Ahmed Uluca

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Birth Date: 10/08/1994
Place of Birth: Bursa, Turkey

Personal Statement:

I am a MSc Physics Engineer focused on the research area of Nanomechanics. I have studied surfaces with Scanning Probe Techniques for seven years in the ITU Nanomechanics lab. Beyond using SPM systems, I built them. I have widened my research area to Nanoindentation and Thermal Transport since I started my graduate degree studies. Currently I am working on superlubricity at high pressures in the EU project SSLiP as a PhD student and looking for opportunities to collaborate and learn from others.

Education:

- **Ph.D.** Physics, Trinity College Dublin (TCD), March 2026 (expected)
  - Funded by EU project SSLiP.
  - Thesis: **High pressure investigation of superlubricious interfaces.**
  - **TCD Studentship Award-2022 (code 1252)**
- **M.Sc.** Physics Engineering, Istanbul Technical University (ITU), April 2022
  - GPA: 3.17/4.00
  - Thesis: Investigation of **Thermal Conduction in Microcontacts** Created by Nanoindentation
- **B.Sc.** Physics Engineering, Istanbul Technical University (ITU), July 2017
  - GPA: 3.13/4.00
  - Thesis: Process and Characterization of **2D Materials**

Teaching/Working Experiences:

- Post-graduate **teaching assistant**, School of Physics, Trinity College Dublin (September 2022-cont.)
- **Internship** at Nanomechanics Laboratory, CRANN Trinity College -Dublin Ireland (06/2017-08/2017)
- **Internship** at Electron Microscopies Laboratory, TUBİTAK Marmara Research Center - Gebze Turkey (06/2016-07/2016)
- **Internship** at Lathe and Levelling Workshop, Istanbul Sehir Hatları Haliç Shipyard -Istanbul Turkey (08/2015-09/2015)

- Istanbul Technical University, Nanomechanics Lab., **Assistant student** (2014-2022)
- Usturlab Children Workshops, **Astronomy-Physics instructor**, (2013-2022)
- Turkish Air Association, Model plane **course instructor**, Habire Yahşi Anadolu High School (2010-2012)

Research Experiences:

- **Simultaneous STM/AFM** System Design and Construction, ITU-Nanomechanics Lab., September 2015-March 2017
- **Fabrication of Thin Films and 2D Materials** (Graphene, MoS_2, Cr-Au, TiO_2) and Investigation with Scanning Probe Techniques, ITU-Nanomechanics Lab., July 2014-2022.
- Electron Microscopy (**SEM-EDX**) Analysis of Materials, TUBİTAK – MAM, June – July 2016
- **Mesoscale Contact Heat Transfer Research with Nanoindenter**, Trinity College-Dublin, June – August 2017
- **Radiation Pressure Excitation of Cantilevers in UHV STM/AFM**, August 2019-April 2022
- **Graphene Ribbon Creation by Nanoindentation**, ITU- Nanomechanics Lab. (in collaboration with Trinity College Dublin Nanomechanics Lab.), June 2017-cont.
- **Construction of Tabletop Microindenter and Transient Heat Transfer Setup** for Investigation of Thermal Contact Conductance in Single Contact Level, ITU-Nanomechanics Lab., August 2017-April 2021

Skills:

I have experience at below listed laboratory equipment/procedures:

- **Scanning Probe Microscopy** (imaging, calibrations, maintenance and overhaul)
- **Physical Vapor Deposition** (Thermal Evaporation and Sputter Coating)
- **Mechanical and Liquid Exfoliation** (Graphene and MoS_2)
- **Fiber Interferometry** Setup (Fiber preparation, coating etc.)
- **Ultra-High Vacuum** System (General use and maintenance)
- **Electrochemical Etching** and Polishing (Tip & Cantilever Preparation for SPM)
- **Lock-in Amplifier and PLL** (for detecting sub-Angstrom cantilever oscillation & tunnel current)
- **Scanning Electron Microscopy** (and EDX data analysis)
- Construction of **Piezoelectric** Positioners
- **Nanoindenter** (usage & construction & tip preparation from diamond particles)

I have experience at below listed software/hardware usage-programming:

- Microprocessors (ATMEL & ST) Programming and circuit design.
- Coding with Python, C#, Julia, and C (on 4 different projects).
- LabVIEW & National Instruments PCI-e DAQ.
- ABAQUS (Basic Mechanical & Thermal Simulations of experiments).

Languages:

Turkish: Mother tongue

English: Work/research proficiency

- Duolingo English Test – TCD approved [01/2022] Grade: 125/160
- ITU Foreign Language School - English Proficiency Exam [Fall 2012] Grade:75.00/100;
- YDS (Academic English Proficiency Exam of Turkey) Grade: 77.5/100 [09/2016]

French: Elementary/Intermediate

- Studied 4 years at High School as a second foreign language.

Published/Presented Works:

- Investigation of Thermal Conduction in Microcontacts Created by Nanoindentation,
  - Master Thesis, ITU, October 2021-Expected
- Radiation Pressure Excitation of the Cantilever in Simultaneous Scanning Tunneling/Atomic Force Microscopy,
  - nc-AFM 22nd in Regensburg Germany, August 2019
- Liquid Exfoliation of MoS_2
  - NanoTR13, Antalya, October 2017
- Process and Characterization of 2D Materials
  - Graduation Project, ITU, June 2017
- Construction of Ambient Simultaneous Atomic Force/Scanning Tunneling Microscopy,
  - Deutsche Physikalische Gesellschaft, Dresden, March 2017
- Construction of an Ambient STM, (Advanced Project Laboratory Report)
  - ITU, December 2015
- Construction and Characterization of Supported Lipid Membranes to mimic Cell Surface Interactions,
  - BIOMED Congress, Antalya, October 2015

Society Memberships:

- Society of Tribologists and Lubrication Engineers (STLE)
- Dublin Society of Model and Experimental Engineers (DSMEE)

References:

- Prof. Graham Cross

School of Physics, Trinity College Dublin, Ireland

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- Prof. Hakan Özgür Özer

Physics Engineering Department, Istanbul Technical University, Turkey.

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