

Burak Hasircioğlu

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Education

Imperial College London

PH.D. IN ELECTRICAL AND ELECTRONIC ENGINEERING

London, United Kingdom

Dec. 2018 - June 2022 (expected)

- I am working on techniques for **efficient, secure** and **private distributed learning**.
- This includes **coded computation** techniques for dependable, fast and private distributed machine learning.
- Moreover, I am working on **differentially private** distributed training of machine learning models, especially **in wireless medium**, of which we can utilize the physical properties to improve the privacy.
- Supervisor: Prof. Deniz Gündüz

Ecole polytechnique fédérale de Lausanne (EPFL)

MSc. IN COMMUNICATION SYSTEMS

Lausanne, Switzerland

Sept. 2014 - Feb. 2017

- GPA: 5.18/6.00
- The topic of my master's thesis was multi-server coded caching.
- My thesis supervisors were Prof. Michael Gastpar and Saeid Sahræi
- The full text of my master's thesis can be reached on <https://bit.ly/2pdKV4c>
- I also worked in LCA2 research group as a master research scholar during my master's course. I give details in Experience section.

Middle East Technical University (METU)

B.S. IN ELECTRICAL AND ELECTRONICS ENGINEERING

Ankara, Turkey

Sept. 2010 - June 2014

- Specialization: Communication
- GPA: 3.79/4.00

Middle East Technical University (METU)

MINOR DEGREE IN PHYSICS

Ankara, Turkey

Sept. 2011 - Feb. 2014

- A minor program orthogonal to electrical engineering B.S. program

Experience

Turkish Aerospace Industries, Inc. (TAI)

DESIGN ENGINEER AT FLIGHT MECHANICS AND AUTOPILOT SYSTEMS DIVISION

Ankara, Turkey

Oct. 2017 - Nov. 2018

- I worked on the software verification of a recently developed helicopter's flight control computer
- I had a role of the development of a simulation environment (in C++) necessary for the verification and system integration of the flight control computer
- I also designed and implemented algorithms for distributed services of the simulation environment to work consistently.

ABB Corporate Research Center

INTERN

Baden- Dättwil, Switzerland

Mar. 2016 - Aug. 2016

- Design, implementation (in C++), and documentation of modules for fault tolerance in a service-oriented architecture
- Integration of fault tolerance modules with a message bus infrastructure and real-time runtime environment
- Verification of functional and non-functional properties by unit and system tests

Laboratory for Communications and Applications 2 (LCA2), EPFL

MASTER RESEARCH SCHOLAR

Lausanne, Switzerland

Sept. 2014 - Feb. 2016

- As a part of a smart grid research project, I made performance analysis and improvements to the grid agent software which has real-time requirements. It was developed within the research group for the practical demonstrations of the research.
- The project was in C++. I also gained some experience in profilers such as Valgrind.
- Supervisors: Prof. Jean-Yves Le Boudec and Dr. Niek Johannes Bouman

Publications

- Hasircioglu, Burak, Gomez-Vilardebo Jesus, and Gunduz Deniz. **"Speeding Up Private Distributed Matrix Multiplication via Bivariate Polynomial Codes"** Available: <https://arxiv.org/pdf/2102.08304.pdf>
- Malekzadeh Mohammad, Hasircioglu Burak, Mital Nitish, Katarya Kunal, Ozfatura M Emre and Gunduz Deniz. **"Dopamine: Differentially Private Secure Federated Learning on Medical Data."** *The Second AAAI Workshop on Privacy-Preserving Artificial Intelligence (PPAI-21)* Available: <https://arxiv.org/pdf/2101.11693.pdf>
- Hasircioglu, Burak and Gunduz Deniz. **"Private Wireless Federated Learning with Anonymous Over-the-Air Computation"** To appear in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2021*. Available: <https://arxiv.org/pdf/2011.08579.pdf>.
- Hasircioglu, Burak, Gomez-Vilardebo Jesus, and Gunduz Deniz. **"Bivariate Hermitian Polynomial Coding for Efficient Distributed Matrix Multiplication"** *IEEE Global Communications Conference (Globecom) 2020*. Available: <https://bit.ly/BivariateHermitianCoding>.
- Hasircioglu, Burak, Gomez-Vilardebo Jesus, and Gunduz Deniz. **"Bivariate Polynomial Coding For Straggler Exploitation With Heterogeneous Workers"** *IEEE International Symposium on Information Theory (ISIT), 2020*. Available: <https://bit.ly/HGVG-ISIT2020>.
- Hasircioglu, Burak, Gomez-Vilardebo Jesus, and Gunduz Deniz. **"Bivariate Polynomial Coding for Exploiting Stragglers in Heterogeneous Coded Computing Systems"** *arXiv:2001.07227, 2020*. Available: <https://arxiv.org/pdf/2001.07227.pdf>.
- Hasircioglu, Burak, Yvonne-Anne Pignolet, and Thanikesavan Sivanthi. **"Transparent Fault Tolerance for Real-Time Automation Systems."** In *Proceedings of the 1st International Workshop on Internet of People, Assistive Robots and Things*, pp. 7-12. ACM, 2018.

Scholarships & Achievements

- **ITU AI/ML in 5G Challenge** Our team is the winner of the "Privacy Preserving AI/ML for healthcare applications" problem
- **Imperial College London, EEE Departmental PhD Scholarship** (Dec. 2020-May 2022)
- **TUBITAK, International Doctoral Fellowship** (Dec. 2018-Nov. 2020)
- **EPFL Research Scholars MSc Program** (Sept. 2014-Feb. 2016)
- **Bülent Kerim Altay High Success Award by METU EEE Department** (Fall 2010, Spring 2011, Fall 2011)

Computer Skills

- C, C++
- Python (with some experience on PyTorch, Opacus (DP library) and TensorFlow)
- MATLAB
- Linux
- Git, SVN

Teaching

Programming for Engineers

TEACHING ASSISTANT, IMPERIAL COLLEGE LONDON

- Guidance to students for programming exercises in C++
- Exam marking

Communication Systems Electronics Lab

TEACHING ASSISTANT, IMPERIAL COLLEGE LONDON

- Guidance to students during lab sessions
- Conducting the oral examinations of the course and marking

Communication Systems

TEACHING ASSISTANT, IMPERIAL COLLEGE LONDON

- Exam marking

Advanced Digital Communications

TEACHING ASSISTANT, EPFL

- Guidance to students in weekly exercise sessions
- Homework marking