

Neil Mathew

MASc. Mechanical & Mechatronics Engineering
University of Waterloo

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Education

- 2011-2013 **M.A.Sc. University of Waterloo, Mechanical & Mechatronics Engineering.**
Advisers: Stephen L. Smith, Steven L. Waslander
Thesis: Discrete Path Planning Strategies for Coverage and Multi-robot Rendezvous
- 2005-2010 **B.A.Sc. University of Waterloo, Honours Mechatronics Engineering.**

Research Interests

- Autonomous systems and mobile robotics
- Distributed control of multi-robot systems
- Motion planning, SLAM, computer vision, control theory
- Autonomous exploration, multi-robot rendezvous

Publications

Journal Articles

- [1] N. Mathew, S. L. Smith and S. Waslander, *Multi-robot Rendezvous Planning for Recharging in Persistent Tasks*, IEEE Transactions on Robotics, October 2013. Submitted.
- [2] A. Das, M. Diu, N. Mathew, C. Scharfenberger, J. Servos, A. Wong, S. Zelek, A. Clausi and S. Waslander, *Mapping, Planning and Sample Detection Strategies for Autonomous Exploration*, Journal of Field Robotics, October 2013. Accepted, awaiting Publication.

Conferences and Other Articles

- [3] N. Mathew, S. L. Smith, and S. Waslander, *A Graph-Based Approach to Multi-Robot Rendezvous for Recharging in Persistent Tasks*, IEEE Conference on Robotics and Automation, Karlsruhe, Germany, pages 3482-3487, May 2013.
- [4] N. Mathew, *Discrete Planning Strategies for Coverage and Multi-robot Rendezvous*, University of Waterloo MASc. Thesis, November 2013.

Honours and Awards

- 2012-2013 University of Waterloo Graduate Research Scholarship
2013 Mechanical Engineering Teaching Assistant Excellence Award
2013 UW Special Graduate Scholarship
2013 Winner of the K.W. Start-up Weekend
2012 Blackberry 10 Developer Award for outstanding contributions
2009 - 2010 ASME - Northern Alberta Design Challenge Award
2009 - 2010 Sandford Fleming Foundation Best Technical Speaker Award
2005 - 2007 Engineering International Student Scholarship

- 2005 - 2006 University of Waterloo President's Scholarship
- 2005 Gold Medal for outstanding performance on I.S.C. Board Exams
- 2003 Air India Scholarship for Highest Cumulative GPA in I.C.S.E. Board Exams
- 2003 First place in the U.A.E. Mathematics Olympiad
- 2000 President of India National Innovative Science Award

Experience

Academic Experience

- 2011-2013 **Graduate Research Assistant**, *WAVE Laboratory*, University of Waterloo, Ontario.
Research projects involved motion planning problems for single and multi-robot systems in a number of application domains like exploration, surveillance and other long-term autonomous missions. Developed heuristic algorithms for NP-hard multi-objective path planning and task scheduling problems such as robust coverage of an unknown environment and autonomous recharging of UAVs during persistent surveillance. See publications for details.
- 2012-2013 **Path-planning Team Lead**, *UW NASA Sample Return Robotics Team*, Waterloo.
Led the path-planning team for the University of Waterloo entry into the NASA Sample Return Robot Challenge 2013. Designed robust coverage planning algorithms for SLAM-based navigation in a GPS denied environment.
- 2009-2010 **President**, *UW Micro Aerial Vehicles Team*, Waterloo.
Led the UWMAV team in developing a modular autopilot platform for versatile use on any UAV platform. Built a single PCB module to integrate a Gumstix Overo and ARM7 MCU with a Camera, GPS, IMU and Altimeter to perform estimation, control, and image processing all on one module.

Work Experience

- Oct 2010 - **Financial Software Developer**, *Bloomberg L.P.*, New York, USA.
- Sept 2011 Developed analytical applications for the Bloomberg Terminal to track the impact of news and events on industry wide equity indices. Built semantic analysis tools for new stories on the Dow Jones Wire to track investor reactions. All client-server applications were built in C++ and Javascript.
- May 2009 - **Electronic Market Making Analyst**, *TD Securities*, Chicago, USA.
- Aug 2009 Developed a Neural Network platform to predict long-term option price and volatility fluctuations. Designed a simulated stock exchange to emulate market impact while back-testing trading strategies and designed options pricing and quoting engine algorithms.
- Sept 2008 - **Algorithmic Trading Developer**, *Scotia Capital*, Toronto, Canada.
- Dec 2008 Researched a dynamic volume model for the Volume Weighted Average Price trading algorithm to enhance performance. Developed a company wide security master database to integrate exhaustive market data for all traded securities.
- Jan 2008 - **Electrical Design Engineer**, *General Motors of Canada*, Oshawa, Canada.
- Apr 2008 Initiated a Global R & D project to develop self-powered TPM sensors using piezoelectric energy harvesters. Led a project involving replacing the parts supplier for Chevrolet Tire Pressure Sensors.
- May 2007 - **Display Abstraction Layer Developer**, *Advanced Micro Devices*, Markham, Canada.
- Aug 2007 Worked on the AMD Graphics display interface driver for ATI Radeon HD2600 graphics card. Performed kernel mode debugging for memory management in Windows XP and Linux display drivers. Implemented Linux compatibility components in ATI Radeon HDMI and DisplayPort interface layers.

Professional Activities

Journal Reviewing

- 2013 International Journal of Intelligent Unmanned Systems
- 2012 IEEE Transactions on Automatic Control

Conference Reviewing

- 2013 IEEE International Conference on Robotics and Automation

Volunteer Experience

- 2012 Active member of the Graduate Student Association
- 2011 Career mentorship at New York City public schools
- 2010 Physics and Biology tutoring for high school and college students
- 2007-2009 UW Freshman Orientation Leader
- 2005-2006 English tutor for international students at the University of Waterloo

Skills and Interests

- Programming C, C++, Python, SQL, JAVA, JavaScript, PHP
- Tools ROS, MATLAB/Simulink, Maple, Octave, L^AT_EX, Adobe Products (Photoshop, Illustrator, After Effects etc.)
- Languages English (native), Hindi (fluent), Marathi (fluent)
- Activities Bass guitar, Fine art (Presented at various exhibitions), Writing, Improvisational Comedy, Graduate Student Association
- Sport Basketball, Soccer, Squash, Snowboarding