **Cairo University**, Egypt.  
Ph.D. in ECE, June 2009.  
Ph.D. Dissertation Title: "Different Realizations of Composite Right/Left-Handed Transmission lines and its Application as a Leaky Wave antenna".
- **University of Maryland**, College Park, MD, USA.  
Graduate studies, Jan. 2000- June 2001, GPA (4.0/4.0).
- **Cairo University**, Egypt.  
M.Sc. in ECE, Jan. 2001, GPA (4.0/4.0).  
Thesis Title: "Full Wave Analysis of Double Ridged Waveguide Using Mode Matching Technique".
- **Cairo University**, Egypt.  
B.Sc. in Electronics and Electrical Communications, July 1998.  
Cumulative Grade: Distinction with Honors (GPA 3.996/4.0).  
Department Rank: First on a class of 200 students.  
Graduation Project: "Noise cancellation using DSP"

## Research Interests

- Analyzing electromagnetic field propagation inside harsh environment.
- Applying statistical electromagnetics in characterizing channel models.

- Design of novel antennas and dual band devices applied in wireless communications.
- Metamaterials guided-wave structures.
- Modeling of microwave structures.
- Mode matching technique.
- Computer aided design.

## **Selected Research Projects**

- **Statistical Analysis of Electromagnetic Field inside Engines using Statistical Antenna Approach**

Analysis and modeling of electromagnetic field distribution inside the harsh environment and jet engines are considered as important problems because they span both civilian and military needs. Statistical electromagnetics address the problem of treating interior responses of complex field enclosures or systems by modeling the problem using a probabilistic approach. An efficient procedure that combines simulations and measurements has been introduced and applied successfully. Software tools: HFSS.

- **Statistical Approach for Exposure Assessment to IEEE 802.11 Base Stations in Indoor Environments.**

An efficient procedure that combines simulations and measurements has been introduced and verified in a selected and controlled environment. The procedure is based on a precise simulation of the electromagnetic ambience where the access points are deployed, by means of a

combination of physical and ray optics. A statistical description of the obstacles is implemented to speed up the computational time.

- **New Realizations for Metamaterials Composite Right/Left-Handed Transmission Lines.**

Metamaterials represent an exciting and rich research area. They gain a lot of attention in optical and microwave applications such as new types and features of filters, lenses, microwave couplers, dual band phase shifters, novel leaky wave and electronically scanned antennas. We developed a novel method to construct left handed metamaterials transmission lines using coupled lines. The design depends on the electromagnetic coupling between the coupled lines. The unit cell was achieved by applying the procedure on three coupled lines configurations which provide high coupling and in the same time small size. By cascading the CRLH unit cells, three different realizations for metamaterials transmission lines were achieved. We fabricated the lines and measured their characteristics. The first realization was done using broadside coupled coplanar waveguides. The second realization was done using coupled microstrip lines with slotted ground. The third realization was done using coupled microstrip lines with floating conductor in the ground plane. Software tools: HFSS – Ansoft Designer – ADS.

- **Metamaterial Dominant Mode Leaky Wave Antenna.**

In this project, we exploited the left-handed properties to construct a leaky wave antenna with superior properties. The designed antenna is dominant mode leaky wave antenna with scanning properties from

backward to endfire scanning capabilities with simple feeding concepts. We designed the antenna using microstrip lines with floating conductor at the ground plane. Software tools: Ansoft Designer.

- **Humanitarian Demining Project: Cairo Demining Trials.**

In this project, we evaluate the performance of different types of mine detectors in different soil types which characterize the different soils in Egypt to choose the best depending on performance, accuracy, easiness of usage, and price. The project sponsored by the Genève International Center for Humanitarians Demining (GICHHD), the Ministry of International Cooperation, and the Egyptian Armed Forces, May 2007.

- **Analysis of Rounded Ends Iris and Coupling.**

Developing simple methods to analyze various waveguides as ridged waveguides using mode matching techniques and applying this method to analyze the rounded ends iris and study its effect on coupling. (M. Sc. Thesis).

## Research Advising

- PhD Theses Jointly Supervised: 2011 – Present: Aparna Krishna, “Applying Statistical Electromagnetics in Analyzing Harsh environment”, ECE Dept., Qatar University. Awards:
  - 2015 Qatar University Graduate Research Award .
  - Graduate Assistantship by office of graduate studies, Qatar University.
  - *Second prize* for graduate studies outstanding scholarship and research in engineering for the top poster presented at the 2013 *Grad Student-Faculty Forum*.

# Publications

- A. Krishna, T. Khattab, A.F. Abdelaziz, Statistical Antenna for electromagnetic analysis of dynamic systems, submitted to IEEE Antennas and Wireless Propagation Letters.
- A. Krishna, A. F. Abdelaziz, T. Khattab, "Design of Metamaterial Unit Cell for Electrically Small Conformal Antenna", Submitted to International Symposium on Antennas and Propagation (ISAP 2016), Okinawa, Japan.
- A. Krishna, T. Khattab, A.F. Abdelaziz, M. Guizani, "Analysis of Electromagnetic Fields inside Jet Engines: A Journey from Numerical and Experimental Analysis to Statistical Analysis", Accepted in IEEE Microwave Magazine, 2016.
- Aya F. Abdelaziz, Qammer H. Abbasi, K. Yang, Khalid Qaraqe, A. Alomainy, Signal propagation analysis through human skin tissues, 2015 IEEE 11<sup>th</sup> International Conference on Wireless and Mobile computing, Networking and Communications (WiMob), Oct., 2015.
- Aya F. Abdelaziz, Qammer H. Abbasi, A. Fatih Demir, Khalid Qaraqe, Erchin Serpedin, Huseyin Arslan, Experimental Characterization of in vivo radio channel at MICS and ISM bands, PIERS Proceedings, Prague, July, 2015.
- A. Krishna, T. Khattab, A.F. Abdelaziz and M. Guizani, "On the Study of Field Uniformity Inside Jet Engine", 2015 Loughborough Antennas & Propagation Conference, Loughborough University, UK.
- A. Krishna, T. Khattab, A.F. Abdelaziz and M. Guizani, "Circular Patch Array Antenna Conformal to Harsh Environment", IEEE AP-S and URSI National radio Science Meeting 2015, Vancouver, Canada.
- A. Krishna, T. Khattab, A. Abdelaziz, M. Guizani, On the correlation analysis of electric field inside jet engine, Loughborough Antennas & Propagation Conference, UK, 2014.

- A. Krishna, T. Khattab, A. Abdelaziz, M. Guizani, Applying statistical antenna approach in jet engine electromagnetic field analysis, Loughborough Antennas & Propagation Conference, UK, 2013.
- A. Krishna, T. Khattab, A. Abdelaziz, M. Guizani, On the Statistical Distribution of Electric Field Inside Jet Engines, IEEE AP-S and URSI National Radio Science Meeting, Florida, USA, 2013.
- Aya F. Abdelaziz, D. Trincherro, T. Khattab, Statistical analysis of electromagnetic field inside a jet engine using the reverberation chamber approach, PIERM, Vol. 24, 157-165, 2012.
- Mohamed Elsayed, Aya F. Abdelaziz, Mazen Hasna, Daniele Trincherro, Exposure assessment of WiFi access points by simulation and measurements, IEEE Electromagnetics in Advanced Applications (ICEAA), Torino, Italy, pp. 1442-1445, September 2011.
- Mohamed Elsayed, Aya F. Abdelaziz, Mazen Hasna, Daniele Trincherro, Statistical approach for exposure assessment to IEEE 802.11 base stations in indoor environments, URSI General Assembly and Scientific Symposium, Istanbul, Turkey, August 2011.
- Aya F. Abdelaziz, Daniele Trincherro, Tamer Khattab, New methodology for field analysis inside jet engines, Presentation at IEEE AP-S and URSI National Radio Science Meeting, Seattle USA, 2011.
- Aya F. Abdelaziz, Tamer M. Abuelfadl, Osman L. Elsayed, Leaky wave antenna realization by composite right/left-handed transmission line, PIERL 11, page 39-46, 2009.
- Aya F. Abdelaziz, Tamer M. Abuelfadl, Osman L. Elsayed, Realization of composite right/left-handed transmission line using coupled lines, Progress in electromagnetic research PIER 92, page 299-315, 2009.
- Aya F. Abdelaziz, Tamer M. Abuelfadl, Osman L. Elsayed, Realization of composite right/left-handed transmission line using broadside coupled

coplanar waveguides, IEEE International symposium on antennas and propagation (IEEE. APS 2009).

- A. F. Abdelaziz and K. A. Zaki, Full Wave Analysis of Rounded Ends Iris and Its Application In coupling, Journal of Electromagnetic Waves and Application JEMWA, Vol. 15, No. 9, 1215-1227, 2001.

## Honors and Awards

- Cairo University Graduate School Fellowship.
- University of Maryland Graduate School Super fellowship, 2000-2001.
- Distinction at M. Sc (top 1), Cairo University, Jan. 2001.
- Distinction with Honor degree at B.Sc. (top 1), Cairo University, July 1998.
- Certificate of Merit, First Class Honors, for being one of the top ten students in the electrical engineering department during my undergraduate study, Cairo University, Egypt 1993-1998.

## Professional Licenses and Certifications

- Communication skills (FLDC, Cairo University, Egypt 2008)
- Conference organization (FLDC, Cairo university, Egypt 2008)
- Applying technology in teaching (FLDC, Cairo university, Egypt 2009)
- Scientific publishing (FLDC, Cairo university, Egypt 2009)

## Work Experience

- **Postdoctoral Researcher**, (Feb. 2015 – June 2015)  
ECE Department, Texas A&M, Qatar.
- **Postdoctoral Researcher**, (Feb. 2010 – June 2014)  
ECE Department, Qatar University, Qatar.

- **Visiting Professor**, (Feb. 2010 – June 2010)  
ECE Department, Qatar University, Qatar. Teaching undergraduate course “ELEC311 Electromagnetics”.
- **Assistant Professor**, (June 2009 – Present) (on leave)  
ECE Department, Cairo University, Egypt.
- **Assistant Lecturer**, (Jun. 2007 – July 2009)  
ECE Department, Cairo University, Egypt. Assisted in teaching undergraduate:
  - Microwave Engineering: Transmission line theory, matching techniques, microwave network analysis and microwave passive devices.
  - Antennas: Classical theory of radiation, radiation mechanism, radiation integrals, antenna parameters, antenna types and antenna arrays.
  - Laser Engineering: laser physics, atomic transition, atomic rate equations, amplification, optical feedback, laser oscillators, Optical beam and resonators and laser dynamics.
- **Research Assistant**, (Jan. 2000 – July 2001)  
ECE Department, University of Maryland, College Park, USA.  
Research Topic: Design of Microwave Filters.
- **Teaching Assistant**, (Sep. 98 – Dec. 99)  
ECE Department, Cairo University, Egypt. Assisted in teaching undergraduate microwave, antennas, circuits, electrical labs, and laser classes.
- **Summer Intern**, (Jun. 97 – Aug. 97)  
Technical university Hamburg, Germany.
- **Summer Intern**, (Jun. 96 – Aug. 96)  
Center of satellite, Cairo, Egypt.



# Relevant Graduate Coursework

- Antenna Theory and Design
- Propagation of Radio Waves
- Semiconductor Device and Technology
- Integrated Circuit Device and Technology
- Optical Frequency Generation and Transmission
- Laser Engineering
- Electrical Network Theory
- Electromagnetic Theory I
- Electromagnetic Theory II
- Microwave Engineering