Jessica YI FEI Bo

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__Researcher__, __engineer__, and __designer__ with multidisciplinary experiences in deep learning, robotics, medical device development, and mixed reality. My research interests broadly intersect with __human-centered design__ of __intelligent systems__. I am currently working on deep learning and medical technologies related to __digital medicine__ at MIT.

EDUCATION

ETH Zurich | MSc Mechanical Engineering, *concentration in Robotics* — *Expected Spring 2023*
Thesis (at MIT): Bridging the domain shift in clinical deep learning with adversarial augmentations
Semester Project: Worldloop Transfer – evaluating perceptual capabilities learned through embodied tasks
Coursework: Probabilistic Artificial Intelligence, 3D Vision, Human Factors, Mixed Reality, Computer Vision

University of British Columbia | BASc Mechanical Engineering, *with distinction* — *2020*
Thesis: Wheelchair detection and state estimation using laser scanning sensors for mobile robots
Coursework: Machine Learning, Algorithms, Data Structures, Mechanical Design, Instrumentation

EXPERIENCES

Traverso Lab, MIT | Advisors: Giovanni Traverso, Hen-Wei Huang, Peter Chai — *Full Year 2022*
Visiting Scholar for Master Thesis — *Python, sensors, bioethics*
- Developing mitigation strategies for data distribution shift of deep learning models used in clinical applications
- Evaluating patient acceptability and bioethics of closed-loop drug delivery systems with diagnostic abilities

Visual Intelligence and Learning Lab, EPFL | Advisors: Amir Zamir — *Summer – Fall 2021*
Summer@EPFL Research Intern — *Python, PyTorch, Habitat*
- Investigated perceptual capabilities developed by reinforcement learning agents trained on embodied tasks
- Developed transfer learning framework to evaluate active perception modules on downstream vision tasks

Attentiv Medical | Advisors: Konrad Walus, Manon Ranger — *Fall 2019 – Fall 2021*
Co-Founder and Research Lead — *Python, scikit-learn, sensors*
- Designed a patentable bioelectric sensor and real-time monitoring system for detecting IV infiltration
- 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)*

CARIS Robotics Lab, UBC | Advisor: Machiel Van der Loos — *Fall 2019 – Spring 2020*
Bachelor Thesis — *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*
- 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 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) | Advisor: Gordon Bell — *Fall 2018*
Autonomous Vehicle R&D Intern — *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 | Advisor: Héctor Caltenco — *Summer 2017*
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

Journals

Vinker Y, Pajouheshgar E, **Bo J**, Bachmann R, Bermano AH, Cohen-Or D, Zamir A, Shamir A (2022). CLIPasso: Semantically Aware Object Sketching. *ACM Transactions on Graphics (SIGGRAPH 2022).* *(Best Technical Paper)*

Conferences

Bo J, Ta K, Nishida R, Yeh G, Tsang V, Bolton M, Ranger M, Walus K (2022). ATTENTIV: Instrumented Peripheral Catheter for the Detection of Catheter Dislodgement in IV Infiltration. *44th Annual International Conference on the IEEE Engineering in Medicine and Biology Society (IEEE EMBC 2022).* *(Oral)*

Agrawal D*, Lobsiger J*, **Bo J**, Kaufmann V, Armeni I (2022). HoloLabel: Augmented Reality User-In-The-Loop Online Annotation Tool for As-Is Building Information. *European Conference on Computing in Construction 2022*.

Bo J, Van der Loos HFM (2021). Detection of Wheelchair Orientation in Human-Robot Interactions. *13th International Conference BIOMDLORE 2021.*

Abstracts

Bo, J (2020). Detection of Wheelchairs Using Laser Scanning Sensors for Mobile Robotics. *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 (2017). Use of Centralized Electronic Medical Records System in Paediatric Care. *American Academy of Pediatrics Conference 2017.*

AWARDS

2022 **Graduate Student Research Grants** (3400 USD) – *IEEE Computational Intelligence Society*
2022 **Zeno Karl Schindler Master Thesis Grant** (10,500 CHF) – *Zeno Karl Schindler Foundation*
2022 **Swiss-European Mobility Scholarship** (4500 CHF) – *Swiss-European Mobility Programme*
2021 **Heyning-Roelli Mobility Grant** (1100 CHF) – *Heyning-Roelli Foundation*
2021 **EPFL Summer Research Fellowship** (4800 CHF) – *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 **Speak Out for Engineering Americas** (1st Place, 300 GPB) – *Institution of Mechanical Engineers*
2019 **Women in Technology Scholarship** (10,000 CAD) – *IKB BC Scholarship Society*
2016 **NSERC Experience Award** (4500 CAD) – *NSERC Canada*
All years **UBC Dean's Honour List** – *University of British Columbia*

LEADERSHIP & MENTORSHIP

ML Corner, Traverso Lab | **Lead Organizer** *2022 – Present*
- Manages the first machine learning reading group at the Traverso Lab of 10+ students and postdocs.

Open Roboethics | **Competition & Toolkit Team** *2022 – Present*
- Organizes roboethics competitions and developing a public-use ethical AI toolkit

connect-f, UBC | **STEM Mentor** *2020 – 2021*
- Mentored high school students in exploring an education and career in engineering and computer science

International Children's Advisory Network (iCAN) | **Conference Committee Chair** *2016 – 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** *2014 – 2019*
- Advised 10+ Vancouver research teams on promoting youth involvement in pediatrics research
- Reviewed Canada-wide policies for standardizing clinical pediatrics research consent/assent protocol

SKILLS

Languages: Python (PyTorch, Tensorflow, scikit-learn, NumPy, pandas, matplotlib), Java, Scala, C, MATLAB, SQL
Others: ROS, QNX, Linux, Unity, Blender, HoloLens, AWS, Arduino, SolidWorks, Fusion 360