
EDUCATION

- **Ph.D. in Electrical and Computer Engineering** May 2009
University of Maryland, College Park, MD, USA
Thesis: “*Relay deployment and selection in cooperative wireless networks*”
GPA: 3.83/4
- **M.S. in Electrical and Computer Engineering** Dec. 2007
University of Maryland, College Park, MD, USA
GPA: 4/4
- **M.S. in Electronics and Electrical Communications Engineering** Aug. 2004
Cairo University, Cairo, Egypt
Thesis: “*Multilayered space-frequency coding for OFDM systems*”
- **B.S. in Electronics and Electrical Communications Engineering** May 2002
Cairo University, Cairo, Egypt
Graduation Project “*MEMS-based IR static earth sensor*”
Cumulative grade: 90%

PROFESSIONAL EXPERIENCES

- **Intel Corporation**, Wireless Standards & Technology, Hillsboro, OR, USA Jun. 2008–Mar. 2009
Communication Systems Engineering Intern
Mentors: **Dr. Yang-Seok Choi and Dr. Shahrnaz Azizi**
 - **WiMAX (IEEE 802.16m) standards**
Designed and evaluated *Preamble* sequences for *MIMO/OFDM-based* WiMAX IEEE 802.16m via **Matlab**; Ran link level and system level simulations of various preamble sequences under different channel models; Designed Location Based Services (*LBS*) capability for WiMAX; contributed to **1** patent (Preamble design) and **3** contributions (Preamble, LBS, cooperative relaying) in the IEEE 802.16m standards.
- **Qualcomm Incorporated**, Corporate R&D Division, San Diego, CA, USA May-Aug. 2007
Communication Systems Engineering Intern
Mentors: **Dr. Dhananjay Gore and Dr. Sony Akkarakaran**
 - **Ultra Mobile Broadband (UMB) Prototype**
Developed and tested the modulator/demodulator blocks of all the *MIMO/OFDM-based* Forward Link Control Segment (FLCS) sub-channels via **C++**; Ran simulations under different channel models for both fixed and floating point blocks; Wrote a **Perl** script to generate the performance curves for all the FLCS sub-channels in an easy and efficient way.
- **Interuniversity Microelectronics Center (IMEC)**, Leuven, Belgium Jun. - Sep. 2001
Undergraduate Technical Intern
 - **Micro-Electro Mechanical Systems (MEMS)**
Developed *Design Rule Checker (DRC)* for MEMS-based devices (**C/C++**); Modeled MEMS-based switches, capacitors, and transmission lines.

RESEARCH & TEACHING EXPERIENCES

- **University of Maryland**, ECE Dept., College Park, MD, USA Aug. 2004 – May 2009
Research Assistant
Advisor: **Prof. K. J. Ray Liu**
 - **Relay-selection in cooperative communications**
Answered the fundamental questions of “*When to cooperate?*” and “*Whom to cooperate with?*”; Proposed a *relay-selection* scheme for cooperative networks (**Matlab**); Bandwidth efficiency is boosted by 75% compared to conventional schemes; **3** related papers are published.
 - **Cooperative routing**
Proposed a *cooperative-based routing algorithm* in wireless ad hoc networks (**C/C++**, **Matlab**, **Mathematica**); Power saving of 65% is achieved; **2** related papers are published.

- **Network lifetime maximization**
Proposed a *network-maintenance* scheme to maximize network lifetime of *wireless sensor networks* by adding a set of relays to it (**Matlab**); Network lifetime gain of 100% is achieved; Proposed a *network-repair* scheme to *reconnect* a disconnected sensor network; **3** related papers are published.
 - **Mitigating channel estimation error and interference**
Showed the impact of various cooperative communication schemes on channel estimation error and interference problems (**Matlab**); Characterized the tradeoff between channel estimation error and timing synchronization error; **1** related paper is published and **1** is submitted for publication.
- **Pharad LLC, Glen Burnie, MD, USA** Feb. 2006 – May 2007
Research Assistant
Team Leader: **Dr. Dalma Novak**
 - **Concealed weapons detection**
Developed *signal processing* techniques for extracting the unique signature of each tested weapon (**Matlab, C/C++**); Investigated various classification techniques to achieve high probability of detection and low probability of false alarm; **1** related paper is published.
 - **Cairo University, Electronics and Electrical Communications Dept., Cairo, Egypt** May 2002- Aug. 2004
 - **Research Assistant**
Advisor: **Prof. Mohamed M. Khairy**
Proposed multilayered *space-time* and *space-frequency* coding schemes in *OFDM* systems (**Matlab**); **2** related papers are published.
 - **Teaching Assistant**
Taught *communication and signal processing* courses including Communication Systems, Digital Communications, and Signals & Systems.

SKILLS

- **Programming Languages:** C, C++, Matlab, and Perl.
- **Platforms:** Linux and Windows.
- **Softwares:** Mathematica, VHDL, L-Edit, and PSpice.

PATENTS

- **Preamble sequence for WiMAX IEEE 802.16m**
Proposing a Preamble sequence for *Cell-ID detection* in the WiMAX IEEE 802.16m system; The proposed Preamble consists of 768 distinct sequences with *low-correlation*, which allows the WiMAX system to support a large number of base stations, relay stations, and femto cells; It has a *scalable* structure and has no impact on the performance of the WiMAX IEEE 802.16e legacy devices.

GRADUATE COURSEWORK

Random processes in communication	Wireless communications	Error correcting codes
Advanced digital signal processing	Advanced numerical optimization	Information theory
Estimation & detection theory	Numerical analysis	Optimal control
Multi-user information theory	Space-time signal processing	System theory

RELEVANT GRADUATE PROJECTS

- **Filterbank design and subband coding for images**
Designed two-tap perfect reconstruction (PR) Quadrature mirror filter (QMF) bank; used the designed QMF in performing subband coding of images.
- **Linear prediction**
Predicted the Dow Jones Industrial Average (DJIA) weekly closing price.

GRANT PROPOSALS

- **Concealed weapons detection**
Actively participated in writing a technical proposal on *signal processing techniques for concealed weapons detection*; accepted by the *Maryland Industrial Partnerships (MIPS)* program, Aug. 2006.

- **Border surveillance system**

Actively participated in writing a proposal on signal processing techniques for a cost effective border surveillance system based on a network of distributed wireless sensors.

HONORS & AWARDS

- Included in the 2009 Edition of **Who's Who in America**.
- **Best Speaker Award of the ECE Seminar Series**, University of Maryland, College Park, MD, USA, 2008.
- **Nominee for Best Student Paper Award**, IEEE Conf. on Acoustics, Speech and Signal Processing (ICASSP), 2007.
- **IEEE Travel Grant** for participating in IEEE ICASSP, Honolulu, Hawaii, 2007.
- **Goldhaber Travel Grant**, University of Maryland, College Park, MD, USA, 2006.
- **Graduate School Super Fellowship**, University of Maryland, College Park, MD, USA, 2004-2006.
- **Schlumberger's Award** for best senior students, Schlumberger Company, Cairo, Egypt, 2002.
- **Distinction with Honor** at B.Sc. degree, 2nd on a class of 352 students, Cairo University, Cairo, Egypt, 2002.
- **IMEC Summer Scholarship**, Interuniversity Microelectronics Center (IMEC), Leuven, Belgium, 2001.
- **Certificate of Merit**, First Class Honors, Cairo University, Cairo, Egypt, 1998-2002.

ACTIVITIES

- **Paper Reviewer**
IEEE Transactions on Communications, IEEE Transactions on Signal Processing, IEEE Transactions on Wireless Communications, IEEE Journal on Selected Areas in Communications, IEEE Global Telecommunications Conference (Globecom), IEEE International Conference on Communications (ICC), IEEE Wireless Communication and Networking Conference (WCNC), IEEE Information Theory Workshop (ITW), and IEEE Vehicular Technology Conference (VTC).
- **Technical Program Committee (TPC) Member**
International Wireless Communications and Mobile Computing Conference (IWCMC'07).
- **Member**
Institute of Electrical and Electronics Engineers (IEEE).
- **Engineering Graduate Student Council (EGSC) Member** (Dec. 2004 - May 2006)
Led the council in organizing an *orientation* for the new engineering graduate students; Participated in preparing a *survey* about the major problems facing the engineering graduate students.

PUBLICATIONS

- **Journal Papers**
 1. **A.S. Ibrahim** and K.J.R. Liu, "Mitigating channel estimation error with timing synchronization tradeoff in cooperative communications," to appear, *IEEE Trans. on Signal Processing*, 2009.
 2. **A.S. Ibrahim**, K.G. Seddik, and K.J.R. Liu, "Connectivity-aware network maintenance and repair via relays deployment," *IEEE Trans. on Wireless Communications*, vol. 8, pp. 356-366, Jan. 2009.
 3. **A.S. Ibrahim**, Z. Han, and K.J.R. Liu, "Distributed energy-efficient cooperative routing in wireless networks," *IEEE Trans. on Wireless Communication*, vol. 7, pp. 3930-3941, Oct. 2008.
 4. **A.S. Ibrahim**, A.K. Sadek, W. Su, and K.J.R. Liu, "Cooperative communications with relay selection: when to cooperate and whom to cooperate with?," *IEEE Trans. On Wireless Communication*, vol. 7, pp. 2814-2827, Jul. 2008.
 5. K.G. Seddik, A.K. Sadek, **A.S. Ibrahim**, and K.J.R. Liu, "Design criteria and performance analysis for distributed space-time coding," *IEEE Trans. on Vehicular Technology*, vol. 57, pp. 2280-2292, Jul. 2008.
 6. K.G. Seddik, **A.S. Ibrahim**, and K.J.R. Liu, "Trans-modulation in wireless relay networks," *IEEE Communications Letter*, vol. 12, Is. 3, pp. 170-172, Mar. 2008.
 7. Hung-Quoc Lai, **A.S. Ibrahim**, and K.J.R. Liu, "Wireless network cocast: location-aware cooperative communications with linear network coding," *IEEE Trans. on Wireless Communication*, 2009.
 8. M. Baidas, **A.S. Ibrahim**, K G. Seddik, and K.J.R. Liu, "Correlation-Based Cooperation for Distributed Detection in Wireless Sensor Networks: Analysis and Modeling," in revision, *IEEE Trans. On Wireless Communication*.
- **Conference Papers**
 1. **A.S. Ibrahim** and K.J.R. Liu, "Mitigating channel estimation error via cooperative communications," Proc. IEEE International Conference on Communications (ICC'09), Jun. 2009.
 2. M. Baidas, **A.S. Ibrahim**, K G. Seddik, and K.J.R. Liu, "On the impact of correlation on distributed detection in wireless sensor networks with relays deployment," Proc. IEEE International Conference on Communications (ICC'09), Jun. 2009.
 3. Hung-Quoc Lai, **A.S. Ibrahim**, and K.J.R. Liu, "Location-aware cooperative communications utilizing linear network coding," Proc. in IEEE Global Telecommunications Conference (Globecom'08), pp. 1-5, Nov. 2008.

4. **A.S. Ibrahim**, K G. Seddik, and K.J.R. Liu, "Connectivity-aware network maintenance via relays deployment," Proc. IEEE Wireless Comm. and Networking Conference 2008 (WCNC'08), pp. 2573-2578, Apr. 2008.
5. **A.S. Ibrahim**, K G. Seddik, and K.J.R. Liu, "Improving connectivity via relays deployment in wireless sensor networks," Proc. IEEE Global Telecommunications Conference (Globecom'07), pp. 1159-1163, Nov. 2007.
6. **A.S. Ibrahim**, Z. Han, and K.J.R. Liu, "Distributed energy-efficient cooperative routing in wireless networks," Proc. IEEE Global Telecommunications Conference (Globecom'07), pp. 4413-4418, Nov. 2007.
7. K.G. Seddik, A.K. Sadek, **A.S. Ibrahim**, and K.J.R. Liu, "Synchronization-aware distributed space-time codes in wireless relay networks," Proc. IEEE Global Telecommunications Conference (Globecom'07), pp. 3452-3456, Nov. 2007.
8. **A.S. Ibrahim**, K.J.R. Liu, D. Novak, and R.B. Waterhouse, "A subspace signal processing technique for concealed weapons detection," Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'07), pp. II-401 - II-404, Apr. 2007. **(Nominee of the Best Student Paper Award)**
9. **A.S. Ibrahim**, A.K. Sadek, W. Su, and K.J.R. Liu, "Relay selection in multi-node cooperative communications: when to cooperate and whom to cooperate with?," Proc. IEEE Global Telecommunications Conference (Globecom'06), pp. 1-5, Nov. 2006.
10. **A.S. Ibrahim**, A.K. Sadek, W. Su, and K.J.R. Liu, "Cooperative communications with partial channel state information: when to cooperate?," Proc. IEEE Global Telecommunications Conference (Globecom'05), pp. 3068-3072, Nov. 2005.
11. **A.S. Ibrahim**, M.M. Khairy, and A.F. Hussein, "Multilayered space-frequency block coded OFDM systems," Proc. The Global Signal Processing EXPO and Conference, Santa Clara, CA, USA, Sep. 2004.
12. **A.S. Ibrahim**, M.M. Khairy, and A.F. Hussein "Multilayered space-time block codes for OFDM systems," Proc. The International Conference on Electrical, Electronic and Computer Engineering, Ain Shams University, Egypt, Sep. 2004.
13. **A.S. Ibrahim**, A. Adel, A. Ezeldin, A. Ali, A. Hussein, and S.E.-D. Habib, "Design and implementation of an area-efficient MEMS-based IR static earth sensor," Proc. The 15th IEEE International Conference on Microelectronics (ICM), pp. 143-146, Dec. 2003.
14. S. Pamidighantam, W. Laureyn, **A.S. Ibrahim**, A. Verbist, H.A.C. Tilmans, "A novel process for fabricating slender and compliant suspended poly-Si micro-mechanical structures with sub-micron gap spacing," Proc. The 15th IEEE Conference on MEMS, pp. 661-664, 2002.

Publications are available online at: <http://www.ece.umd.edu/~asalah/#Publications>

REFERENCES Available Upon Request