Ruixin Qiu

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EDUCATION

BASc., Engineering Physics   Vancouver, BC | Sept. 2019 - May 2024 (expected)
The University of British Columbia

RESEARCH INTERESTS

- Application of experimental, numerical, and analytical methods to solve mechanics problems.
- Interdisciplinary study of MEMS focusing on the integration of electrical and mechanical components with physics knowledge to develop innovative and efficient micro-scale devices.

CONFERENCE

Calvin Z. Qiao, <u>Ruixin Qiu</u>, Cynthia Lam, Daniel Bondi, Adam Clansey, Jean-Sébastien Blouin, Lyndia C. Wu. **Quantifying Postural Stability and Complexity in Ice Hockey Players Using Wearable Sensors**, 9th World Congress of Biomechanics 2022, Taipei

Calvin Z. Qiao, <u>Ruixin Qiu</u>, Jean-Sébastien Blouin, Lyndia C. Wu. **A novel methodology to investigate cerebellar involvement during adaptation to an unexpected delay in standing balance control**, 2023 Biomedical Engineering Society Annual Meeting, Accepted, Seattle

Jian Gao, Zihao Pu, <u>Ruixin Qiu</u>, Ying Li, Xiulun Yin, Kieran Morton, Sadan Wani, Justin Wyss, Michael Steszyn, Ryusuke Ishizaki, Fumiya Hamatsu, Takeshi Ohasato, John Madden. **Smart Insole: Stand-alone Soft 3-axis Force Sensing Arrays in a Shoe**, Submitted, IEEE Sensors 2023, Vienna

RESEARCH EXPERIENCE

RESEARCH ASSISTANT Sensing in Biomechanical Processes Lab, UBC   Vancouver, BC
Full-time   May 2022 - Aug. 2022
Volunteer   Oct. 2021 - Apr. 2022, Sept. 2022 - Apr. 2024
Supervisor: **Dr. Lyndia Wu**
Research Project: **Hockey Stance Balance Study with IMU Measurement**

- Performed neurocognitive tests on hockey players and control groups, and analyzed data to quantify postural stability and complexity in ice hockey players using wearable sensors
- Maintained codes and troubleshot wearable sensors during neurocognitive tests

Research Project: **Balance Adaptation Tasks with EEG Measurement**

- Designed and conducted experiments to determine the effect of concussion on balance adaptation tasks with EEG measurements
- Built pipelines to analyze EEG data using independent component analysis, power spectrum analysis, coherence analysis and source localization with MATLAB, EEGLAB and Brainstorm

RESEARCH ASSISTANT Advanced Materials and Process Engineering Laboratory, UBC   Vancouver, BC
Full-time   Sept. 2022 - Dec. 2022, May 2023 - Aug. 2023
Part-time   Jan. 2023 - Apr. 2023, Sept. 2023 - Apr. 2024
Supervisor: **Dr. John Madden**
Research Project: **Artificial Skin for Robots** (in Collaboration with **HONDA**)

- Built up COMSOL finite element model and theoretical physics model to simulate the mechanical and electrical response of the soft capacitive sensor
- Designed and performed experiments to compare the simulation result with the actual testing result
- Designed and performed experiments to characterize the functionality of the soft capacitive sensor

Research Project: **Soft Sensor Array for Automated Fiber Placement**

- Improved fabrication methods for a more reliable and uniform roller sensor, resulting in enhanced performance and accuracy

- Developed and implemented shear force sensing ability to the roller sensor, improving process control capabilities

RESEARCH ASSISTANT Stewart Blusson Quantum Matter Institute, UBC　　　　Vancouver, BC
Capstone Project　　　　　　　　　　　　　　Sept. 2022 - Apr. 2023, Sept 2023 - Apr. 2024
Supervisor: **Dr. Kirsty Gardner & Dr. Jeff Young**
Research Project: **LIGO Coating Tester**

- Build and run Finite Element Method (FEM) models to calculate microresonator eigenfrequencies, Q factors, deformations, and energies both with and without thin film coatings.
- Use results of simulation to design an experimental procedure to extract both independent loss angles from ringdown measurements.
- Carry out ringdown measurements and use simulation results to calculate loss angles.

TEACHING EXPERIENCE

UNDERGRADUATE TEACHING ASSISTANT Department of Physics & Astronomy, UBC　　Vancouver, BC
Part-time　　　　　　　　　　　　　　　　　　　　　　Sept. 2023 - Dec. 2023
Supervisor: **Miti Isbasescu**

- Course: ENPH 353 Engineering Physics Project I
- As a TA, my responsibilities include providing guidance and support to students during the course.

UNDERGRADUATE TEACHING ASSISTANT Department of Physics & Astronomy, UBC　　Vancouver, BC
Part-time　　　　　　　　　　　　　　　　　　　　　　Jan. 2023 - Apr. 2023
Supervisor: **Dr. Marcel Franz**

- Course: PHYS 158 Introductory Physics for Engineers II
- As a Lecture TA, my responsibilities include conducting experimental demonstrations, providing guidance and support to students during the course, and evaluating their performance through grading final exams

TECHNICAL PROJECTS

AUTONOMOUS PARKING AGENT
Coursework Project　　　　　　　　　　　　　　　　　　　Jan. 2022 - Apr. 2022

- Designed an autonomous parking agent which can move around the campus, upload the license plates and identify parking IDs without breaking the traffic rules within a virtual world using computer vision
- Used OpenCV to locate license plates and CNNs to identify the letters and numbers and the parking IDs
- Used custom trained Yolov3-tiny model to detect the locations of pedestrians and moving vehicles
- Constructed the driving system using a PID controller to work with plate recognition system to publish velocity commands and object detection system to avoid collision

AUTONOMOUS SAMPLE RETURN ROBOT
Coursework Project　　　　　　　　　　　　　　　　　　　May 2021 - Aug. 2021

- Designed and constructed an autonomous sample return robot which can follow a taped path and retrieve sample cans to the collection bin
- Built H-bridge to drive motors and infrared reflectance sensing circuits to detect taped paths
- Gathered sample cans by sweeping the cans to the storing trunk of the robot and returned them to the collection bin by tilting the storing trunk
- Implemented a PID controller using C++ on an STM32 board to control the direction and velocity of the robot with data from reflectance sensors

HONOURS & SCHOLARSHIPS

- 2018 S.-T. Yau High School Science Award (Mathematics) Honorable Mention ($6,000)
- 2018 High School Mathematical Contest in Modeling Meritorious Award
- 2019 Outstanding International Student Award ($15,000)

- 2020 Trek Excellence Scholarship for Continuing Students ($4,000)
- 2021 Faculty of Applied Science International Student Scholarship ($8,500)
- 2022 Work Learn International Undergraduate Research Award ($6,000)
- 2022 Trek Excellence Scholarship for Continuing Students ($4,000)
- 2022 Novicov Scholarship in Engineering ($600)
- 2023 Work Learn International Undergraduate Research Award ($6,000)

SKILLS

- Computer: Java, Python, C, C++, Matlab, JavaScript, VHDL, Assembly, Linux, ROS, COMSOL
- Electrical: Digital Logic Design, Circuit Analysis, Soldering, Oscilloscope, Microcomputer, Microcontroller, NI Multisim, Altium
- Mechanical: SolidWorks, Machine Design, Hand & Power Tools, Mechanics of Materials, Fluid Mechanics, Waterjet Cutting