

Ahmed Bedewy

📍 ahmedbedewy.github.io/osu-bedewy/

Contact Information

mobile: +1 614-477-7613
E-mail: bedewy.2@osu.edu

Address: 670 Cuyahoga CT
Columbus, OH 43210

Research Interests

- 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

- Runner-up of Best Paper Award, ACM MobiHoc Conference, 2020.
- NSF Travel Grant to attend ACM MobiHoc, 2019
- Student Travel Grant to attend IEEE ISIT, 2017
- Student Travel Grant to attend IEEE ISIT, 2016
- Ranked **1st** over Electrical Engineering Class of 2011, Alexandria University
- Awarded the Prof. Abdelsamie Mustafa prize for the **1st** student over Electrical Engineering Class of the Faculty of Engineering, Alexandria University in 2011
- Graduation project fund winner, National Telecommunications Regulatory Authority - NTRA, 2011
- 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
- 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 policies are proven in stochastic ordering sense.
- We investigate the age-optimality for multi-channel and multihop networks.
- We design low-power age-optimal schedulers in multi-source information update systems, which are apt for many applications such as Internet of Things (IoT) and massive Machine-Type Communication mMTC.

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.

Industry Experience

Qualcomm - Wireless R&D Virtual Internship

Bridgewater, NJ

May 2020 - August 2020

Worked on Multi-radar coexistence in autonomous vehicles, using tools from Wireless Communication and Estimation Theory.

Book Chapter (during Ph.D.)

- o **Ahmed M. Bedewy**, Yin Sun, Sastry Kompella, and Ness B. Shroff, "Sampling and Scheduling for Minimizing Age of Information of Multiple Sources", a chapter in the book *Age of Information: Foundations and Applications*, 2021.

Journal Papers (during Ph.D.)

- o **Ahmed M. Bedewy**, Yin Sun, Sastry Kompella, and Ness B. Shroff, "Optimal Sampling and Scheduling for Timely Status Updates in Multi-source Networks" accepted by *IEEE Transactions on Information Theory*, 2021.
- 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, Rahul Singh, and Ness B. Shroff, "Low-Power Status Updates via Sleep-Wake Scheduling" submitted to *IEEE/ACM Transactions on Networking*, 2021.

Conference Papers

- o **During Ph.D.**
 - Guidan Yao, **Ahmed M Bedewy**, and Ness B. Shroff, "Age-Optimal Low-Power Status Update over Time-Correlated Fading Channel", submitted to *IEEE ISIT*, 2021.
 - Guidan Yao, **Ahmed M Bedewy**, and Ness B. Shroff, "Battle between Rate and Error in Minimizing Age of Information", submitted to *ACM MobiHoc*, 2021.
 - Jiayu Pan, **Ahmed M Bedewy**, Yin Sun, and Ness B. Shroff, "Minimizing Age of Information via Scheduling over Heterogeneous Channels", submitted to *ACM MobiHoc*, 2021.
 - **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. [Running-up Award].
 - **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