

Selin Yildirim

PHD STUDENT IN COMPUTER SCIENCE

University of Illinois at Urbana-Champaign

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Summary

2nd year PhD student in Computer Science being focused and dedicated with a desire to gain strong academic and technical experience in High Performance Computing and Parallel Computing. Taking a role in a brilliant academic research group where cutting-edge innovations and team collaboration are basic priorities. An excellent communicator and team player with the ability to meet deadlines and quickly resolve issues. Not only multilingual and ambitious, but also enjoys being a great value to research teams.

Experience

- GRADUATE RESEARCH ASSISTANT, Coordinated Science Laboratory

INSTITUTION: UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Champaign, IL, USA

05/2023 - Current

Research Project: GPU Virtualization by UIUC and Princeton University, supervised by Dr. Deming Chen and Dr. Kai Li: Leading the GPU Virtualization subproject for Library as a Service project. GPU Virtualization aims to provide a framework for NVIDIA GPUs where full isolation of GPU resources are provided to cloud multi-tenants. Working hands-on with hypervisors, CUDA, Kubernetes and Docker.

- GRADUATE RESEARCH ASSISTANT, Parasol Lab

INSTITUTION: UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Champaign, IL, USA

08/2022 - 05/2023

Research Project: Exoplanet by UIUC (Dr. Rauchwerger) and Insuper, funded by NASA: Achieved remarkable speedups for the scientific code in Exoplanet Project on the distributed machines of Campus Cluster, UIUC. Used software-focused pure parallelism concepts such as combining different parallel algorithms with unique advantages to obtain a trade-off between them to accelerate the execution time of a graph traversal problem, developing optimizations for parallel algorithms that might also involve tensor computations (such as bottom-up BFS with direction optimization), finding dynamic scheduling strategies of threads and data distribution techniques that would best-fit a particular problem definition, as well as investigating different data decomposition techniques for memory bound problems.

- UNDERGRADUATE RESEARCH ASSISTANT

INSTITUTION: DEPARTMENT OF COMPUTER ENGINEERING, MIDDLE EAST TECHNICAL UNIVERSITY

Ankara, TURKEY

10/2021 - 08/2022

Job Description: Academic research on parallelization of Skew-Symmetric Sparse Matrix-Vector Multiplication problem, with the paper *Parallel Sparse Skew-Symmetric Matrix-Vector Multiplication with Reverse Cuthill-McKee Reordering*, under the supervision of *Prof. Dr. Murat Manguoğlu*. Our research has been ranked 2nd in the undergraduate research competition at METU.

- HIGH PERFORMANCE COMPUTING TRAINEE, ERASMUS+ TRAINEESHIP

INSTITUTION: HIGH PERFORMANCE COMPUTING STUTTGART (HLRS), UNIVERSITY OF STUTTGART

Stuttgart, Baden-Württemberg,

GERMANY

07/2021 - 10/2021

Job Description: Erasmus+ Trainee is expected to work on the project, *ExaHyPE*, which is funded by European Union's Horizon 2020 research and innovation program under grant agreement No 671698, as a part of the exascale computing project *ChEERE*, which aims to forecast and simulate possible natural disasters to minimize the damage by better predicting them and its *trailer* is available. The assigned task of trainee, who collaborates with the SPMT Team, is to optimize I/O operations which takes relatively long time by using various parallel programming skills. Trainee developed parallel applications such as Sieve of Eratosthenes Prime Finder Algorithm with the TBB library. Asynchronous Tasks Optimization on I/O Operations of ExaHyPE's Compressible Navier-Stokes Example.

- C++ DEVELOPER

COMPANY: ARGOS AI, MIDDLE EAST TECHNICAL UNIVERSITY TECHNOPARK

Ankara, TURKEY

10/2020 - 3/2021

Job Description: C++ developments to control airport cameras and capture point of views, then by computer vision engineering processing those images for foreign object detection to keep runways and aprons of airports safe for upcoming flights. Worked on isolation of a microservice from a big monolith C++ project, which controls a remote Pan-Tilt Unit and a Vimba camera, then automated the microservice by deploying it on a gRPC server. Also worked in DevOps, used Docker to perform developments and provided an establishment of a log stash making use of Kibana Elasticsearch.

- DEEP LEARNING/DATA SCIENCE INTERN

COMPANY: OTSIMO, MIDDLE EAST TECHNICAL UNIVERSITY TECHNOPARK

Ankara, TURKEY

06/2020-10/2020

Job Description: In Otsimo, a company developing mobile application for special children with Autism, I worked on Speech Recognition neural network whose development is inspired by Apple Siri's algorithm, on remote computing platforms and performed data analysis using Big Query on Google Cloud. Assigned tasks are as follows; data augmentation, generating datasets of audio files; training, converting and testing ML models; model tracing/scripting; supervised learning, confusion matrices for categories; adopting accuracy/loss calculations to trainings; training parameters to control the learning algorithm; analyzing application and customer data on BQ; implementing CLI for admin web interface using Golang. Used Technologies are Python, Golang, Octave, SQL, Node.js, Amazon Web Services, MATLAB, GarageBand, MLTest, coremltools, mdbook

- UNDERGRADUATE TEACHING ASSISTANT

DEPARTMENT OF COMPUTER ENGINEERING, MIDDLE EAST TECHNICAL UNIVERSITY

Ankara, TURKEY

02/2020 - 03/2020

Job Description: Assisted sophomore students in computer laboratories who study **CENG230 - C Programming** offered by Department of Computer Engineering. Job duration had been limited by the unpredictable outbreak of CoViD19 pandemic.

Education

University of Illinois at Urbana-Champaign

DOCTOR OF PHILOSOPHY IN COMPUTER SCIENCE

IL, USA

2022 - Current

GPA: 3.89

Middle East Technical University

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

Ankara, TURKEY

2017 - 2022

High Honor with CGPA: 3.56

Top ranked Computer Science department with the highest research output in Turkey. *Curriculum* is accredited by the Engineering Accreditation Commission of ABET. My top-interest courses were Introduction to Parallel Programming, Quantum Computing, Guided Research, Computer Architecture and Operating Systems.

Mersin Fen Lisesi (Science Highschool of Mersin)

HIGH SCHOOL: SCIENCE AND MATHS

Mersin, TURKEY

2013 - 2017

Conducted a project about "Van de Graaff's Generator and the Fourth State of the Matter" at Scientific and Technological Research Council of Turkey (TUBITAK)'s science and project exhibition (2015, May). Graduation Grade: 95.99/100

Skills

GPU programming, CUDA, object-oriented compilers

Various programming languages and language concepts; Assembly, C, C++, Python, Golang, Java, Haskell, Prolog, MySQL, Big Query, SQLite, Numpy

Parallel Programming using MPI, OpenMP and Intel TBB libraries, HPC performance analysis tools

Computer organization, instruction architecture sets and knowledge of safe coding; X86 and Y86 architecture and optimizations

Instruction cycle analysis and performance tuning in C and C++

Algorithms analysis and knowledge of various data structures

OS knowledge in Linux, Ext2 File System and multithreading applications in C/C++

Embedded systems development using MPLAB in Assembly and C

Verilog, hardware design with Logisim and Xilinx, HDLs

Basic stack smashing, code injection attacks and return oriented programming, GDB debug and stack trace skills

Database applications and database languages

Machine learning application and preprocessing tools; GarageBand, ML Test, coremltools, scikit-learn

Experience in development tools such as Jira, Bitbucket, GitLab, VSCode, CLion, LaTeX

Conferences

- 10/11/2022 **PACT 2022 - ACM Student Member**, Attended as a guest PhD student to observe academic trends in the domain and to monitor ACM student research competition. ACM Membership Number: 9304625 Chicago, USA
- 09/2021 **Euro MPI 2021**, Attended as an audience guest of HLRS to one of the most important conferences in High Performance Computing in Europe, Euro MPI, which hosts a professional international committee and is conducted by Leibniz Supercomputing Centre of the Bavarian Academy of Sciences and Humanities, Germany. Munich, Germany

Projects

- 10/2021 - 07/2022 **Wanderlust**, Senior project for the Computer Engineering Design Course, CENG491/2. Wanderlust is a mobile application planning holistic touristic trips for people. It has a new multi-variate Traveling Salesman algorithm. In the core, AI-based combinatorics algorithm tries to calculate the maximum satisfaction all-inclusive path, considering user inputs, accommodation preferences, transportation tickets, time, and the city characteristics that might affect derived satisfaction. Department of Computer Engineering, METU
- 07/2021 **Parallel Finding Prime Numbers**, Conducted as a term project, *Parallel Finding Primes*, in a team of 3, during the technical elective course, Introduction to Parallel Programming, CENG478. Deployed on Slurm HPC platform and coded in C++, as well as using MPI library. Researched optimization methods on Sieve Algorithm of Eratosthenes and tried to implement methods proposed in *Parallel Prime Sieve: Finding Prime Numbers* and observed performance metrics. Department of Computer Engineering, METU

Certifications

- 10/2020 **Machine Learning by Andrew NG, Stanford University, Grade:98.82/100**, [Certificate Credentials](#) Coursera
- 09/2020 **Problem Solving**, [Certificate Credentials](#) Hackerrank
- 09/2020 **C++**, [Certificate Credentials](#) Hackerrank
- 09/2020 **Intermediate C**, [Certificate Credentials](#) Hackerrank
- 11/2019 **Extracurricular : Work and Travel Exchange Program**, Photographer and Sales Assistant Maryland, the USA, [Certificate Credentials](#)

Achievements

UNIVERSITY

- 07/2022 **Second Best Research Award**, Guided Research, Department of Computer Engineering, Middle East Technical University Ankara, TURKEY
- 2022-2023 **Departmental Fellowship**, University of Illinois at Urbana-Champaign IL, USA
- 2017-2022 **Non-refundable Grant Award for Skillful Undergraduate Students**, [Sema Yazar Youth Foundation](#) Ankara, TURKEY
- 5x **Placed in High Honor Students Roll**, Middle East Technical University Ankara, TURKEY
- 3x **Certificate of Honor**, Middle East Technical University Ankara, TURKEY

EXAMS

- 2017 **Top 0.05% among 2.162.895 participants**, National University Entrance Exam (LYS) Turkey
- 2013 **Top 0.1% among 1.112.604 participants**, National High School Entrance Examination (SBS) Turkey

Languages

- English** IELTS: 7.5 (C1) , European Online Linguistic Support: C1
- German** A2
- Turkish** Native Language