Kübra Keskin

Education

University of Southern California — Aug 2019 - May 2025
PhD - Electrical and Computer Engineering | GPA: 3.9/4.0 — Los Angeles / CA
MS - Computer Science (Multimedia and Creative Technologies)

Bilkent University — Jun 2017 - Aug 2019
MS - Electrical and Electronics Engineering | GPA: 3.8/4.0 — Ankara / Turkey

Bilkent University — Jun 2012 - Jun 2017
BS - Electrical and Electronics Engineering | GPA: 3.6/4.0 — Ankara / Turkey
Minor - Graphic Design

Skills

- **Programming:** C++, MATLAB, Python, GLSL, JavaScript, HTML, CSS, LaTeX
- **Software:** Autodesk Maya, Adobe Illustrator, Photoshop, InDesign, Microsoft Office
- **Technologies/API:** OpenGL, Visual Studio, Git, Linux

Selected Projects

Ray Tracer, *Computer Graphics* — *USC*

- Implemented ray tracing in **C++** for triangles and spheres, using Phong shading for accurate illumination, shadows for depth perception, and recursive reflection for complex rendering. Added antialiasing to reduce artifacts and soft shadows for natural lighting in 3D scenes.

Roller Coaster Simulation, *Computer Graphics* — *USC*

- Developed a roller coaster simulation using **OpenGL** and **C++**, featuring a first-person view with gravity-based camera movement, achieving a 30fps animation. Employed Catmull-Rom splines for procedurally generated rail tracks and implemented **GLSL** shaders for Phong shading and texture mapping.

Height Fields Using Shaders, *Computer Graphics* — *USC*

- Created a 3D terrain creation tool from input images using **OpenGL** and **C++**, enabling real-time manipulation, various shading modes, and interactive color customization.

Trojan Map, *Computing Principles for Electrical Engineers (Group of 2)* — *USC*

- Implemented a **C++** graph-based map application, optimizing route-finding with algorithms like Dijkstra's and Bellman-Ford, and optimized the Traveling Salesman Problem using 2-opt and 3-opt techniques.

Image Captioning, *Neural Networks (Group of 2)* — *Bilkent*

- Utilized CNN and auto-encoders to acquire lower-dimensional representation of image features. Implemented LSTM and RNN models from scratch in **MATLAB** for generating descriptive image captions, achieving a 0.47 BLEU-1 score.

Visual Object Recognition, *Computational Neuroscience (Group of 3)* — *Bilkent*

- Implemented machine learning models (Gaussian Naive Bayes, Softmax Regression, LDA, SVM, kNN) in **MATLAB** for visual object recognition, achieving 89% multi-class classification accuracy with LDA.

Relevant Coursework

- Computer Graphics | 3D Graphics and Rendering | 3D Modeling, Animation, and Visual Effects
- Advanced Signal Processing | Computational Methods for Inverse Problems
- Optimization for the Information and Data Sciences | Mathematics of High-Dimensional Data
- Machine Learning | Neural Networks | Statistical Learning and Data Analytics
- Analysis of Algorithms | Web Technologies

Experience

Research Assistant

USC - Magnetic Resonance Engineering Laboratory — Aug 2020 - May 2025

Bilkent - National Magnetic Resonance Research Center — July 2017 - Aug 2019

Teaching Assistant

USC - Viterbi School of Engineering — Aug 2021 - May 2022

Bilkent - Department of Electrical and Electronics Engineering — Sep 2017 - Jun 2019

Summer Intern

Aselsan Electronic Industries Inc. — Aug 2016 - Aug 2016

Desistek Robotics Ltd. — Aug 2015 - Aug 2015

Honors and Awards

- USC Annenberg Fellowship - USC — 2019 - 2023
- Ranked twice in top 15 among 30,000 - Turkish Intelligence Foundation Competition — 2017 - 2018
- Comprehensive Scholarship for MS Study - Bilkent — 2017 - 2019
- Ranked 12th among 300,000 - Turkey National Postgraduate Education Entrance Exam — 2017
- Comprehensive Scholarship for BS Study - Bilkent — 2012 - 2017
- Ranked 137th among 1.8 million - Turkey Nationwide University Entrance Exam — 2012
- Ranked 1st - METU Math Society High School Math Competition — 2011

Academic Projects

Imaging Near Metal with High-Performance Low-Field MRI — *USC*

Doctoral Thesis Project

- Simulated advanced multi-spectral imaging techniques near metallic implants using MATLAB, utilizing a realistic digital body phantom and a hip implant scanned with photogrammetry.
- Prepared simulations and obtained preliminary data for an NIH R01 grant application, resulting in a $3M grant award.
- Developed a 3D high-resolution MRI method for patients with metallic implants, eliminating the need for acquiring images in multiple orientations and reducing scan time by 50%.
- Resulted in 3 first-authored conference abstracts.

Efficient Parameter Mapping for Magnetic Resonance Imaging — *Bilkent*

Masters Thesis Project

- Devised a simultaneous parameter estimation technique for fundamental MRI parameters, leading to a 50% faster acquisition time and enhanced parameter estimations compared to the previous method.
- Implemented phase-cycling technique for bSSFP imaging and integrated associated control parameters into MRI operator's user interface using C++ and MRI vendor's programming software.
- Resulted in first-authored publication of 1 journal article and 3 conference abstracts.

Target Localization by Using UAV Monocular Camera and IMU — *Bilkent*

Undergraduate Senior Project (Group of 5) in collaboration with ASELSAN

- Developed a real-time target localization system utilizing ORB-SLAM2 algorithm with UAV monocular camera input, creating 3D point clouds of the environment, tracking UAV movement, and integrating IMU sensor information to convert the virtual environment into real-world units.
- Awarded 1st place in IEEE Turkey Senior Projects Competition and received Innovation in Defense Industry Award from Bilkent University.

Journal Publications

- **Keskin K**, Yılmaz U, Çukur T. Constrained Ellipse Fitting for Efficient Parameter Mapping with Phase-cycled bSSFP MRI. IEEE Transactions on Medical Imaging. 2021.
- Bıyık E, **Keskin K**, Dar SUH, Koç A, Çukur T. Factorized sensitivity estimation for artifact suppression in phase-cycled bSSFP MRI. NMR in Biomedicine. 2020.

Conference Publications (2/9)

- **K Keskin**, NG Lee, J Acharya, KS Nayak. "Isotropic sub-mm bSSFP imaging near metal at 0.55T", 31st Scientific Meeting of ISMRM, Toronto, June 2023.
- **K Keskin**, BA Hargreaves, KS Nayak, "Realistic Simulation of MRI Metal Artifact and Field Strength Dependence", 2021 Proceedings of the 29th Scientific Meeting of ISMRM, Vancouver, May 2021.