

# Ahmed Bedewy

📧 [ahmedbedewy.github.io/osu-bedewy/](https://ahmedbedewy.github.io/osu-bedewy/)

## Contact Information

---

mobile: +1 614-477-7613  
E-mail: [bedewy.2@osu.edu](mailto:bedewy.2@osu.edu)

Address: 670 Cuyahoga CT  
Columbus, OH 43210

## Research Interests

---

- Age-of-Information Optimization, Wireless Communications, Cognitive Radios

## Education

---

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

**August 2015 - current**

Ph.D. student in Electrical Engineering  
*Advisors: Prof. Ness Shroff, Prof. Yin Sun*

**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 (out of 443): 1<sup>st</sup>.*  
*Thesis: Baseband Implementation of LTE Advanced Downlink Physical Layer.*

## Honors and Awards

---

- Student Travel Grant to attend IEEE ISIT, 2017
- Student Travel Grant to attend IEEE ISIT, 2016
- Ranked 1<sup>st</sup> over Electrical Engineering Class of 2011, Alexandria University
- Awarded the Prof. Abdelsamie Mustafa prize for the 1<sup>st</sup> 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 1<sup>st</sup> during 2008-2011 in Electrical Engineering
- Ranked 1<sup>st</sup> 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.

### **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 queueing 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.

## **Submitted Journals**

---

- o **Ahmed M. Bedewy**, Yin Sun, and Ness B. Shroff, "The Age of Information in Multihop Networks", submitted to *IEEE Transactions on Information Theory*, 2017: <http://arxiv.org/abs/1712.10061>
- o **Ahmed M. Bedewy**, Yin Sun, and Ness B. Shroff, "Minimizing the Age of the Information through Queues", submitted to *IEEE Transactions on Information Theory*, 2017: <https://arxiv.org/abs/1709.04956>

## **Conference Papers**

---

- o **Ahmed M. Bedewy**, Yin Sun, and Ness B. Shroff, "Age-Optimal Information Updates in Multihop Networks", *IEEE ISIT*, 2017.
- o **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 **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.
- o **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.
- o **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 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, Matlab and  $\text{\LaTeX}$

**Wireless Standards:** GSM, GPRS, UMTS, LTE and LTE-A

## 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