

Furkan Altincicek | Résumé

Edmonton, Alberta, Canada

📞 (+1) 780 243 3677 • ✉️ faltincicek@gmail.com

↗️ Personal Webpage

Work Experience

Graduate Researcher

University of Alberta

July 2019 - Present

Edmonton, AB, Canada

- Operated and maintained ultra-high vacuum, low-temperature (4.5 K) scanning tunneling microscopy (UHV LT-STM).
- Managed lab's cryogenics (liquid nitrogen and helium) consumption and maintained helium recovery plant.
- Worked on silicon surface passivation with hydrogen monolayer and studied molecules on this surface.
- Lead a project about making atomic wires on the silicon surface with LT-STM and conducted molecular orbital analysis through scanning tunneling spectroscopy (STS).
- Studied variable size atomic switches on the hydrogenated silicon surface with applications to memory and random number generation.
- Characterized surface quality of nanolithographed samples prepared in the clean room with photolithography and e-beam lithography with STM.
- Took part in upgrading the LT-STM system to non-contact QPlus AFM.
- Developed a numerical simulation of the atomic wires I made and coded it in Python.
- Analyzed atomic wires data with Fourier transform to study their electronic bands and effective masses.
- Taught first year physics labs for a total of ~200 students.

Graduate Researcher

University of North Dakota

August 2017 - May 2019

Grand Forks, ND, USA

- Operated and maintained UHV XPS system and AFM.
- Assembled a home-built chemical vapor deposition (CVD) system with spare rough and turbo pump, argon gas cylinder, and tube furnace for quartz tubes.
- Synthesized quasi-two-dimensional chromium sulfides with the CVD system I built.
- Characterized two dimensional molecules I deposited on mica with X-ray photoelectron spectroscopy (XPS), X-ray powder diffraction (XRD), and atomic force microscopy (AFM).
- Collaborated with groups from the Petroleum Engineering and Chemistry departments in two separate projects where I analyzed their samples with XPS, which yielded two papers.
- Taught first year physics labs for a total of ~400 students.

Undergraduate Researcher*Bilkent University***September 2014 - June 2017***Ankara, Turkey*

- Studied the Gross-Pitaevski-Poisson system to model compact astrophysical objects as Bose-Einstein condensates.
- Studied a solvable model of Maxwell's Demon computationally.

Summer Intern*METU***2015 Summer***Ankara, Turkey*

- Analyzed neutron stars and pulsars with computational methods.

Education

Doctor of Philosophy*University of Alberta***2019 - present***Edmonton, AB, Canada*

Supervisor: Prof. Robert Wolkow

Expected graduation date: May 2025

Dissertation Title: Atomic Silicon Dimer Wires on the Hydrogenated Surface and Their Macro-to-Atom Connection

Master of Science**2017 – 2019***University of North Dakota**Grand Forks, ND, USA*

Supervisor: Prof. Nuri Oncel

Thesis Title: Synthesis and Characterization of Quasi-Two-Dimensional Chromium Sulfides

GPA: 3.85/4.00

Bachelor of Science**2012 - 2017***Bilkent University with Full Scholarship**Ankara, Turkey*

Supervisor: Prof. Bilal Tanatar

Senior Project Title: Adaptation of Two Dimensional Bose-Einstein Condensates to Compact Astrophysical Objects

Graduated with Honors, Class Rank: 2

GPA: 3.04/4

Laboratory Skills

- Scanning Tunneling Microscopy (STM)
- Ultra-High Vacuum (UHV) Systems
- Field Ion Microscopy (FIM)
- Chemical Vapour Deposition (CVD)
- Residual Gas Analyzer (RGA)
- Omicron LT-STM System
- Atomic Force Microscopy (AFM)
- X-ray Photoelectron Spectroscopy (XPS)
- Liquid Helium Recollection Systems
- Physical Vapour Deposition (PVD)
- Vacuum Leak Test Systems
- Nanonis STM Controller

Computer Skills

Programming: Python, Matlab, LabView, HTML, \LaTeX

Simulation: Amsterdam Modelling Suite (AMS), Quantum Espresso, Vesta

Processing: Gwyddion, WSxM, Origin

Publications

- 6:** **Altincicek, F. M.***., Kumar, A.*., Leon, C., Pitters, J., Wolkow, R. Nano Lithographed Etch Mark Sample Preparation for STM Studies. In preparation 2025.
- 5:** **Altincicek, F. M.**, Leon, C., Chutora, T., Wolkow, R. Buckling and Controlled Switching of Variable Size Silicon Dimer Wires. In preparation 2025.
- 4:** **Altincicek, F. M.**; Livadaru, L.; Leon, C. C.; Chutora, T.; Yuan, M.; Achal, R.; Croshaw, J.; Pitters J.; Wolkow, R. Electronic Structures of Atomic Silicon Dimer Wires as a Function of Length. Recently accepted on a peer-reviewed journal 2025.

DOI: [10.1088/1361-6528/adafae](https://doi.org/10.1088/1361-6528/adafae)

- 3:** Liu, X.; Han, J.; Hou, X.; **Altincicek, F.**; Oncel, N.; Pierce, D.; Wu, X.; Zhao, J. X. One-Pot Synthesis of Graphene Quantum Dots Using Humic Acid and Its Application for Copper (II) Ion Detection. *Journal of Materials Science* 2020, 56, 4991–5005.

DOI: [10.1007/s10853-020-05583-6](https://doi.org/10.1007/s10853-020-05583-6)

- 2:** Lee, H.; Oncel, N.; Liu, B.; Kukay, A.; **Altincicek, F.**; Varma, R. S.; Shokouhimehr, M.; Ostadhassan, M. Structural Evolution of Organic Matter in Deep Shales by Spectroscopy (^1H and ^{13}C Nuclear Magnetic Resonance, X-Ray Photoelectron Spectroscopy, and Fourier Transform Infrared) Analysis. *Energy & Fuels* 2020, 34, 2807–2815.

DOI: [10.1021/acs.energyfuels.9b03851](https://doi.org/10.1021/acs.energyfuels.9b03851)

- 1:** **Altincicek, F. M.** Synthesis And Characterization Of Quasi-Two-Dimensional Chromium Sulfides. University of North Dakota, Theses and Dissertations 2019, 2446.

[Available on UND Commons](#)

Awards and Honors

2022: Best Scanning Probe Micrograph of The 65th International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication (EIPBN)

2017: Best Senior Project Award by Department of Physics, Bilkent University, Turkey

2015: NUBA International Nuclear Physics Summer School Achievement Certificate, Akdeniz University, Turkey

2015: Feza Gürsey Institute Einstein's General Relativity Summer School Achievement Certificate, Bogazici University, Turkey

Selected Presentations

- 2024:** "Silicon Dimers on the Hydrogenated Surface" Contributed Talk at Condensed Matter Physics Seminar Series, University of Alberta, Canada
- 2023:** "Nano Hotdog" Image Presentation at Images of Research Competition, University of Alberta, Canada
- 2022:** "Atomically Defined Wires on P-Type Silicon" Contributed Talk at the Annual Canadian Association of Physicists (CAP), McMaster University, Canada
- 2022:** "Atomically Defined Wires on P-Type Silicon" Contributed Talk at the 65th International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication (EIPBN), New Orleans, USA
- 2022:** "Atomically Defined Wires on P-Type Silicon" Contributed Talk at the Annual American Physical Society (APS) March Meeting, Chicago, USA
- 2021:** "Silicon Dangling Bond Pairs as Quantum Random Number Generators" Talk at National Institute of Standards and Technology (NIST) iSPM3, Online
- 2021:** "Silicon Dangling Bond Pairs as Quantum Random Number Generators" Poster Presentation at the Annual Canadian Association of Physicists (CAP), Online
- 2019:** "Synthesis and Characterization of quasi 2D-Chromium Sulfide" Talk at the Annual American Physical Society (APS) March Meeting, Boston, USA
- 2019:** "Synthesis and Characterization of quasi 2D-Chromium Sulfide" Talk at the Physics Department Colloquium, University of North Dakota, USA
- 2019:** "Working in Two Dimensions" 3 Minute Thesis Competition Presentation, University of North Dakota, USA