Jessica YI FEI Bo

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__Researcher__, __engineer__, and __designer__ with multidisciplinary experiences in robotics, software engineering, medical device development, and entrepreneurship. My research interests broadly intersect with __human-centered design__ of __intelligent systems__. Currently, I am working on __perception__ and __learning__ for robotics.

EDUCATION

ETH Zurich | MSc Mechanical Engineering, Robotics concentration — *Expected 2022*
Coursework: Probabilistic Artificial Intelligence, 3D Vision, Human Factors, Mixed Reality, Physical HRI

University of British Columbia | BASc Mechanical Engineering, Biomedical option — *May 2020*
Thesis: Wheelchair Detection and State Estimation using Laser Scanning Sensors for Mobile Robots
Coursework: Machine Learning, Algorithms, Data Structures, Mechanical Design, Instrumentation

RESEARCH & INDUSTRY EXPERIENCE

Visual Intelligence and Learning Lab, EPFL | Supervisor: Prof. Amir Zamir — *Summer 2021*
Research Assistant for Summer@EPFL — *Python, PyTorch*
- Investigating the perceptual capacities developed by robotic agents through reinforcement learning

CARIS Robotics Lab, UBC | Supervisor: Prof. Machiel Van der Loos — *Fall 2019 – Spring 2020*
Robotics Research Assistant — *ROS, Python, MATLAB, scikit-learn, TensorFlow*
- Proposed a wheelchair state estimation algorithm to improve safety in interactions with mobile robots
- Used a multi-class neural network to predict wheelchair orientation from 2D laser data with 86% accuracy

Coursera | Team: Payments Engineering, Decision Science — *Summer 2020*
Software Engineering Intern — *Scala, Python, SQL, statistical analysis*
- Led the backend consolidation of billing information for 6.5M+ monthly transactions in a RESTful API
- Analyzed 900+ A/B experiments and causally identified patterns in statistically significant revenue patterns

Amazon | Team: Amazon Marketplace — *Summer 2019*
Software Development Engineering Intern — *Java, Spring, AWS (SNS, SQS, Lambda)*
- Designed a backend pipeline using AWS services to guarantee real-time event polling and delivery
- Implemented an event-processing service in Java for 120k+ annual Amazon membership events

Blackberry QNX (Autonomous Vehicle Innovation Centre) | Supervisor: Gordon Bell — *Fall 2018*
Autonomous Vehicle Research & Development Co-op Student — *C, MATLAB, QNX, LiDAR*
- Developed a LiDAR processing algorithm that detects road signs and free space with < 10 ms runtime
- Applied projective geometry to 3D LiDAR point cloud to fuse with 2D camera image for visualization at CES

CERTEC Group, Lund University | Supervisor: Dr. Héctor Caltenco — *Summer 2017*
Rehabilitation Engineering Research Assistant — *Arduino, sensors, fabrication, user testing*
- Prototyped a hand spasticity rehabilitation device that provides stimulating motion-triggered feedback
- Integrated real-time control of a computer keyboard using hand movements with accelerometers and Arduino

PUBLICATIONS

Conference Papers

Bo, J, Van der Loos, HFM (2021). Detection of Wheelchair Orientation in Human-Robot Interactions. In proceedings of *International Conference BIOMDLORE 2021.*

Conference Abstracts

Bo, J (2020). Detection of Wheelchairs Using Laser Scanning Sensors for Mobile Robotics. In proceedings of *Multidisciplinary Undergraduates Research Conference 2020.* *(Best Oral Presentation)*

Gwara, M, Tsang, VL, Thompson, CA, Smith, S, **Bo, J**, Fletcher, S, Janusz, N, Chew, SY, Janusz, M, Thompson, CK, Bertrand, M, Woods, H, Thompson, C (2018). Use of Centralized Electronic Medical Records System in Paediatric Care. In proceedings of *American Academy of Pediatrics 2017.*

Technical Projects

Attentiv Medical | attentivmedical.com — *Fall 2019 – Present*
Co-Founder and Research Lead — *Python, scikit-learn, sensors, medical device*

- Designed a patentable bioelectric sensor and real-time monitoring system for detecting IV infiltration
- Achieved 100% accuracy in blood-tissue differentiation using an SVM model for proof-of-concept prototype
- Led 80+ user and expert interviews to determine engineering, regulatory, and clinical design requirements

Awards: *James Dyson National Winner ($3k) and International Top 20, Microsoft Discover AI – Healthcare Winner ($6k), Medical Device Design Center – Principal Award ($5k), UBC Innovation on Board Start-Up Competition Runner Up ($2.5k), New Venture Design Best Project ($800), New Venture Design Industry Award ($600), RBC Get Seeded Winner ($500)*

"Into the Forest" Game | ETH Zurich – Virtual Reality — *Spring 2021*
Art Direction and Game Integration — *Unity, Blender, C#*

- Designed an immersive and multimodal web-based escape game through creating concept art, storyboards, Blender models, and Unity environments. Try out the game demo.

H4ptic Sensory Feedback Prosthesis | Hatching Health — *Spring 2019*
Research Lead — *Arduino, sensors, sensory substitution*

- Designed a sensory substitution device for prosthetic users that converts force to haptic feedback
- Researched sensory feedback method that leverages neuroplasticity and somatosensory cortex remapping

Awards: *UBC Applied Science Best Technical Innovation ($1k), Hatching Health Runner Up*

HoloLens Point Cloud Registration | ETH Zurich – 3D Vision — *Spring 2018*
Project Course Member — *MATLAB, HoloLens*

- Adapted the "Guaranteed Outlier Removal" point cloud registration algorithm with "Iterative Closest Point" algorithm in MATLAB to reduce HoloLens 3D point cloud alignment errors

Skills

Software: Python, Java, Scala, C/C++, ROS, MATLAB, SQL, AWS, REST, Arduino, QNX, Linux, Unity, Blender
Libraries: PyTorch, scikit-learn, NumPy, pandas, matplotlib, Tensorflow,
Engineering: SolidWorks, Fusion360, ANSYS, Arduino, 3D printing, soldering, instrumentation

Awards

2021	**EPFL Summer Research Fellowship** (4800 SFr.) – *École polytechnique fédérale de Lausanne*
2020	**Order of the White Rose Scholarship Finalist** – *Nominated by UBC Applied Science*
2020	**Top 5% Academic Ranking** – *UBC Applied Science and Mechanical Engineering*
2020	**Canada Graduate Scholarships-Master's** ($17,500 CAD, *declined*) – *NSERC Canada*
2019, 2020	**Speak Out for Engineering Americas** (1st Place) – *Institution of Mechanical Engineers*
2019	**Women in Technology Scholarship** ($10,000 CAD) – *IKB BC Scholarship Society*
2017	**Go Global Research Abroad Programs Award** ($2000 CAD) – *University of British Columbia*
2016	**NSERC Experience Award** ($4500 CAD) – *NSERC Canada*
2014 – 2020	**UBC Dean's Honour List** – *University of British Columbia*

Advisory & Mentorship

connect-f, nwPlus | **STEM Mentor** — *2020 – Present*

- Mentoring high school students in exploring an education and career in engineering and computer science

International Children's Advisory Network (iCAN) | **Conference Committee Chair** — *2014 – 2019*

- Led a 10+ member international team to plan events and fundraisers for the annual iCAN Summits
- Reviewed and improved upon European Medicine Agency's pediatrics clinical research policies

Kidscan Youth Advisory Council | **Youth Advisor & Mentor** — *2013 – 2018*

- Advised 10+ Vancouver research teams on promoting youth involvement in pediatrics research
- Reviewed Canada-wide policies for standardizing clinical pediatrics research consent/assent protocol