Manasa Kaniselvan

Email: mkaniselvan@iis.ee.ethz.ch
LinkedIn: manasa-kaniselvan
Phone: +41 0768144581
ORCID: 0000-0002-5331-8878

Education

ETH Zurich — Zurich, Switzerland
PhD (in progress), Information Tech. and Electrical Engineering — 2021–present

University of Waterloo — Waterloo, ON, Canada
Master of Applied Science (MASc), Electrical and Computer Engineering — 2019–2021

University of Waterloo — Waterloo, ON, Canada
Bachelor of Applied Science (BASc), Nanotechnology Engineering — 2014–2019

Research Experience (Full-Time)

PhD Student - ETH Zürich — Zürich, Switzerland
Advisor: Dr. Mathieu Luisier, Professor — September 2021 - current

- Developing an *ab-initio* model for resistive switching in oxide-based Valence Change Memory (VCM) cells

MASc Student (Thesis-based) - University of Waterloo — Waterloo, ON, Canada
Advisor: Dr. Youngki Yoon, Associate Professor — September 2019 - July 2021

- Engineering the performance of 2D Transition-Metal-Dichalcogenide (TMD) devices through mechanical strain, using *ab-initio* simulations

Research Assistant - Waterloo Institute for Nanotechnology (WIN) — Waterloo, ON, Canada
Supervisor: Dr. Dayan Ban, Professor — January 2018 - August 2018

- Developing a code to model transport through Resonant-Phonon Quantum Cascade Lasers (QCLs), and using it to design new structures

Research Assistant - National Institute of Materials Science (NIMS) — Tsukuba, Ibaraki, Japan
Supervisor: Dr. Genki Yoshikawa, Associate Professor and Group Leader — January 2016 - April 2016

- Optimizing the morphology of polymer films on a membrane-type olfactory nanosensor

Research Assistant - Canadian Nuclear Laboratories (CNL) — Chalk River, Ontario, Canada
Supervisor: Dr. Syed Bukhari, Research Associate, Neutron Scattering Branch — May 2015 - August 2015

- Optimizing sputtering parameters to minimize the interfacial roughness between stacked metal-alloy 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

Teaching Experience

Teaching Assistant Positions

- **Quantum Transport in Nanostructures, ETH Zurich** — February 2022 - April 2022
  Taught one third of the tutorials.
- **Linear Circuits (NE140), University of Waterloo** — January 2021 - April 2021
  Prepared and taught all remote (synchronous) tutorials.
- **Nanoelectronics (NE471), University of Waterloo** — September 2020 - December 2020
  Held office hours for student questions, prepared assignments, and marked exams.

- **Electronic Circuits (NE344), University of Waterloo** May 2020 - August 2020
  Prepared and taught all remote (synchronous) tutorials.
- **Linear Circuits (NE140), University of Waterloo** January 2020 - April 2020
  Prepared and taught all tutorials.

Project Supervisions

- **Jente Clarysse, ETH Zurich** September 2022 - January 2023
  Master's student, developing a parameterized graph-based model of current flow through amorphous oxides.
- **Zhouyang Yu, ETH Zurich** September 2022 - January 2023
  Master's student, preforming quantum transport simulations on Interband Cascade Lasers (ICLs). Co-supervising with Matheiu Luisier.
- **Patrik Gjini, ETH Zurich** February 2022 - May 2022
  Bachelor's thesis student, implemented a Fast Multipole Method algorithm to accelerate the solution of Poisson's equation in a valence change memory device. Co-supervised with Marko Mladenovic.
- **Patrick Bütler, ETH Zurich** February 2022 - May 2022
  Master's student, investigating phase transition-induced resistive switching in monolayer $MoTe_2$ towards non-volatile memory applications. Co-supervised with Jonathan Backman.

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.
- Competition Record: 3rd place (at ICRA 2015), 1st place (at ICRA 2016), 2nd place (at ICRA 2018).

Journal Articles

1. **M. Kaniselvan**, M. Sritharan, and Y. Yoon, "Mitigating Tunneling Leakage in Ultrascaled HfS_2 pMOS Devices with Uniaxial Strain," *IEEE Electron Device Letters*, June 2022 doi:10.1109/LED.2022.3179228 ***Editor's Pick***

2. **M. Kaniselvan** and Y. Yoon, "Strain-tuning $PtSe_2$ 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

3. G. Han, **M. Kaniselvan**, and Y. Yoon, "Photoresponse of $MoSe_2$ 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

4. M. Naqi*, **M. Kaniselvan***, S. Choo*, G. Han, S. Kang, J. Kim, Y. Yoon, and S. Kim, "Ultrasensitive Multilayer MoS_2-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**, Mathieu Luisier and Marko Mladenovic *An Atomistic Modelling Framework for Valence Change Memory Cells.* International Conference on Simulation of Semiconductor Processes and Devices (SISPAD), Granada, Spain, August 2022

2. **Manasa Kaniselvan**, Marko Mladenovic, Patrik Gjini, and Mathieu Luisier *Modelling transport in valence change memory cells.* Psi-k Conference, Lausanne, Switzerland, August 2022

3. **Manasa Kaniselvan**, Marko Mladenovic, Patrik Gjini, and Mathieu Luisier *Modelling transport in valence change memory cells.* CECAM Workshop on "Quantum transport methods and algorithms: from particles to waves approaches", ETH Zürich, Switzerland, July 2022

4. Marko Mladenovic, **Manasa Kaniselvan**, and Mathieu Luisier *Ab-Initio-Parametrized Kinetic Monte Carlo Model for Vacancy Diffusion in Amorphous Oxides in Valence Change Memory.* First Principles Modelling of Defects in Solids Workshop, ETH Zürich, June 2022

5. **Manasa Kaniselvan**. *Engineering the Performance of 2D Transition Metal Dichalcogenide Nanotransistors through Quantum Transport Simulations.* Nanotechnology Seminar delivered at the University of Waterloo, June 2021

6. 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

7. 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

8. **UW Nano Robotics Group**. *Solenoid Actuated Microbot (SAM).* 2018 IEEE IEEE International Conference on Robotics and Automation (ICRA). Brisbane, Australia

Scholarships & Awards (all values in CAD)

- Top 10% (out of 715) Poster Commendation at the Psi-K Conference 2022
- 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