

## **SKILLS SUMMARY**

- Robotics engineering background and hands-on work experience
- Extensive mechanical design skill set
- Applied machine shop manufacturing experience
- Broad CAD experience using Solidworks
- Strong MATLAB and SIMULINK knowledge

## **RELEVANT EXPERIENCE**

### **Engineering Culminating Design Project, University of Waterloo** *Redesign of MDA's KidsArm surgical robot, on contract for CIGITI*

*Sep. 2012 - present*

- Identified problems present in original KidsArm prototype
- Designed and manufactured two functional prototypes addressing the identified problems
- Performed all machining and assembly work for the prototypes

### **Surgical Robotics Intern, The Hospital for Sick Children, CIGITI research group** *Implementation of 7 degree of freedom control of a DENSO industrial robotic arm*

*Apr. 2012 - Aug. 2012*

- Implemented low-level remote center of motion control of a 7 degree of freedom robotic arm
- Derived Jacobian, as well as forward and reverse kinematic models of the robot
- Implemented control scheme in MATLAB SIMULINK
- Designed and manufactured robotic forceps tool extension for robotic arm

### **Robotic Tool Developer, The Hospital for Sick Children, CIGITI research group** *Design and prototyping of robot for minimally invasive neurosurgery*

*Jan. 2011 - Dec. 2011*

- Lead mechanical and electrical design of world's smallest neurosurgical robot
- Extensive Solidworks modeling and MATLAB simulations
- Machined three, to-scale functional prototypes of the robot
- Authored specifications report which was used as basis for contractual talks regarding clinical-grade manufacturing

## **EDUCATION**

### **Candidate for Bachelor of Applied Science, University of Waterloo** *Undergraduate engineering - design of electromechanical systems*

*Sep. 2008 - present*

- Focus on team design projects ranging from 3 to 5 team members with timelines of up to eight months
- Acquired experience in many engineering software packages including MATLAB and Solidworks
- Learned machining skills through the use of the student machine shop

## **Courses of Study**

- Four courses in controls, including SISO and MIMO systems
- Introduction to Micro-Electromechanical Systems (MEMS) manufacturing
- Four circuits courses including signal conditioning, power electronics and motor control
- Dynamics, statics and mechanics of deformable solids courses

## **ACADEMIC ACHIEVEMENTS**

- **University of Waterloo President's Scholarship** - Entrance scholarship recognizing students of strong academic potential.
- **Cumulative average of 85.6% in third and fourth year of undergraduate program**
- **Excellent Academic Standing Designation** - Excellent academic standing recognition received in six of seven completed terms of undergraduate engineering.

## **REFERENCES**

**Dr. James Drake, Head of Neurosurgery, The Hospital for Sick Children**

**415-813-6125**  
**james.drake@sickkids.ca**

- Supervisor while working with CIGITI
- Collaborator on minimally invasive neurosurgical robot
- Proposed supervisor for Master's thesis

**Thomas Looi, CIGITI Lab Manager**

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- Co-Supervisor while working with CIGITI