

# Kyle Chisholm

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## PROFILE

I'm a roboticist and engineer who loves to build solutions for applications that are human-centered. My work is focused on surgical, collaborative, and assistive robots.

## TOOLS AND SKILLS

### PROGRAMMING

C/C++ • Python  
CMake • Bash  
MATLAB • Simulink • Scipy  
OpenCV • ROS • PCL

### PRODUCTIVITY

Codebeamer • Conan • Jira  
Doxygen • Jenkins • Sonarqube  
VS Code • CLion •  $\LaTeX$

### PLATFORMS

POSIX/Linux • STM32  
Amtel AVR • QNX Neutrino  
FreeRTOS

### CAD

SolidWorks • Autodesk Inventor  
KiCAD • Blender • FEMM

### APPS

Node.js • Redis • React.js  
HTML • CSS • Typescript

## EDUCATION

### CARLETON UNIVERSITY

DOCTORAL STUDENT - RESEARCH  
IN REHABILITATION ROBOTICS  
Sept 2011 - August 2017 | Ottawa, ON  
• 2012-2015 NSERC Post Graduate  
Scholarship - Doctoral

### MASC MECHANICAL ENGINEERING

2010 | Ottawa, ON  
CGPA 11.67/12  
• 2010 University Senate Medal  
nomination for outstanding research  
• 2009-2010 NSERC CGS

### BENG MECHANICAL ENGINEERING

2008 | Ottawa, ON  
CGPA 10.68/12

## EXPERIENCE

### VENTION CO. SENIOR ROBOTIC DEVELOPER

May 2025 - present | Montreal, QC

- Engineered advanced trajectory generation algorithms for real-time robotic control, such as jogging and waypoints with blending.
- Developed robust streaming interfaces for industrial robots, including ABB, Fanuc, and UR, enabling seamless integration and interoperability.
- Applied motion algorithms to optimize cycle times and reliability of a physical AI bin-picking application.

### KINOVA ROBOTICS SENIOR ROBOTIC CONTROL DEVELOPER

April 2021 - May 2025 | Montreal, QC

- Developed toolpath trajectory generator, hand-guiding, timescaling, and saturation features for Link 6 light industrial cobot.
- Update kinematic calibration procedures of a robot manipulator used in bronchoscopy surgical robots (MONARCH™).
- Preliminary design of a 7 DoF surgical robots with workspace analysis, redundancy resolution, and optimizing robot geometry.
- Prototyping, simulation, and visualization with ROS integration.
- Implemented safety features such as collision detection, collision reaction, and energy limitation.

### ROSS VIDEO INC. ROBOTICS R&D SOFTWARE DEVELOPER

December 2017 - April 2021 | Ottawa, ON

- Software developer and architect for next-generation Ross Video camera motion systems mobile robot and manipulator.
- Built custom trajectory planning, kinematics, and real-time control software for differential drive robot with a multi-axis camera column.
- Incorporated 3D sensor package (Realsense) with point cloud processing (PCL) and image processing (OpenCV) for collision avoidance.

### ADVANCED BIOMECHATRONICS AND LOCOMOTION LABORATORY (ABL) RESEARCH ENGINEER

Sept 2011 - 2017 | Ottawa, ON

- Designed, built and tested a novel prototype gait rehabilitation robot for stroke patients capable of delivering haptic feedback from virtual environments, full gait trajectories, and monitoring patient effort.
- Acquired a broad practical skill set through the full development cycle including conceptual design, requirements analysis, detailed mechanical design, procurement, controller design, integration and implementation.
- Implemented advanced controls and sensing techniques such as admittance force control, feedback linearization, 6DoF proxy haptic rendering, redundancy resolution, and unscented kalman filters.

## ABL - SAFE HUMAN-ROBOT INTERACTION

### DOCTORAL CANDIDATE

Sept 2014 - August 2017 | Ottawa, ON

- Real-time user monitoring techniques for safe integrated human-machine interfaces by fusion of redundant and/or wearable biomechanical sensor data (EMG, inertial measurements, forces, joint angles).
- Novel approach included continuous monitoring of human biomechanics, lower extremity muscle activation, and joint torque estimations.

## GESTURELOGIC LEAD RESEARCHER

August 2015 - April 2016 | Ottawa, ON

- Implemented sensor fusion and on-line parameter learning algorithms measuring power output of cyclists from wearable sensing technology.
- Validation with electromyography, inertial measurements, and power data from multiple test subjects.

## STANDARD INNOVATION CORPORATION RESEARCHER

May 2016 - December 2016 | Ottawa, ON

- Simulated, designed and prototyped electromagnetic components for mini hydraulic soft actuators.
- Built bench testing apparatus with 3D printed multi-material parts, sensors, and low-cost acquisition electronics.

## ABL - COMPLIANT LIMB SENSOR RESEARCH ENGINEER

August 2014 - December 2014 | Ottawa, ON

- Development of a compliant shell sensor for robot manipulators, rendering them safe for human-machine interaction.
- Contributions involved development of a real-time shell pose estimation algorithm that incorporated a nonlinear optimization routine and an embedded infrared sensor array.

## ALLEN VANGUARD ROBOTICS RESEARCH ENGINEER

May 2012 - September 2012 | Ottawa, ON

- Kinematic modeling, simulation and visualization of a new reconfigurable mobile robot concept with mixed passive and active joint actuation.
- Mobile robot controls and inverse kinematics algorithms implemented for remote operation.

## IEASTE WORK EXPERIENCE PROGRAM RESEARCH ASSISTANT

Sept 2010 - December 2010 | Tarbiat Modares University, Tehran, Iran

- Improved depth profile calculation technique of a mobile sewage pipe inspection robot with mobile robot modeling and sensor processing.
- Researched, calibrated and tested a 3D profile reconstruction sensor using a single camera and line laser for a sewage pipe inspection robot.

## EXPERIMENTAL STRESS ANALYSIS FACILITY NRC-IAR

### ENGINEERING RESEARCH ASSISTANT

Sept 2006 - August 2007 | Ottawa, ON

- Developed a prototype solution for automating the detection of rotor blade damage using stereo vision surface profilometry and 3-axis robotic stage
- Applied experimental digital image correlation and infrared cameras to crack propagation and full-field stress-strain analysis.

## SELECT PUBLICATIONS

"A limb compliant sensing strategy for robot collision reaction," *IEEE/ASME Transactions on Mechatronics*, 2016

"A task oriented haptic gait rehabilitation robot," *Mechatronics*, 2014

"Orientation control of Atlas: A novel motion simulation platform," *Mechatronics*, 2012

"Design and control for a gait rehabilitation robot," *Master's Thesis*, 2010

## COMMUNITY

### RADIO SNACK COMMUNITY CENTRE BOARD MEMBER

2024-present | Montreal, QC

- <https://radiosnack.ca/>

### OPEN SOURCE HARDWARE SUMMIT VOLUNTEER

2024 | Montreal, QC

- <https://2024.oshwa.org/>

### FIRST ROBOTICS MENTOR

2018-2019 | Toronto, ON

- Mentored high school students participating in FIRST Robotics.

### LET'S TALK SCIENCE

2013-2015 | Ottawa, ON

- Traveled to rural first nations communities and facilitated science-based activities.

### IEEE EMBS INTERNATIONAL STUDENT CONFERENCE TECHNICAL CHAIR

2015-2016 | Ottawa, ON

### ENGINEERS WITHOUT BORDERS VOLUNTEER

2004-2010 | Carleton University

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