Gokberk Yaylali

January 2025

New Haven, CT, USA | +1 203 506 62 90 | gokberk.yaylali@yale.edu

Research Interests

Mathematical optimization, distributionally robust optimization, risk-aware decision-making & stochastic resource allocation, quantitative analysis, risk-constrained optimization, machine learning, information theory

Education

Yale University — New Haven, CT, USA
Ph.D. Electrical & Computer Engineering — *Aug. 2022 – Present*
- **Advisor:** Prof. Dionysis Kalogerias
- **Concentration:** *Stochastic Optimization & Decision-Making*

Bogazici University — Istanbul, TR
M.Sc. Electrical and Electronics Engineering, magna cum laude — *Jan. 2020 – June 2022*
- **Thesis Title:** Design, Analysis, and Channel Modeling of Molecular Multiple-Receiver Communication Systems
- **Thesis Advisor:** Prof. Ali Emre Pusane
- **Specialization:** *Communications & Signal Processing*

Bogazici University — Istanbul, TR
B.Sc. Electrical and Electronics Engineering, cum laude — *Sept. 2014 – Jan. 2020*
B.Sc. Physics, cum laude — *Sept. 2016 – Jan. 2020*

Research Experience

RADIO Lab, Yale University — New Haven, CT, USA
Graduate Research Assistant — *Aug. 2022 – Present*
- Risk-aware stochastic optimization for resource allocation in wireless networks
- Distributionally robust optimization via coherent risk measures

Nanonetworking Research Group, Bogazici University — Istanbul, TR
Graduate Research Assistant — *Jan. 2020 – July 2022*
- Channel impulse response modeling and capacity analysis of molecular MIMO topologies
- Implementation of molecular *index modulation*-based communication schemes
- Molecular communication modulations based on deep learning methods

Teaching Experience

ENAS 435: Decisions and Computations Across Networks — New Haven, CT, USA
Teaching Fellow — *Spring 2024*
- Instructor: Prof. A. Stephen Morse, Yale University

ENAS 432: Linear Systems — New Haven, CT, USA
Teaching Fellow — *Fall 2024*
- Instructor: Prof. A. Stephen Morse, Yale University

Conferences

[1] **G. Yaylali** and D. Kalogerias, "Distributionally Robust Power Policies for Wireless Systems under Power Fluctuation Risk," *2024 58th Asilomar Conference on Signals, Systems & Computers*, Pacific Grove, CA, USA, 2024.

[2] **G. Yaylali** and D. Kalogerias, "Stochastic Resource Allocation via Dual Tail Waterfilling," *2024 58th Annual Conference on Information Sciences and Systems (CISS)*, Princeton, NJ, USA, 2024, pp. 1-6.

[3] **Gokberk Yaylali** and Dionysis Kalogerias, "Robust and Reliable Stochastic Resource Allocation via Tail Waterfilling," *2023 IEEE 24th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC), Shanghai, China*, 2023, pp. 256-260.

Journals

[1] **Gokberk Yaylali**, Bayram C. Akdeniz, Tuna Tugcu and Ali E. Pusane, "Channel Modeling for Multi-Receiver Molecular Communication Systems," in *IEEE Transactions on Communications*, vol. 71, no. 8, pp. 4499-4512, Aug. 2023.

[2] O. Kara, **G. Yaylali**, A. E. Pusane, and T. Tugcu, "Molecular index modulation using convolutional neural networks," *Nano Communication Networks*. Elsevier BV, p. 100420, Oct. 2022.

Preprints

[1] **G. Yaylali** and D. Kalogerias, "Distributionally Robust Resource Allocation via Tail Waterfilling," *under preparation*, 2025.

[2] **G. Yaylali** and D. Kalogerias, "Quantile Optimization in Wireless Networks via Conditional Value-at-Risk," *under preparation*, 2025.

Projects

Risk-Aware Resource Allocation for Robust Wireless Autonomy *Aug. 2023 – Present*
Principal Investigator: Prof. Dionysis Kalogerias
NSF Research Project

- Risk-Aware stochastic optimization for resource allocation in power-constrained multi-terminal point-to-point communication networks with fading. The generalizing solution extends the classical waterfilling algorithm. Convergence analysis of the problem for nonconvex channel rate functions is included.

Design of Index Modulation-Based Molecular Communication Systems *Jan. 2020 – June 2022*
Supervisor: Prof. Ali Emre Pusane
Bogazici NRG - TUBITAK Research Project

- Comprehensive analysis on molecular multiple-receiver systems, with respect to communication performance and channel characteristics. Additionally, an elaborate channel modeling is provided for molecular multiple-receiver systems with fully-absorbing spherical receivers.

Hand Gesture Recognition via AI *Apr. 2018 – June 2018*
Term project

- Hand gesture recognition from live camera stream, via several machine learning methods such as *logistic regression, neural nets, decision tree* and *random forest*. Recognised hand gestures are fed into unsupervised *rock, paper, scissors* game.

Honors and Scholarships

- Fully funded Ph.D. Fellowship by Yale University *2022 to 2023*
- Special Achievement Award for Master's Thesis by IEEE Communications Society Turkey *Aug 2022*
- Scientific Research Projects Scholarship by TUBITAK – ($18k/year) *2020 to 2022*
- Honor awarded by Bogazici University Faculty of Engineering & Faculty of Arts and Sciences *Jan. 2020*
- Domestic Undergraduate Scholarship by TUBITAK – ($3k/year) *2016 to 2020*
- Ranked Top 0.01% among 2 million students in the national university entrance exam *June 2014*

Professional Experience

Pointr: The Deep Location Company Istanbul, TR
Machine Learning Intern *June 2019 – Aug. 2019*

- Development of a robust imputation service for positional data of indoor devices via deep learning techniques
- Utilization of positional data for business insights using other *Deep Analytics* services as per client specifications

Technical Skills

Technical Languages: MATLAB, PYTHON, C/C++, LaTeX
Libraries: `pandas, Tensorflow, PyTorch, numpy, scikit-learn`
Languages: Turkish (native), English (full professional proficiency)

References

Prof. Dionysis Kalogerias dionysis.kalogerias@yale.edu
Assistant Professor
Department of Electrical and Computer Engineering
Yale University

Prof. Ali Emre Pusane ali.pusane@bogazici.edu.tr
Professor
Department of Electrical & Electronics Engineering
Bogazici University