# GUANXIONG CHEN

M.Sc. Student · Computer Science

*University of British Columbia*

gxchen@student.ubc.ca | www.guanxiongchen.com | https://github.com/ericchen321

## Education

**University of British Columbia** *Vancouver, BC, Canada*

Master of Science in Computer Science *Sept. 2021 - Nov. 2023 (expected)*

- Research focus: TBD

**University of British Columbia** *Vancouver, BC, Canada*

Bachelor of Applied Science in Computer Engineering *Sept. 2015 - May 2021*

- GPA: 89%

## Publications

### Published

**Kianzad S**, Chen G and MacLean KE (2021) PAL: A Framework for Physically Assisted Learning Through Design and Exploration With a Haptic Robot Buddy. Front. Robot. AI 8:700465. doi: 10.3389/frobt.2021.700465

### Preprinted

**Chen, G., Yang, H.**, & Mitchell, I. M. (2021). ROS-X-Habitat: Bridging the ROS Ecosystem with Embodied AI. arXiv preprint arXiv:2109.07703.

## Research Experience

**Lab of Computational Intelligence, University of British Columbia** *Paper & Code*

Advisor: Prof. Ian Mitchell *May 2020 - Aug. 2021*

- Built "ROS-X-Habitat", a Python-based interface between AI Habitat and ROS, allowing 1) RL-based agents to access ROS' vast hardware and visualization support, 2) ROS-packaged planners to access photorealistic and physically-realistic Habitat Sim, without introducing excessive run-time delays
- Verified code correctness with test suite based on rostest
- Co-first-authored paper "ROS-X-Habitat: Bridging the ROS Ecosystem with Embodied AI" (aiming for submission to *CRV 2022*)

**SPIN (Sensory, Perception and Interaction) Lab, University of British Columbia** *Blog*

Co-Advisors: Dr. Soheil Kianzad, Prof. Karon MacLean *Sept. 2019 - July 2021*

- Contributed to paper "PAL: A Framework for Physically Assisted Learning through Design and Exploration with a Haptic Robot Buddy" (accepted by *Frontiers in Robotics and AI* in August 2021)
- Built a haptic pen with CAD features for creating scientific and engineering sketches
- Completed literature review of over 60 papers on sketching and haptic pen
- Implemented a Python module for a haptic pen running on Raspberry Pi, to allow users define geometric relations between objects (eg. lines being parallel)
- Verified code correctness with a test suite

**RESESS (Reliable, Secure, and Sustainable Software) Lab, University of British Columbia)**

Advisor: Prof. Julia Rubin *May 2019 - Aug. 2019*

- Ran DroidNative (an open-source malware detection tool) on over 1,000 Android app samples
- Wrote Python scripts to automatically deploy experiments inside VM clusters hosted on Linux servers
- Preprocessed and extracted features from apps for training in DroidNative
- Optimized DroidNative (written in C++) to speed up feature extraction by 2X+

## Coursework and Personal Projects

**MP-Conjugate Gradient Solver for Cloth Simulation** *Source*

Coursework for math 607E: Numerical Methods for Partial Differential Equations *Nov. 2021 - Dec. 2021*

- Implemented a cloth simulator in Python based on work by Baraff & Witkin 98'
- Implemented the Modified Preconditioned Conjugate Gradient Method for speeding up the simulation

**Deep Learning-based Road Damage Detection System** *Media*

Coursework for cpen 491: Computer Engineering Capstone Design *Sept. 2020 - May 2021*

- Prepared a literature review on over 20 existing road damage detection techs, well-received by our client
- Established system specs based on limitations of existing techs and stakeholder needs
- Trained a novel CNN model on a remote cluster to classify and localize road damages from RGB images
- Analyzed the model's architecture with generalization theory to explain its performance

**Simple Ray Tracer** *Source*

Coursework for cpsc 314: Computer Graphics *Nov. 2020 - Dec. 2020*

- Modified the C++-implemented rendering engine by Peter Shirley in *Ray Tracing in One Weekend*
- Implemented geometries including triangles, cubes and torus
- Implemented ray-traced shadows and Blinn-Phong shading model

**Simple Image Processing SoC**

Coursework for cpen 311: Digital Systems Design *Mar. 2018*

- Implemented independently an accelerator used for accelerating affine rotations of 2D images on a FPGA chip
- Built the system with EDA tools from basic blocks - a soft-core CPU, memories, and the accelerator
- Wrote code in C to evaluate the accelerator's speed-up

## Awards, Fellowships, & Grants

**NSERC Canada Graduate Scholarships – Master's program**

Natural Sciences and Engineering Research Council *2021*

- The award is given to Canadian Master's students who "demonstrate a high standard of achievement in undergraduate and early graduate studies."

**NSERC Undergraduate Student Research Award**

Natural Sciences and Engineering Research Council *2021, 2019*

- The award intends to develop Canadian students with outstanding academic backgrounds as potential researchers.

**Jim and Helen Hill Memorial Service Award**

Dept. of Electrical and Computer Engineering, UBC *2019*

- The award is given to students who demonstrated leadership through volunteerism.

**Trek Excellence Scholarship**

University of British Columbia *2017*

- The Scholarships are offered every year to students in the top 5% of their undergraduate year, faculty, and school.

**Chancellor's Scholar Award**

University of British Columbia *2015*

- Award for students who enter the UBC Vancouver campus with outstanding academic backgrounds.

## Teaching Experience

| | | |
|---|---|---|
| Spring 2022 | **CPSC 314: Computer Graphics**, Senior Teaching Assistant | *UBC* |
| Fall 2021 | **CPSC 314: Computer Graphics**, Graduate Teaching Assistant II | *UBC* |
| Fall 2020 | **CPEN 331: Operating Systems**, Undergraduate Teaching Assistant | *UBC* |
| Fall 2018 | **CPEN 311: Digital Systems Design**, Undergraduate Teaching Assistant | *UBC* |

## Outreach & Professional Development

## Service and Outreach

2021 **UBC Enrolment Services / Alumni UBC**, Broad-based Admissions Alumni Reader
2016 - **UBC Opening and Move-in Day**, Move-in Volunteer
2016 **UBC AMS Bike Kitchen Daily Maintainance**, Bike Repair Volunteer