

# Hang Dong

U.S. Address  
310 Tickfaw Court  
Simpsonville, SC, 29681  
(619) 630-8581

Candidate for Master of Applied Science  
Autonomous Space Robotics  
hang.dong@utoronto.ca

Canadian Address  
5178 Doubletree Drive  
Mississauga, ON, L5M 8B1  
(647) 876-5178

## HIGHLIGHTS OF SKILLS AND QUALIFICATIONS

- Multidisciplinary engineering experience and project management skills developed through research projects, previous internships, and a variety of volunteering opportunities
- Experience with camera and lidar based navigation systems for outdoor unstructured 3D environment
- Highly motivated in working with robotics, and enjoy demonstrating the work to the general public
- Relevant experience in writing project proposals, creating conceptual design sketches, fabricating and testing prototypes

## SPECIALIZED KNOWLEDGE AND SKILLS

### Software Engineering Skills

- Coding experience in C, C++, Python, Java, Perl and Visual Basic
- Experience in developing and maintaining software packages for Willow Garage's Robot Operating System (ROS) and Microsoft Robotics Studio
- Embedded system programming on PLC, FPGA and Atmel AVR microcontroller
- Software integration and test experience in production environment

### Computer Science Knowledge

- Basic knowledge of TCP/IP and network programming, maintain a robot that communicates with sensors over UDP utilizing Google Protocol Buffers
- Real-time operating system design and implementation
- Exposure to concepts in computer vision, AI, and machine learning
- Currently taking advanced track of Prof. Andrew Ng's Stanford public courseware in machine learning

### Software Skills

- Extensive mechanical engineering design experience with CATIA, SolidWorks, AutoCAD
- Working knowledge of high-level scientific programming languages Octave and MATLAB/Simulink
- Familiarity with Windows, Mac OS X, and Ubuntu computing environments and relevant productivity software suites for each

### Mechanical Skills

- Exposure to small to medium size aircraft turbo shaft and turbofan technology
- Experience with high precision instrument: height gauge, micrometer, inclinometer, and telescope gauge
- Installation and data acquisition using optical linear encoders and laser interferometers
- Knowledge of geometric dimensioning/tolerance and stack-up calculation
- Working knowledge of machine shop tools and equipments including drill press, lathe and milling machine

### Electrical and Electronics Skills

- Electronic prototype fabrication: etching, soldering and troubleshooting
- Extensive experience with switching mode power converter circuitry design and testing
- Operation of analog and digital signal generator, oscilloscope, spectrum analyzer
- Working knowledge of I<sup>2</sup>C and 1-wire interfacing protocols
- Exposure to established and emerging high speed interface: USB, PCI-Express, HDMI, Display Port

## RECENT RESEARCH PROJECTS

**Appearance-Based Lidar Visual Odometry – MASC Thesis** 09/2010 – Present  
*Autonomous Space Robotics Lab (ASRL), University of Toronto*

- Creating an outdoor navigation system robust to ambient lighting changes, specially with space application in mind: enabling robotic dark navigation of lunar permanently shadowed craters;
- Hybrid approach, point cloud from lidar range measurement and image created using lidar reflectance information, to enable efficient feature extraction, and ultimately creating a simultaneous localization and mapping (SLAM) system with real-time performance;
- Created an lidar simulator in Python using Panda3D, producing dataset for testing feature extraction and estimation algorithm.

**Lunar Analogue Mission – Canadian Space Agency** 06/2011 – 09/2011  
*Sudbury, Ontario; Mistastin Impact Crater, Northern Labrador*

- Provided rover engineering support during deployment in the field;
- Responsible for maintaining communication with mission control over a satellite internet connection, uploading science/rover operation data, and downloading/reviewing instructions.

## RECENT FULL TIME WORK EXPERIENCE

**Embedded Software Developer – Target Software Team** 05/2010 – 09/2010  
*Qualcomm Inc., San Diego, CA*

- Responsible for weekly software integration for a LTE data access device, working with upstream and downstream technology teams to resolve integration conflicts;
- Embedded software project: improved interprocessor diagnostic message passing method.

**Multimedia and Operating Systems Test Intern – APT CoreBSP** 05/2009 – 09/2009  
*Qualcomm Inc., San Diego, CA*

- Development and execution of automated software test to verify cellular chipset functionalities;
- Communicated software deficiency to appropriate developer and provide support to locate its root cause;
- Customized/maintained an php/SQL-based dynamic reporting/tracking system.

**Hardware Diagnostic Engineering Intern - Manufacturing Test Analysis** 09/2008 – 12/2008  
*Sandvine Inc., Waterloo, ON*

- Evaluating failed units, identifying failure trends, recommending and implementing corrective action;
- Ongoing evaluation of manufacturing process to improve product quality and manufacturing efficiency;
- Maintained group reference Wiki and hosted training session on new diagnostic tool and equipment.

**Signal Integrity Engineering Intern - Product Design Qualification** 01/2008 – 04/2008  
*Advanced Micro Devices Inc (AMD), Markham, ON*

- Characterization and diagnostic of GPU and related products at board level;
- Development of data collection and testing procedures;
- Usability study of Agilent 7000 Series oscilloscope in signal integrity testing environment; provided feedbacks to Agilent engineering team for future software improvement.

**Research Associate - Precision Controls Laboratory** 05/2007 – 08/2007  
*University of Waterloo, Waterloo, ON*

- Designed and implemented retrofit of a CNC machine with ultra high precision linear encoders to improve its measurement accuracy; the high-quality output of the test results and the final reports leads a new project from Tekcel CNC;

**Weights Analyst - Weights Group, Knowledge Management** 09/2006 – 12/2006  
**Mechanical Drafting - Engine Integration Group, Product Definition** 01/2006 – 04/2006

*Pratt & Whitney Canada Corp, Mississauga, ON*

- Evaluation of the mass properties of components and assemblies for developmental and production aircraft engines;
- Prepared a number of technical drawings for experimental engine components for PW600 series engine.

## VOLUNTEERING AND PART TIME WORK EXPERIENCE

- Tour Guide**, Autonomous Space Robotics Laboratory (ASRL) 12/2010 – Present
- Giving interactive presentation and demonstration of autonomous robotics technologies
- Class Representative**, 2010 Mechatronics Engineering Program 05/2006 – 12/2008
- Acting as liaison between the Mechatronics class student body, professors and as well as Mechanical and Mechatronics Engineering department
- Undergraduate Research Associate**, Precision Control Lab, University of Waterloo
- 5 Axis ultra high precision CNC machine design and fabrication 05-09/2008
  - Identification and avoidance of machine resonance through controller design 09/12/07
  - Design of custom optical linear encoder mounting solution using Solidworks 01-05/2007
- Project Leader**, University of Waterloo Robotics Team 09/2005 – 09/2006
- Coordinating a team of nine people to design and construct an autonomous bipedal walking robot.
  - Placed third in 2005 Eastern Canadian Robotics Competition

## EDUCATION

- Candidate for Master of Applied Science (GPA: 3.65/4)  
Aerospace Engineering, University of Toronto, ON, Canada 09/2010 – Present
- Bachelor of Applied Science (GPA: 91.07/100)  
Mechatronics Engineering, University of Waterloo, ON, Canada 09/2005 – 05/2010

## AWARDS AND ACHIEVEMENTS

- Northern Scientific Training Program by the Department of Indian Affairs and Northern Development 01/2011
- Alexander Graham Bell Canada Graduate Scholarship by Natural Sciences and Engineering Research Council of Canada (NSERC) 09/2010
- Ontario Graduate Scholarship (Declined due to acceptance of NSERC award) 09/2010
- Undergraduate Student Research Award by NSERC 05/2007
- 3rd Place in Eastern Canadian Robotics Competition 11/2005
- Thor E. Stephenson Memorial Scholarship by Pratt & Whitney Canada:  
full tuition & academic fees for 5 years of Canadian university engineering studies 09/2005
- University of Waterloo President's Scholarship 09/2005
- Silver Medal of New York State Science Olympiad (Robotics Category) 03/2003
- Gold Medal of New York Capital Region Science Olympiad (Earth Science) 02/2003

## EXTRA-CURRICULAR ACTIVITIES

- Remote controlled model airplanes and helicopter (9 years of hobbies)
- Free hand sketch and charcoal painting
- Geocaching, downhill skiing, biking, soccer, table tennis, badminton, basketball and volleyball
- Captain of recreational basketball team - Flying Elbows, University of Waterloo
- Beginner level piano