Ahmed Bedewy

⊕ ahmedbedewy.github.io/osu-bedewy/

Contact Information

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Research Interests

o Optimization, Scheduling Algorithms, Wireless Communications, Age of Information, Cognitive Radios, Resource Allocation

Education

The Ohio State University (OSU), Columbus, OH, USA   **August 2015 - current**

 Ph.D. student in ECE

GPA: 3.967
Advisor: Prof. Ness Shroff, OSU
Co-advisor: Prof. Yin Sun, Auburn University

Alexandria University, Alexandria, Egypt   **September 2011 - January 2015**

 M.Sc. in Electrical Engineering

Advisor: Prof. Karim G. Seddik
Thesis: Cognitive MAC Design with Cooperation and Energy Harvesting

Alexandria University, Alexandria, Egypt   **September 2006 - July 2011**

 B.Sc. in Electrical Engineering

Overall grade: Distinction with Degree of Honor (grade: 93.59%, GPA:3.96).
*Rank: 1st out of **443** students.*
Thesis: Baseband Implementation of LTE Advanced Downlink Physical Layer.

Honors and Awards

o NSF Travel Grant to attend ACM MobiHoc, 2019
o Student Travel Grant to attend IEEE ISIT, 2017
o Student Travel Grant to attend IEEE ISIT, 2016
o Ranked 1st over Electrical Engineering Class of 2011, Alexandria University
o Awarded the Prof. Abdelsamie Mustafa prize for the 1st student over Electrical Engineering Class of the Faculty of Engineering, Alexandria University in 2011
o Graduation project fund winner, National Telecommunications Regulatory Authority - NTRA, 2011
o Awarded Certificate of Merit, First Class Honors, for being one of the top ten undergraduate students during 2006-2008 and 1st during 2008-2011 in Electrical Engineering
o Ranked 1st on El Abassia Secondary School (Maths Dep.) upon high school graduation (99.02%)

Research Experience

The Ohio State University (OSU), Columbus, OH, USA

Advisors: Prof. Ness Shroff, Prof. Yin Sun

Graduate Research Assistant   **August 2015 – current**

- We study data freshness optimization in information update networks. An important metric of data freshness is "Age-of-information" which is defined as the time elapsed since the freshest packet was generated.
- We design low complexity scheduling policies that can achieve age-optimality or near age-optimality in general system setting including arbitrary arrival process. The optimality of these polices are proven in stochastic ordering sense.
- We investigate the age-optimality for multi-channel and multihop networks.

The American University in Cairo (AUC), Cairo, Egypt

Advisors: Prof. Ayman Y. Elezabi, Prof. Karim G. Seddik

Research Assistant **August 2012 – August 2013**

- Studying a cognitive radio network in which a secondary user (SU) exploits the primary user (PU) feedback from a queuing theory point of view where the secondary user accesses the channel with different access probabilities.
- Determining the access probabilities so that the SU throughput is maximized under two PU's QoS (Quality of Service) constraints: the PU queue stability and a limit on the average PU packet delay.

Alexandria University, Alexandria, Egypt

Advisors: Prof. Karim G. Seddik, Prof. Amr A. El-Sherif, Prof. Tamer Elbatt

Research Assistant **September 2011 - January 2015**

- Studying the queues stability in a random access network in which the nodes have finite energy sources. The nodes leverage the feedback information for collision resolution.
- Studying the queues stability and delay in cooperative multiple access for cognitive radio systems in which the SU has finite energy sources.
- Comparing obtained stability region and the average packet delay with those of the systems without energy constraints, and identifying the losses due to finite energy.

Journal Papers (during Ph.D.)

o **Ahmed M. Bedewy**, Yin Sun, and Ness B. Shroff, "The Age of Information in Multihop Networks", *IEEE/ACM Transactions on Networking*, vol. 27, no. 3, pp. 1248-1257, June 2019.
o **Ahmed M. Bedewy**, Yin Sun, and Ness B. Shroff, "Minimizing the Age of Information through Queues", *IEEE Transactions on Information Theory*, vol. 65, no. 8, pp. 5215-5232, Aug. 2019.

Under Review Journal

o **Ahmed M. Bedewy**, Yin Sun, Sastry Kompella, and Ness B. Shroff,"Optimal Sampling and Scheduling for Timely Status Updates in Multi-source Networks" Submitted to *IEEE Transactions on Information Theory*, 2020.

Conference Papers

o **During Ph.D.**
 - **Ahmed M. Bedewy**, Yin Sun, Rahul Singh, and Ness B. Shroff, "Optimizing Information Freshness using Low-Power Status Updates via Sleep-Wake Scheduling", *ACM MobiHoc*, 2020.
 - **Ahmed M. Bedewy**, Yin Sun, Sastry Kompella, and Ness B. Shroff, "Age-optimal Sampling and Transmission Scheduling in Multi-Source Systems", *ACM MobiHoc*, 2019.
 - **Ahmed M. Bedewy**, Yin Sun, and Ness B. Shroff, "Age-Optimal Information Updates in Multihop Networks", *IEEE ISIT*, 2017.
 - **Ahmed M. Bedewy**, Yin Sun, and Ness B. Shroff, "Optimizing Data Freshness, Throughput, and Delay in Multi-Server Information-Update Systems", *IEEE ISIT*, 2016.
o **During M.Sc.**
 - **Ahmed M. Bedewy**, Amr A. El-Sherif, Karim G. Seddik and Tamer ElBatt, "Cooperative MAC for Cognitive Radio Network with Energy Harvesting and Randomized Service Policy", *IEEE GLOBECOM*

(GC Wkshps), 2015.
- **Ahmed M. Bedewy**, Karim G. Seddik and Amr A. El-Sherif, "On the Stability of Random Access with Energy Harvesting and Collision Resolution", *IEEE GLOBECOM*, 2014.
- **Ahmed M. Bedewy**, Karim G. Seddik and Ayman Y. Elezabi, "A Feedback-based Access Scheme for Cognitive Radio Networks Over Interference Channels with Primary Queue Guarantees", *IEEE WiOpt*, 2013.

Technical Reviews

IEEE Transactions on Information Theory, IEEE/ACM Transactions on Networking, IEEE Transactions on Communications, IEEE Internet of Things Journal, Journal of Communications and Networks, IEEE Journal on Selected Area in Communications, Transactions on Mobile Computing, IEEE ISIT, IEEE Infocom

Teaching Experience

Alexandria University, Alexandria, Egypt

Teaching Assistant/Demonstrator   **Fall 2011 – Spring 2015**
Courses:
- Digital Communications
- Analog Communications
- Communications Systems
- Signals and systems
- Microprocessor 8086
- Optical Devices
- Very-large-scale integration (VLSI)

Responsibilities:
o Tutoring
o Lab supervision
o Preparing and Discussing Matlab, Assembly and C programming assignments
o Marking exams and quizzes

Graduate Courses

Computer Communication Networks, Stochastic Process Detection & Estimation, Information Theory, Real Analysis, Probability Theory, Network Optimization & Algorithms

Skills & Background

Software Languages: *8086 Assembly, C, Python, Matlab and LaTeX*

Working Experience

The Academy of Air Defense, Alexandria, Egypt
Lab Supervision: Supervision of the establishment of a Microwave Measurements Lab   **Sep 2014**

Extra Curriculum Activities

Won the **Bronze medal** in the Egyptian Olympic Fencing Championship (Individuals), 2004
Won the **Gold medal** in the Egyptian Olympic Fencing Championship (Teams), 2004

References

Prof. Ness B. Shroff
Ohio Eminent Scholar in Networking and Communications
Chaired Professor of ECE and CSE
The Ohio State University
Columbus, OH, USA
Email: shroff.11@osu.edu

Prof. Yin Sun
Assistant Professor in ECE
Auburn University
Auburn, AL, USA
Email: yzs0078@auburn.edu