

# Mohammed F. A. Ahmed

## Curriculum Vitae

### Education

- 2006–2011 **Ph.D. in Electrical Engineering**, *University of Alberta*, Edmonton, Canada.  
Dissertation: Collaborative Beamforming for Wireless Sensor Networks.  
Supervisor: Prof. Sergiy Vorobyov.  
Courses: ECE 582 Information theory and channel coding, ECE 583 Digital communications, ECE 502 Probability and random processes, ECE 683 Broadband digital communications, ECE 684 Wireless communications, ECE 740 Advanced topics in digital signal processing, ECE 643 Multimedia signal processing.
- 2001–2004 **M.Sc. in Electrical Engineering**, *Assiut University*, Assiut, Egypt.  
Dissertation: Image Compression Using Vector Quantization.  
Courses: Computational methods and programming, Digital communication and digital signal processing, Electronic circuits, Image and speech signal processing, Fuzzy logic and artificial neural networks.
- 1996–2001 **B.Sc. in Electrical Engineering**, *Assiut University*, Assiut, Egypt.  
Honours: Very Good with honours and top of 2001 class.

### Experience

- 2014–present **Postdoctoral Fellow**, *École de Technologie Supérieure*, Montréal, Canada.  
  - Develop analytic models for the performance of the distributed estimation in wireless sensor networks.
  - Explain and present analysis result.
- 2012–2014 **Postdoctoral Fellow**, *King Abdullah University of Science and Technology (KAUST)*, Thuwal, Kingdom of Saudi Arabia.  
  - Investigated the effect of correlation between sensor node observations on the performance of the distributed estimation in WSNs.
  - Derived a closed-form expression in terms of the indefinite quadratic forms for the outage probability that shows its dependency on the correlation.
  - Optimized the power allocation of the sensor nodes to minimize the outage probability under total and individual power constraints.
- 2006 – 2011 **Research Assistant**, *University of Alberta*, Edmonton, Canada.  
  - Studied collaborative beamforming over Gaussian distributed WSNs and analyzed the effect of spatial distribution of the sensor nodes on the beampattern.
  - Developed a node selection scheme for multi-link collaborative beamforming with sidelobe control and the theoretical analysis of some of its performance metrics.
  - Algorithmic development of a collaborative beamforming power control scheme for improved WSN lifetime.
- 2007–2011 **Teaching Assistant/Lab Instructor**, *University of Alberta*, Edmonton, Canada.  
  - Lectured weekly laboratory on the following courses: EE485 Digital communications, EE380 Introduction to microprocessors, EE280 Introduction to digital logic design.
  - Graded weekly lab reports and provided laboratory exams.

- 2001–2006 **Assistant Lecturer**, *Assiut University*, Assiut, Egypt.
- Prepared materials for lectures and laboratory sessions.
  - Graded laboratory reports, projects, and exams.
  - Organized the timetables of lectures and laboratories, and management of final exams.
  - Assisted in installation of electronics and computer laboratories.
  - Delivered sessions for the following courses: Digital signal processing, Electronic circuits, Speech signal processing, Information theory, Programming with C++, Electronic laboratory, Interfacing circuits with PC, Microwave circuits, Introduction to computers.
  - Mentored undergraduate student at final projects.
  - Helped in preparation for laboratory material, sessions scheduling, and maintaining the course web page.
- 2001–2006 **Research Assistant**, *Assiut University*, Assiut, Egypt.
- Developed image compression algorithms using vector quantization.
  - Implement image encryption algorithm using vector quantization with index compression.

## Publications

### Journal Publications

- J1 M. F. A. Ahmed, Tareq Y. Al-Naffouri, Mohamed-Slim Alouini, and George Turkiyyah, "The Effect of Correlated Observations on the Performance of Distributed Estimation," *IEEE Trans. Signal Processing*, vol. 61, no. 24, Dec. 2013.
- J2 M. F. A. Ahmed and S. A. Vorobyov, "Sidelobe control in collaborative beamforming via node selection," *IEEE Trans. Signal Processing*, vol. 58, no. 12, Dec. 2010.
- J3 M. F. A. Ahmed and S. A. Vorobyov, "Collaborative beamforming for wireless sensor networks with gaussian distributed sensor nodes," *IEEE Trans. Wireless Commun.*, vol. 8, no. 2, pp. 638-643, Feb. 2009.
- J4 M. F. Abdel-Latif (Ahmed), T. K. Abdelhamid, H. Selim, and M. M. Doss, "A new VQ index remapping process based on index usage activity for image compression", *Journal of Engineering Sciences*, JES, Assiut University, pp. 239-247, Jan. 2005.

### Conference Publications

- C1 M. F. A. Ahmed, Tareq Y. Al-Naffouri, and Mohamed-Slim Alouini, "On the Effect of Correlated Measurements on the Performance of Distributed Estimation," in *Proc. IEEE International Conference on Communications 2013, ICC'13*, Budapest, Hungary, June 2013, pp. 3333–3337.
- C2 M. F. A. Ahmed and S. A. Vorobyov, "Power control for collaborative beamforming in wireless sensor networks," invited paper, in *Proc. 45th Annual Asilomar Conf. Signals, Systems, and Computers*, Pacific Grove, California, USA, Nov. 6-9, 2011, pp. 99-103.
- C3 M. F. A. Ahmed and S. A. Vorobyov, "Node selection for sidelobe control in collaborative beamforming for wireless sensor networks," in *Proc. IEEE 10th Workshop on Signal Processing Advances in Wireless Communications 2009, SPAWC '09*, Perugia, Italy, June 2009, pp. 519–523.
- C4 Y. M. Y. Hasan, M. F. A. Ahmed, T. K. Abdelhamid, "Image adaptive selective encryption of vector quantization index compression," in *Proc. IEEE International Conference on Image Processing, ICIP '09*, Cairo, Egypt, Nov. 2009, pp. 1277-1280.
- C5 M. F. A. Ahmed and S. A. Vorobyov, "Performance characteristics of collaborative beamforming for wireless sensor networks with Gaussian distributed sensor nodes," in *Proc. 33rd IEEE Inter. Conf. on Acoustics, Speech, and Signal Processing, ICASSP'08*, Las Vegas, Nevada, USA, Mar. 30 - Apr. 4, 2008, pp. 3249–3252.
- C6 M. F. A. Ahmed and S. A. Vorobyov, "Beampattern random behavior in wireless sensor networks with Gaussian distributed sensor nodes," in *Proc. Canadian Conference on Electrical and Computer Engineering, CCECE'08*, Niagara Falls, ON, Canada, May. 4-7, 2008, pp. 257–260.  
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- C7 M. F. Abdel-Latif (Ahmed), T. K. Abdelhamid, M. M. Doss, and H. Selim, "Utilizing repeated adjacencies of vector quantization indices in image compression" In Proceedings of the Fourth IEEE International Symposium on Signal Processing and Information Technology, ISSPIT'04, Rome, Italy, Dec. 2004, pp. 287-290.
- C8 M. F. Abdel-Latif (Ahmed), T. K. Abdelhamid, M. M. Doss, and H. Selim, "Utilizing index usage maps for VQ index compression" In Proceedings of the Fourth IEEE International Symposium on Signal Processing and Information Technology, ISSPIT'04, Rome, Italy, Dec. 2004, pp. 291-295.

## Professional Activities

Referee for:

- IEEE Transactions on Signal Processing,
- IEEE Transaction on Wireless Communications,
- IEEE Signal Processing Letters,
- IEEE Canadian Conference on Electrical and Computer Engineering,
- IEEE Vehicular Technology Conference.

## Honors & Awards

Citations h-index **5** and i10-index **3**.

2012 IEEE Wireless Communications Letters Exemplary Reviewer.

1996-2001 National Merit Scholarship, Egypt.

2001 Egyptian Syndicate of Engineers Award, Egypt.

2001 Mobinil Education excellence award, Egypt.

1997 Prof. Abu-Elwafa Megahed Award, Assiut University, Egypt.

2006-2010 Scholarship of the Egyptian Ministry of Higher Education, Egypt.

2006-2011 Different Medals in Edmonton Dragon Boat Festival, Canada.

## Internships & Training

2010 TA Boot Camp, University of Alberta, Edmonton, Canada.

2007 Workplace Hazardous Materials Information System (WHMIS), Edmonton, Canada.

2006 Leadership Training, Leaders Preparation Institute, Helwan, Egypt.

2004 Teacher Preparation Training, Assiut University, Assiut, Egypt.

2004 Effective Teaching, Assiut University, Assiut, Egypt.

2004 Teaching with Technology, Assiut University, Assiut, Egypt.

1999 Cairo Metro, Cairo, Egypt.

## Technical Skills

Programming C++/C, Visual Basic, and Fortran.

Hardware Koyo DL06 PLC , Xilinx Spartan FPGAs, Intel 8086 Microprocessor, and PIC Microcontrollers.

Operating Systems MS-DOS, Microsoft Windows, Windows 2000 server, Mac OS X, and Linux variants.

Design & Simulation Matlab, Simulink, and LabVIEW.

Applications MS Office, L<sup>A</sup>T<sub>E</sub>X, HTML, PhotoShop, and other common packages for Windows.

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## Memberships

2008- Present The Institute of Electrical and Electronics Engineer (IEEE), *S'08, M'11*

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## References

**Prof. Georges Kaddoum.**

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**Prof. Sergiy A. Vorobyov.**

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**Prof. Tareq Y. Al-Naffouri.**

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