Caglar Tunc — Curriculum Vitae

Contact Information

Sabanci Universitesi, FASS 2029,
Orta Mahalle, Tuzla,
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Research Interests

6G, O-RAN, V-RAN, NTNs, and Digital Twins. Stochastic design and analysis of wireless networks. Applications of machine learning for Beyond 5G.

Education

NYU Tandon School of Engineering, New York, NY, USA
Ph.D., Electrical and Computer Engineering, September 2016 - February 2022

- **CGPA:** 3.97/4.00
- **Advisor:** Prof. Dr. Shivendra Panwar
- **Dissertation title:** *"Mitigating the Challenges of Low-Latency Services in Future Wireless Networks"*
- Ernst Weber Fellowship, Ph.D.
- **Related Courses Taken:** Wireless Communications, Massive MIMO, Advanced Machine Learning, Convex/Nonsmooth Optimization, Information Theory, Advanced Signal Processing, Queuing Theory

Bilkent University, Ankara, Turkey
M.S., Electrical and Electronics Engineering, September 2013 - June 2016

- **CGPA:** 3.84/4.00
- **Advisor:** Prof. Dr. Nail Akar
- **Thesis title:** *"Energy Management in Energy Harvesting Wireless Sensor Nodes With Lifetime Constraints"*
- TUBITAK Graduate Scholarship

B.S., Electrical and Electronics Engineering, August 2009 - June 2013

- **CGPA:** 3.77/4.00
- Comprehensive Scholarship by Placement Examination (OYS)

Ankara Ataturk Anatolian High School, Ankara, Turkey September 2005 - June 2009

Work Experience

Sabancı University, İstanbul, Türkiye
Assistant Professor of Electronics Engineering September 2024 - Present

Turkcell 6GEN Lab, Maltepe, İstanbul, Türkiye
6G Researcher February 2024 - September 2024

- Investigating technologies and verticals for 6G networks
- Coordinating national and EU projects

AT&T Labs Research, Bedminster, NJ, USA
Senior Inventive Scientist March 2022 - January 2024

- Research and development of O-RAN-based networking
- Development of the Digital Twin platform for cellular network automation and testing

Samsung Research America, Berkeley Heights, NJ, USA
Intern, Standard and Mobility Innovation (SMI) May 2020 - August 2020

- Electric and magnetic fields (EMF)-based power control for Massive MIMO

Futurewei Technologies, Bridgewater, NJ, USA
Systems Engineering Intern May 2019 - August 2019

- Data/statistical analysis and machine learning-based prediction/performance improvement of link adaptation in 5G-NR

Systems Engineering Intern May 2018 - August 2018

- Optimizing link adaptation in 5G-NR using machine learning techniques

Systems Engineering Intern May 2017 - August 2017

- Carrier aggregation in LTE-Advanced

ASELSAN, Ankara, Turkey
Part-Time System Engineer December 2012 - June 2013

- Design of Wireless Communication Devices and Networks for Police and Gendarmerie

Academic Experience

NYU Wireless, NYU Tandon School of Engineering, New York, NY, USA

Research Assistant

Teaching Assistant September 2016 - February 2022

- Internet Architecture and Protocols, Graduate Core Course
- Fundamentals of Communication Theory, Undergraduate Core Course
- Communication Networks, Undergraduate Core Course
- Probability and Stochastic Processes, Graduate Core Course

Bilkent University, Ankara, Turkey Fall 2013 - Spring 2016

Research Assistant

Graduate Teaching Assistant

- Internet Architecture and Protocols, EEE536, Graduate Elective Course
- Telecommunications I, EEE431, 4^{th} year Undergraduate Elective Course
- Microprocessors, EEE212, 2^{nd} year Undergraduate Course
  - Project & Laboratory Coordinator Assistant

Professional Service

Associate Editor

IEEE Wireless Communications Letters March 2024 - Present

Technical Program Committee Member

IEEE Conference on Standards for Communications and Networking (CSCN 2024)
Track on Softwarization, Slicing, Automation and Network Management

Book Chapter

- K. Joshi, TX. Tran and **C. Tunc**. "Digital Twin for Beyond 5G", *AI in Wireless for Beyond 5G Networks*, IEEE Press Series on Digital and Mobile Communications, CRC Press, February 2024.

Journal Publications

- **C. Tunc** and S. Panwar. "Mitigating the Impact of Blockages in Millimeter-Wave Vehicular Networks through Vehicular Relays", *IEEE Open Journal of Intelligent Transportation Systems*, July 2021.
- **C. Tunc**, MF. Özkoç, F. Fund and S. Panwar. "The Blind Side: Latency Challenges in Millimeter Wave Networks for Connected Vehicle Applications", *IEEE Transactions on Vehicular Technology*, December 2020.
- E. O. Gamgam, **C. Tunc** and N. Akar. "On the Queuing Model of the Energy-Delay Trade-Off in Wireless Links with Power Control and Link Adaptation", *IEEE Transactions on Communications*, February 2019.
- N. Akar, **C. Tunc**, M. A. Gaertner and F. Erden. "Performance of Shortest Cumulative Access Time First (SCATF) Disk Scheduling Algorithms", *The Turkish Journal of Electrical Engineering & Computer Sciences*, July 2017.
- **C. Tunc** and N. Akar. "Markov Fluid Queue Model of an Energy Harvesting IoT Device with Adaptive Sensing", *Performance Evaluation*, May 2017.
- **C. Tunc** and N. Akar. "Fixed-point Analysis of a Network of Routers with Persistent UDP and TCP Flows and Class-based Weighted Fair Queuing" *Telecommunication Systems*, July 2016.
- **C. Tunc** and N. Akar. "Mapping Time-varying IP Traffic to Flexible Optical Paths in Flexgrid Optical Networks" *Photonic Network Communications*, August 2014.

Working Papers

- K. Czapiga, S. Isci, Y. Karon, V. Kounev, TX Tran and **C. Tunc**. "AI-Accelerated Digital Twins for 6G", in progress.

Patents

- Z. Lin, S. Das, **C. Tunc** and J. Zhang. "Apparatus and method for managing the exposure to electric and magnetic fields (EMF)", US11064443B1, July 2021.

Conference Publications

- **C. Tunc**. "Optimal Digital Twinning of Random Systems with Twinning Rate Constraints", accepted to *IEEE International Workshop on Computer Aided Modeling and Design of Communication Links and Networks (CAMAD 2024), 1st Workshop on Systems and Technologies for IT/OT Integration in industry 4/5.0 Environments (SITE 2024)*.

- MF. Özkoç, **C. Tunc** and S. Panwar. "Data-Driven Beamforming Codebook Design to Improve Coverage in Millimeter Wave Networks", *IEEE 95th Vehicular Technology Conference: VTC2022-Spring*.
- **C. Tunc** and S. Panwar. "Analysis of Outage Probability and Duration in Millimeter Wave Vehicle-to-Infrastructure Networks", *IEEE 92nd Vehicular Technology Conference: VTC2020-Fall*, Victoria, BC Canada.
- **C. Tunc** and S. Panwar. "Optimal Transmission Policies for Energy Harvesting Age of Information Systems with Battery Recovery", *2019 Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, USA.
- **C. Tunc**, MF. Özkoç and S. Panwar. "Millimeter Wave Coverage and Blockage Duration Analysis for Vehicular Communications", *IEEE 90th Vehicular Technology Conference: VTC2019-Fall*, Honolulu, Hawaii, USA.
- **C. Tunc** and N. Akar. "Efficient Transport of Time-varying IP Traffic in Flexi-grid Optical Networks", *Signal Processing and Communications Applications Conference (SIU)*, Trabzon, Turkey, April 2014.

Presentations

- **C. Tunc** K. Duran, B. Bilgin, G. Kalem, B. Canberk. "DTRAN: A Special Use Case of RAN Optimization using Digital Twin", *European Conference on Networks and Communications (EuCNC 2024) & 6G Summit*, Antwerp, Belgium, June 2024.
- **C. Tunc** and N. Akar. "Performance Modeling of Delay-based Dynamic Speed Scaling", *The Ninth International Conference on Matrix-Analytic Methods in Stochastic Models (MAM9)*, Budapest, Hungary, June 2016.

Dissertation

C. Tunc. "Mitigating the Challenges of Low-Latency Services in Future Wireless Networks." *Ph.D. Dissertation*, New York University, May 2022.

Thesis

C. Tunc. "Energy Management in Energy Harvesting Wireless Sensor Nodes with Lifetime Constraints." *MS Thesis*, Bilkent University, June 2016.

Languages

English: Fluent, **Spanish**: Moderate, **German**: Beginner, **Turkish**: Native

Comp. Skills

Python, Matlab/CVX/Gurobi, Torch, TensorFlow, VHDL, Java, R, AMPL, Assembly.

Awards & Achievements

- Ernst Weber Fellowship (Ph.D.), NYU Tandon School of Engineering
- TUBITAK Graduate Scholarship
- Bilkent University Master of Science Study Full Scholarship
- Bilkent University High Honor Student (2009-2010 Fall, 2009-2010 Spring, 2010-2011 Fall, 2010-2011 Spring, 2011-2012 Fall, 2012-2013 Fall, 2012-2013 Spring)
- Bilkent University Honor Student (20011-2012 Spring)
- TUSIAD's 'Bu Gençlikte İş Var' Honourable Mention Award
- Ranked 420th in University Entrance Exam among 1.4 million candidates