

EDUCATION

ETH Zurich PhD (in progress), Information Tech. and Electrical Engineering	Zurich, Switzerland 2021–present
University of Waterloo Master of Applied Science (MASC), Electrical and Computer Engineering	Waterloo, ON, Canada 2019–2021
University of Waterloo Bachelor of Applied Science (BASC), Nanotechnology Engineering	Waterloo, ON, Canada 2014–2019
Graduate Record Examination (GRE) Verbal Reasoning: 164/170, Quantitative Reasoning: 167/170, Analytical Writing: 6/6.	September 2020

RESEARCH EXPERIENCE (FULL-TIME)

PhD Student - ETH Zürich Advisor: Dr. Mathieu Luisier, Professor	Zürich, Switzerland September 2021 - current
<ul style="list-style-type: none">– Project: Ab-initio and multiscale modelling of synaptic memristor crossbar arrays– Developing ab-initio models of crossbar arrays made of valence-change memories, using Density Functional Theory, quantum transport methods, and kinetic Monte Carlo simulations. Collaborating with groups at EPFL and IBM Zurich to realize, fabricate, and test devices.	
MASC Student (Thesis-based) - University of Waterloo Advisor: Dr. Youngki Yoon, Associate Professor	Waterloo, ON, Canada September 2019 - July 2021
<ul style="list-style-type: none">– Project: Modelling strain-engineered properties of Transition-Metal-Dichalcogenide (TMD) Devices– Used Density Functional Theory, Wannierization, and Non-Equilibrium Green's Function-based transport codes to design and simulate devices made from 2D materials. Investigated defect and strain-engineering in FET and TFET structures. Collaborated with experimental group at Sungkyunkwan University, South Korea, to fabricate and test devices.	
Research Assistant - Waterloo Institute for Nanotechnology (WIN) Supervisor: Dr. Dayan Ban, Professor	Waterloo, ON, Canada January 2018 - August 2018
<ul style="list-style-type: none">– Project: Simulation and characterization of Resonant-Phonon Quantum Cascade Lasers (QCLs)– Wrote a model (in MATLAB and C++) to simulate the operation of semiconductor heterostructure QCLs, based on self-consistently solved wavefunctions and charge distributions. Implemented Markov-Chain Monte-Carlo optimization methods to search for designs with higher-temperature lasing potential. Assisted in optical characterization of fabricated devices, and alignment of a Terahertz Time-Domain Spectroscopy (THz-TDS) system.	
Research Assistant - National Institute of Materials Science (NIMS) Supervisor: Dr. Genki Yoshikawa, Associate Professor and Group Leader	Tsukuba, Ibaraki, Japan January 2016 - April 2016
<ul style="list-style-type: none">– Project: Optimizing the morphology of polymer films on a membrane-type olfactory nanosensor– Optimized the coating of drop-casted polymer films on a membrane-type sensor which measures mechanical deflection upon gas absorption to perform 'olfactory' sensing. Designed and 3D printed parts to customize dispensing equipment. Set up COMSOL multiphysics modelling for sensor performance.	
Research Assistant - Canadian Nuclear Laboratories (CNL) Supervisor: Dr. Syed Bukhari, Research Associate, Neutron Scattering Branch	Chalk River, Ontario, Canada May 2015 - August 2015
<ul style="list-style-type: none">– Project: Optimizing sputtering parameters for metal-alloy thin films– Minimized the interfacial roughness of metal alloy thin films to study their nano-scale corrosion mechanisms as part of a larger project to determine their suitability for nuclear waste storage. Used x-ray reflectometry (XRR), x-ray diffraction (XRD), and neutron reflectometry (NR) to characterize thin-films.	

WORK EXPERIENCE (FULL-TIME)

Formulations Engineering Intern - Adaptive Surface Technologies (AST)

Cambridge, MA, USA

Supervisor: Dr. Tehila Nahum, Principle Formulations Engineer

August 2016 - April 2017

- Developing Slippery Liquid-Infused Porous Surface (SLIPS) nanotextured container coatings
- AST is a start-up company by the Aizenberg Lab, developing slippery coatings on the principle of infusing a nanoporous surface with a lubricant. Worked in a team of three engineers to formulate food-safe container coatings for a consumer packaging application. Performed Scanning Electron Microscopy (SEM) of porous surfaces, rheological optimization of spray-coating solutions, and goniometry to judge hydrophobicity of resulting coatings.

RESEARCH EXPERIENCE (PART-TIME)

Fourth-Year Design Project

Engineering design project done in groups of four (our version of a Bachelor's Thesis).

September 2018 - March 2019

- Topic: "Developing a laser-induced optical temperature sensing system using DNA-probes (molecular beacons)".

Senior Term Project

Elective individual research project.

January 2019 - April 2019

- Topic: "Developing k.p Hamiltonians for nanoelectronic device simulations" (course code 'NE459').

Undergraduate Research Assistantship

Done concurrently with my '3B' term of undergraduate studies.

September 2017 - December 2017

- Topic: "Writing a rate-equation based simulation scheme for carrier transport in quantum cascade lasers".

TEACHING EXPERIENCE

- **Teaching Assistant - Linear Circuits (NE140), University of Waterloo** January 2021 - April 2021
Prepared and taught all remote (synchronous) tutorials.
- **Teaching Assistant - Nanoelectronics (NE471), University of Waterloo** September 2020 - December 2020
Held office hours for student questions, prepared assignments, and marked exams.
- **Teaching Assistant - Electronic Circuits (NE344), University of Waterloo** May 2020 - August 2020
Prepared and taught all remote (synchronous) tutorials.
- **Teaching Assistant - Linear Circuits (NE140), University of Waterloo** January 2020 - April 2020
Prepared and taught all tutorials.

OTHER ACTIVITIES

Technical Director - UW Nano Robotics Group (UWNRG)

Waterloo, ON, Canada

Advisor: Dr. Mustafa Yavuz, Associate Professor

January 2015 - July 2019

- UWNRG designs microbotic actuation systems to compete at the annual IEEE ICRA Microbotics Challenges.
- Led the development of a microbot which we call SAM (Solenoid Actuated Microbot). Managed funding applications for lab expenses, equipment, cleanroom usage, and conference travel costs. We are the only undergraduate-level team to have qualified for this competition since its inception. This position includes time as a junior member, team lead, and technical director.
- Competition Record: 3rd place (at ICRA 2015), 1st place (at ICRA 2016), 2nd place (at ICRA 2018).

JOURNAL ARTICLES

1. **M. Kaniselvan** and Y. Yoon, "Strain-tuning PtSe₂ for high ON-current lateral tunnel field-effect transistors," *Applied Physics Letters*, vol. 119, no. 7, p. 073102, Aug. 2021. doi:10.1063/2F5.0053789
2. G. Han, **M. Kaniselvan**, and Y. Yoon, "Photoresponse of MoSe₂ Transistors: A Fully Numerical Quantum Transport Simulation Study," *ACS Applied Electronic Materials*, vol. 2, no. 11, pp. 3765–3772, Nov. 2020. doi:10.1021/acsaelm.0c00795

3. M. Naqi*, **M. Kaniselvan***, S. Choo*, G. Han, S. Kang, J. Kim, Y. Yoon, and S. Kim, "Ultrasensitive Multilayer MoS₂-Based Photodetector with Permanently Grounded Gate Effect," *Advanced Electronic Materials*, vol. 6, no. 4, p. 1901256, Feb. 2020. doi: 10.1002/aelm.201901256.

POSTERS & PRESENTATIONS

1. **Manasa Kaniselvan**. *Engineering the Performance of 2D Transition Metal Dichalcogenide Nanotransistors through Quantum Transport Simulations*. Nanotechnology MASc Seminar delivered at the University of Waterloo, June 2021
2. Boyu Wen, Chao Xu, Siyi Wang, Sm Shazzad Rassel, **Manasa Kaniselvan**, Chris Deimert, Zbigniew Wasilewski and Dayan Ban *Novel 4-well THz QCL with hybrid injection/extraction channels*. ITQW2019: Infrared Terahertz Quantum Workshop
3. Mary Chen*, **Manasa Kaniselvan***, Corin Seeleman*, Danielle Smith*. *A Real-Time Non-Invasive Sensor for Monitoring Laser-Induced Temperature in Medical Applications*. Waterloo Engineering Design Symposium 2019. Waterloo, ON, Canada
4. **UW Nano Robotics Group**. *Solenoid Actuated Microbot (SAM)*. 2018 IEEE IEEE International Conference on Robotics and Automation (ICRA). Brisbane, Australia
5. **UW Nano Robotics Group**. *ElectroMagnetic Micro Actuation (EMMA): Version 2*. 2016 IEEE International Conference on Robotics and Automation (ICRA). Stockholm, Sweden
6. **UW Nano Robotics Group**. *ElectroMagnetic Micro Actuation (EMMA)* 2015 IEEE International Conference on Robotics and Automation (ICRA). Seattle, Washington, USA

SCHOLARSHIPS & AWARDS (TOTALLED VALUES IN CAD)

• NSERC PGSD Doctoral Award - \$63,000	2021
• Waterloo Faculty of Engineering Awards (x2) - \$3,000	2020
• Sanford Fleming Foundation (SFF) Teaching Assistant Excellence Award - \$500	2021
• Waterloo Graduate Research Studentship (with MASc offer) - \$35,000	2019–2021
• Waterloo Dean's Entrance Award (Graduate) - \$5,000	2019
• Presentation Award, Waterloo Nanotechnology Symposium - \$1,000	2019
• Waterloo Undergraduate Research Assistantship Awards (x2) - \$1,400	2017–2018
• Waterloo Undergraduate Research Internship Awards (x2) - \$2,800	2017–2018
• NSERC Undergraduate Student Research Awards (USRA) (x2) - \$9,000	2017–2018
• Waterloo International Internship Award - \$1,000	2016
• NIMS (Japan) Internship Program Fellowship - \$5,700	2016
• Waterloo President's (Entrance) Scholarship - \$2,000	2014