HANNA JIAMEI ZHANG

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EDUCATION

Sept 2021 – April 2023 **Masters of Computer Science (M.Sc.)**, *University of Toronto*, with a Collaborative Specialization in Robotics GPA: 4.00/4.

Sept 2016 – April 2021 **Bachelors of Applied Science (B.A.Sc.) with Honours**, *University of Toronto*, *Engineering Science*, Robotics Major, with a Bioengineering Minor and Business Certificate. Final Year GPA: 4.00/4, Overall GPA: 3.44/4

Sept 2012 – June 2016 **IB International Bacclaureate and OSSD (Ontario Secondary School Diploma)**, *Victoria Park Collegiate Institute*.

RESEARCH & WORK EXPERIENCE

May 2023– Present **Graduate Technology Intern**, Walt Disney Imagineering – Disney Research, Los Angeles, CA, USA.

- Worked on first prototype, base operating software, and system integration of a novel acrobatic robot prototype.
- Implemented methods for motion planning and sensor fusion (motion capture and on-board IMU data streams) in Python.
- Interfaced with Disney Research Team in Zurich to implement real-time control through reinforcement learning using Isaac Gym and Python.

April 2020 - April 2023 **Professor Jessica Burgner-Kahrs**, Continuum Robotics Lab (CRL), University of Toronto – Mississauga, ON, Canada.

Masters Thesis: Distance-Geometric Inverse Kinematics for Tendon-Driven Continuum Robots
Undergraduate Thesis: Teleoperation of a a dual-arm continuum robot for single-port surgery with assistive/task-based autonomous control

- Designed and tested a novel distance-based model of continuum robots compatible with state-of-art convex optimization solving techniques.
- Developed C++ 3D simulator (VTK) and GUI in Qt as well as implemented and tested novel task-priority control for a real dual-arm continuum robot setup.
- Published and presented both works in reputable journals and conferences.

June 2019 – June 2020 **Research & Development Team: Automation Engineering Intern**, Inkbox Tattoos Inc., Toronto, ON, Canada.

- Developed and tested customized automated measurement, manufacturing, and production line solutions, developed SOP documentation.
- Ideated and executed on quantifiable methods (computer vision and hardware-based) for measuring production performance/manufacturing, automatic inspection/quality control, and conducted in-vitro/vivo experiments to test validity of solutions.
- Named inventor on patent for novel semi-permanent tattoo technology.

May – Aug 2018 **Professor Milos Popovic**, Rehabilitation Engineering Lab (REL), University Health Network – University of Toronto, ON, Canada.

Closed-loop Control of Neuroprosthesis Using Stretch Sensors In a Novel Wearable Configuration

- Developed a state-of-the art wearable stretch sensing sleeve and state-based controller (LabVIEW) to enable more effective rehabilitation in patients with spinal cord injury.

May – Aug 2017 **Professor Adrian Koh Soo Jin**, Department of Mechanical Engineering, Engineering Science, National University of Singapore (NUS), Singapore.

- Designed and tested an antagonistic system comprised of dielectric elastomer artificial muscles based on MATLAB simulation and experimental testing.

Sept 2015 – Sept 2018 **LEGO Robotics Teaching Lead Instructor/Curriculum Developer**, Holland Bloorview Kids Rehabilitation Hospital, Toronto, ON, Canada.

- Developed the basis of this curriculum teaching robot design, sensors, programming autonomous control algorithms, and real-world applications using the EV3 LEGO Mindstorms system. 200+ instructing hours and 75+ hours training volunteers.

July – Aug 2016 **Professor Kullervo Hynynen**, Focused Ultrasound Group, Sunnybrook Research Institute, Toronto, ON, Canada
Term 1: Biomedical Electronics Design & Testing
Term 2: Effects of Multiple Focused Ultrasound Treatments on Neurogenesis.

PUBLICATIONS AND PROCEEDINGS

May 2024 **CIDGIKc: Distance-Geometric Inverse Kinematics for Continuum Robots [PUBLISHED] Zhang, Hanna et. al.**, IEEE Robotics and Automation Letters (RA-L), IEEE International Conference on Robotics and Automation (ICRA) 2024, Yokohama, Japan.

Sept 2021 **Cooperative Control of Dual-Arm Concentric Tube Continuum Robots [PUBLISHED] Zhang, Hanna et. al.**, MARSS 2022 International Conference on Manipulation, Automation and Robotics at Small Scales, Nominated for MARSS 2022 Best Robotics Paper Award, Toronto, Canada.

Dec 2019 **Semi-permanent tattoos, patent for novel application technology, semi-permanent ink, and manufacturing process**, *Named Inventor*, Inkbox Tattoos Inc., Toronto, Canada.

AWARDS & DISTINCTIONS

May 2022 **Ontario Graduate Scholarship (OGS)**, Department of Computer Science, University of Toronto, $15,000 CAD, A prestigious and limited number of merit-based scholarships are awarded to Ontario's best graduate students in all disciplines of academic study.

June 2021 **Loumankis Family Engineering Graduating Student Scholarship**, Council of the Faculty of Applied Science and Engineering, University of Toronto, $2,500 CAD, Awarded to 2 graduating undergraduate engineering students for demonstrating outstanding leadership.

June 2021 **Spirit of EngSci Student Award**, University of Toronto – Division of Engineering Science, Presented to graduating students for exemplary non-academic contributions within the University community.

May 2020 **The Natural Sciences and Engineering Research Council (NSERC) Undergraduate Student Research Award (USRA)**, University of Toronto, $5,625 CAD, This program supports more than 3,000 students across Canada annually and is administered jointly by Canada's three research granting agencies.

Sept 2018 **Engineering Society Award Scholarship**, University of Toronto, $4,448 CAD, Awarded to undergraduate students in the Faculty on the basis of financial need, academic ability, and extra-curricular involvement within the undergraduate engineering community.

May 2018 **Johannes Michael Holmboe Undergraduate Summer Research Fellowships**, University of Toronto, $4,620 CAD, One or more fellowship(s) are available based on academic ability, the responsibility of the applicant in the proposed research project, and financial need.

April 2017 **University of Toronto Student Exchange Bursary**, *$2,750 CAD*, Provides travel funds to students who've procured a travel exchange abroad awarded on the merit of the applicants' proposals, academic standing, and financial need.

April 2017 **National University of Singapore Grant**, *$2,750 CAD*, Provides travel funds to students who've procured a travel exchange with the school.

Sept 2016 **U of T Dean's Merit Award**, University of Toronto, $7,500 CAD, Given to students entering first year of any undergraduate program in the Faculty on the basis of academic merit.

June 2016 **Jim McQueen Excellence in Education Award**, Victoria Park Collegiate Institute, $1,500 CAD, Recognizes students in the TDSB for their exceptional involvement and service to their school and/or community life.

June 2016 **The Yip Engineering, Science, and Technology Scholarship**, Victoria Park Collegiate Institute, $1,500 CAD, Awarded to one graduating student entering a STEM degree program based on academic merit.

Feb 2016 **Schulich Leader Scholarship Nominee**, A coveted Canada-wide undergraduate STEM scholarship, selected as the single nominee from my high school.

Jan 2016 **Status of Women Award — OSSTF District 12 Toronto**, OSSTF Toronto, The Status of Women Committee Annual Awards Dinner honours outstanding women and women-identified Teachers, Professional Student Services Personnel and students in the TDSB and District 12.

Mar 2015, 2014 **FIRST Robotics Dean's List Finalist Award – Nominee (2014) & Recipient (2015)**, *FIRST Robotics Canada*, The Dean's List Award is presented to students who demonstrate exceptional leadership, technical expertise, and a commitment to promoting robotics as a way to inspire more young people to become involved in the field.

Dec 2015, 2014, 2013 **FIRST LEGO League Youth Mentor Award**, FIRST Lego League Canada, *FIRST Robotics*, This award goes to the coach or mentor whose leadership and guidance is clearly evident.

TEACHING ASSISTANTSHIPS

Spring 2023 **Data Structures and Algorithms**, *First year Engsci core C++ programming course*.

Spring 2023 **Engineering Science Option Seminar**, *Third year seminar*.

Winter 2022 **Mathematics for Robotics**, *Third year Engsci core robotics major course*.

Spring 2022 **Robotics Final Year Capstone Project**, *Final/Fourth year Engsci core robotics major capstone course*, Head Teaching Assistant.

Winter 2021 **Fundamentals of Robotics**, *Third year Computer Science robotics course*.

Winter 2021 **Introduction to Computer Science**, *First year Engsci core Python programming course*.

Summer 2021 **Robotics Final Year Capstone Project Course Development – Drone Racing Platform Development**, *Developed autonomous drone platform and curricula for new course offering.*.

All held at University of Toronto Departments of Engineering Science, Computer Science, and Robotics Institute.

LEADERSHIP & CO-CURRICULAR ACTIVITIES (SELECTED)

Feb – Sept 2020 **Vice Chair Operations**, University of Toronto Engineering Orientation Committee, University of Toronto, Toronto, Canada.

- Led a team of over 400 volunteers to deliver a week of online and in-person programming for over 1000 incoming first-year engineering students, with a budget over $130k.

May – Aug 2020 **Summer Student Fellowship**, Troost Institute for Leadership Education in Engineering, University of Toronto, Toronto, Canada.

- Worked with other student leaders who were deeply committed and driven to improve their own club or organization, myself participating as Vice Chair Operations from Orientation committee.

May – Sept 2019 **Head Leader**, University of Toronto Engineering Orientation Committee, University of Toronto, Toronto, Canada.

- Led group activities for 70 incoming Engineering students to the tight-knit community, campus, people, and student life at U of T.

Sept 2018 – June 2019 **ILead Student Clubs Liason**, Troost Institute for Leadership Education in Engineering, University of Toronto, Toronto, Canada.

- Connected with student organizations/leaders and promoted/developed ILead's club-oriented initiatives/programming.

April 2018 – Jan 2019 **Co-Chair Engineering Science Education Conference**, Department of Engineering Science, University of Toronto, Toronto, Canada.

- Planned, coordinated and executed on programming for the annual Engineering Science Education Conference (ESEC) with 500+ students in attendance.

Sept 2017 – April 2018 **Executive NSight – Enginering Science Mentorship Program**, Division of Engineering Science, University of Toronto, Toronto, Canada.

- Facilitated a mentor-ship program as well as ran research/industry talks and resume/cover letter workshops.

Jun 2017 – April 2018 **Co-Director**, Research Experience Program (Galbraith Society), University of Toronto, Toronto, Canada.

- Coordinated with professors to create research projects that students could apply to.

Sept 2017 – April 2021 **Engineering Science Ambassador**, Division of Engineering Science, University of Toronto, Toronto, Canada.

- Engaged with prospective and newly admitted EngSci students to discuss the program, share my experience, offer mentorship, and answer questions.

PRESENTATIONS AND INVITED GUEST APPEARANCES

Nov 2022 **Distance-Geometric Inverse Kinematics for Continuum Robots**, *3MT Talk*, University of Toronto Robotics Institute 3MT Competition, Toronto, Canada.

Dec 2021 **The Future is Robotic | U of T Groundbreakers EP3**, *Featured Student*, Toronto, Canada.

Jun 2021 **Teleoperation of a dual-arm continuum robot for single-port surgery with assistive/task-based autonomous control**, *Poster Presentation*, Engineering Research Days: Empowering Innovation 2021, University of Toronto, Toronto, Canada.

May 2021 **Teleoperation of a dual-arm continuum robot for single-port surgery with assistive/task-based autonomous control**, *Virtual Poster*, The Hamlyn Symposium Symposium on Medical Robotics, The Hamlyn Center at Imperial College London, Virtual.

Aug 2018 **Control of a Neuroprosthesis Using Wearable Stretch Sensors**, *Poster and Podium Presentation*, Undergraduate Engineering Research Day (UnERD), University of Toronto, Toronto, Canada.

SKILLS & ABILITIES

Programming C/C++, Python, LabVIEW, MATLAB, Java, Verilog, LaTeX

Software SOLIDWORKS, Qt, Linux, Illustrator/PhotoShop, ROS, Altium Designer

Skills Rapid Protyping, Machining, Mechatronics Design/Troubleshooting, Soldering and Circuit/PCB Design, 3D Modelling/Design, Public Speaking, Teaching, Community Engagement, Event Organization/Planning, Leadership

Languages English (Native proficiency), Mandarin (Native proficiency), French (Conversational)