NYU Wireless - 370 Jay Street
Brooklyn, NY 11201
+1 (929) 678 7926
fbs6417@nyu.edu, fberkay052@hotmail.com
Full time graduate student enrolled in a US institution

Fatih Berkay Sarpkaya

Education

2022-Present **Doctor of Philosophy (Ph.D.)**, *New York University Tandon School of Engineering*, Brooklyn, NY
Major: Electrical & Computer Engineering, Advisor - Professor Shivendra Panwar, **CGPA : 4.00/4.00**

2017-2022 **Bachelor of Science (B.Sc.)**, *Bilkent University*, Ankara, Turkey
Major: Electrical and Electronics Engineering, **CGPA : 3.77/4.00**

Research Interests

Low Latency Networking, TCP Congestion Control, Wireless Communication

Internships

Summer 2024 **Interdigital**, *Research & Innovation Wireless Intern*, New York, NY
Benchmarking Flexible Packet Coding performance - Generative Semantic Communication literature search — Manager: Pascal Adjakple

- Implemented Network Coding and Packet Duplication on MATLAB in various scenarios and compared their performance.
- Conducted a literature search on Generative AI Semantic Communication and its potential impacts on current communication systems.

Publications

July 2024 **F. B. Sarpkaya**, A. Srivastava, F. Fund, and S. Panwar, "To switch or not to switch to TCP Prague? Incentives for adoption in a partial L4S deployment," in *Proceedings of the 2024 Applied Networking Research Workshop (ANRW '24)*, Vancouver, AA, Canada, Jul. 2024, pp. 45–52. Association for Computing Machinery, New York, NY, USA. Available: `https://doi.org/10.1145/3673422.3674896`

Research Experience (Ph.D.)

June 2023-Present **TCP Congestion Control**
NYU Wireless Research Center — Advisors: Fraida Fund, Shivendra Panwar

- Designed experiments on network emulation testbeds to study the co-existence of different Congestion Control protocols.
- Analyzed the potential problems associated with the incremental deployment of Low Latency, Low Loss, Scalable Throughput (L4S) over the public internet and conducted experimental analyses of these problems on FABRIC testbed.
- Reviewed and analyzed Internet Engineering Task Force (IETF) standards and RFC documents related to L4S, including RFC 3168, 9330, 9331, and 9332.
- Presented the L4S coexistence research at **KNIT 8: A FABRIC Community Workshop**, discussing preliminary findings and providing an in-depth view of our experimental methodology on the FABRIC testbed. This included insights into effective strategies for generating large-scale experiment setups with a range of parameters.

May 2023-Present **Dynamic Cross-layer Design with Mutual Awareness across Wireless and Video Sub-systems**
NYU Wireless Research Center (in collaboration with Interdigital) — Advisors: Pei Liu, Yao Wang, Elza Erkip, Shivendra Panwar

- Analyzed wireless (5G/6G) XR systems in terms of their Key Performance Indicators (KPIs) and implementation challenges.
- Reviewed and analyzed KPIs of 5G systems based on Third Generation Partnership Project (3GPP) documents, including 3GPP 23501, 22104, 22261.

Feb 2024- Present **Capacity of a Binary Channel with a Time-Bounded Adversary**
NYU Wireless Research Center — Advisors: Sundeep Rangan, Elza Erkip

- Investigated reliable communication over a binary input memoryless channel under a time-bounded adversary, which can overwrite a fraction of received symbols.
- Completed theoretical proofs on the worst-case capacity of a binary channel with a time-bounded adversary.
- Derived a method using a thresholded log-likelihood ratio (LLR) decoder to achieve this capacity.
- Developed simulations on MATLAB to test the proposed methods and demonstrated practical implementation on real LDPC codes, showing the feasibility of the proposed methods.

Course Projects

Spring 2023 **ECE-GY 7363 - Network Design and Algorithms Project**, *NYU Tandon School of Engineering*
Multi-Hour Node Location Problem

- Found the optimal Transit Nodes and Links to be installed so that the Multi-Hour demands between the access nodes are met subject to the minimal capital cost of installing the nodes, links and operational cost of the links.
- Proposed Link-Path Formulation and tested it with AMPL.
- Proposed Heuristic Algorithm for the installation problem and compared the results with AMPL solution.
- Extended the same problem in the case of multiple Link Failures in restricted configuration such that only the flows with paths having a link failure must be re-routed and the remaining flows follow the same path as without failure scenario.

Fall 2021 - Spring 2022 **Senior Project**, *Electrical and Electronics Engineering*, Bilkent University
Distance Map Extraction and Road Defect Detection Using Stereo Vision

- Used stereo vision data and deep-learning beased object detection methods to detect potholes and speed-bumps on the road.
- Extracted the disparity map of two cameras and used it to estimate the distance from detected objects to the camera.
- Projected object detection and distance estimation outputs on real-time frames, onto a two-dimensional surface considering perspective shifts.

Spring 2021 **CS421 - Computer Networks Project**, *Electrical and Electronics Engineering*, Bilkent University
Flooding the P2P Overlay Network by Python

- Developed a Python program to simulate message flooding in a peer-to-peer network based on user-defined topology.

Spring 2021 **EEE485 - Statistical Learning and Data Analytics Term Project**, *Electrical and Electronics Engineering*, Bilkent University
Mobile Price Classification

- Developed a mobile phone price classifier using three distinct machine learning algorithms, including kNN, Naive Bayes and Multinomial Logistic Regression.
- Conducted performance analysis on the machine learning algorithms to evaluate accuracy and speed.

Fall 2019 **EEE102 - Introduction to Digital Circuit Design Term Project**, *Electrical and Electronics Engineering*, Bilkent University
Distance Adjuster Car

- Engineered a dynamic vehicle-following system that adjusts the distance between two cars, utilizing a Basys3 FPGA board, Arduino, and distance sensors.

Fall 2019 **EEE211 - Analog Electronics Term Project**, *Electrical and Electronics Engineering*, Bilkent University
TRC-10 HF Transceiver

- Constructed an HF radio transceiver operating in the frequency range 100 Hz - 30 MHz.

Work and Internship Experience (Undergraduate)

Nov. 2021 - June 2022 **ASELSAN**, *Candidate Engineer*, Ankara, Turkey
Image Processing

- Practiced the C++ programming language.
- Implemented an edge detection program using MATLAB and C++.

Summer 2021 **ASELSAN**, *Digital Design Intern*, Ankara, Turkey
Implementation of Serial Communication Protocols to an FPGA Board

- Implemented UART protocol with arithmetic logic unit (ALU).
- Implemented Inter-Integrated Circuit (I2C) protocol.

Summer 2020 **ESEN**, *Software Intern*, Ankara, Turkey
Software Development and Analysis in UAV and Navigation Systems

- Created an application to convert between JSON data logs and CSV time series, ensuring message ordering is correct in both directions.
- Generated a sample dataset with random data, structured according to the inertial labs single antenna INS/GPS receiver.
- Investigated and reported on the PX4 project, providing instructions for adding devices to the driver infrastructure.
- Analyzed GPS noise in the Gazebo simulator.

Awards & Honors

2022-Present School of Engineering **Fellowship** at NYU Tandon School of Engineering

2017-2022 Comprehensive **Scholarship** at Bilkent University

2017 Ranked **450th** in **University Entrance Exam (LYS)** among 2 million high school students.

Relevant Coursework

NYU - ECE Probability & Stochastic Processes | Internet Architecture & Protocols | Network Design and Algorithms | Data Center & Cloud Computing | Machine Learning | Network Modeling and Analysis | Digital Communication | Wireless Communication | Introduction to Wireless Networking

Bilkent - EE Computer Networks | Telecommunications I | Telecommunications II | Probability and Statistics | Statistical Learning and Data Analytics

Technical Skills

Programming Python, Linux Kernel, VHDL, Assembly

Software MATLAB, LTSpice, MS Office

Systems GENI testbed, CloudLab testbed, Fabric testbed

Teaching & Mentoring experience

Fall 2023 & Spring 2024 **Course Assistant**, *Internet Architecture & Protocols*, ECE–GY 6353, NYU Tandon School of Engineering

- Resolved student doubts in weekly office hours.
- Helped with developing new homework and exam questions.
- Helped with proctoring midterm and final exams.

Summer 2023 **Mentor**, *ARISE High School Summer Research Program*, NYU Tandon School of Engineering

- Mentored two high school students on their projects related to cloud and edge computing.

Spring 2023 **Course Assistant**, *Communication Networks*, ECE–UY 3613, NYU Tandon School of Engineering

- Resolved student doubts in weekly office hours.
- Developed new homework/quiz problems and lab assignments weekly.
- Assisted the course instructor with assignment and exam preparation, grading, and student communication.

Additional Activities

2018-2022 Active Member of Bilkent University IEEE Student Branch

July 2019 Engaged in short-term volunteer work supporting children with disabilities through the European Voluntary Service (EVS) in Macedonia.