

Alexander James Wallar

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Summary	I am a Ph.D. student in the Distributed Robotics Laboratory at MIT where I have been awarded the School of Engineering Lemelson Presidential Fellowship and the Office of the Dean of Graduate Education Diversity Fellowship. Previously, I was a student contractor in the Distributed Autonomous Systems Group at the Naval Center for Applied Research in Artificial Intelligence. I received a First Class Honours degree in computer science from the University of St Andrews in Scotland.	
Education	Ph.D. Electrical Engineering and Computer Science Massachusetts Institute of Technology	Starting September 2015 Cambridge, MA, USA Will be working under the supervision of Dr. Daniela Rus as part of the Distributed Robotics Laboratory working on algorithms for multi-agent surveillance and persistent monitoring. Receiving the School of Engineering Lemelson Presidential Fellowship and the Office of the Dean of Graduate Education Diversity Fellowship.
	B.Sc. (Honours) Computer Science University of St Andrews	September 2012 – June 2015 St Andrews, Scotland First class honours degree. Direct entry into second year. Dissertation Title: Generating Safe Trajectories in Stochastic Dynamic Environments by Leveraging Information About Obstacle Motion.
	International Baccalaureate Diploma George Mason High School	September 2011 – June 2012 Falls Church, Virginia Extended Essay Title: To What Extent Can Numbers of Different Bases be Used to Hide Information Effectively?
Experience	Graduate Student Massachusetts Institute of Technology	September 2015 – Present Cambridge, MA, USA Working as part of the Distributed Robotics Laboratory developing algorithms for autonomous multi-agent coordination for persistent monitoring and surveillance
	Student Contractor Naval Research Laboratory	January 2015 – August 2015 Washington DC, USA Working as part of the Distributed Autonomous Systems Group at the Naval Center for Applied Research in Artificial Intelligence developing algorithms for multi-agent surveillance and persistent monitoring. Also developing middlewares that provide abstractions for controlling multi-agent systems
	Undergraduate Research Assistant The Catholic University of America	August 2013 – August 2015 Various Locations Working as part of the Computational Robotics Laboratory developing algorithms for swarm manipulation that seek to enable a group of unmanned aerial vehicles to provide surveillance over a given region. Also creating path planning algorithms for swarms that generate paths through cluttered dynamic environments.

Research Intern
Naval Research Laboratory

May 2014 – August 2014
Washington DC, USA

Was selected as part of the Naval Research Enterprise Internship Program.
Worked as part of the Distributed Autonomous Systems Group at the Naval Center for Applied Research in Artificial Intelligence and developed algorithms for surveillance of risk sensitive areas by a team of UAVs.

Research Assistant
School of Computer Science, University of St Andrews

February 2014 – October 2015
St Andrews, Scotland

Worked with Dr. Juan Ye to develop computer vision techniques to produce haptic feedback from two dimensional images.

Research Assistant
School of Psychology, University of St Andrews

September 2013 – June 2014
St Andrews, Scotland

Configured a novel experimental setup that involves three active-shutter 3D displays of different sizes that can be viewed simultaneously through beam splitters.

Research Intern
University of Notre Dame

May 2013 – August 2013
Notre Dame, USA

Was selected as part of the National Science Foundation Research Experience for Undergraduates program. Developed web applications for concussion detection. Also developed a framework for in browser eye tracking and gaze prediction.

High School Research Intern
The Catholic University of America

July 2012 – August 2012
Washington DC, USA

Created an interface for controlling an iRobot Create using voice commands spoken to an Android enabled device. Also developed algorithms for swarm path planning that enabled a group of robots to move from an initial configuration to a goal configuration.

Awards

Fellowships & Grants

- School of Engineering Lemelson Presidential Fellowship, MIT
- Office of the Dean of Graduate Education Diversity Fellowship, MIT
- Symposium Series on Computational Intelligence Travel Grant, IEEE

Academic Prizes & Recognition

- Best Paper Award Nominee, Symposium Series for Computational Intelligence, IEEE
- Dean's List, University of St Andrews
- Best Poster Prize, University of Notre Dame

Hackathons

- Second place, KCL Tech Society HackKing's Hackathon
- Finalist, Barclays Openminds Hackathon
- First place, J.P. Morgan Code for Good Hackathon
- Second place, University of Edinburgh Security Appathon
- Third place, University College London Hackin' the City

Professional Affiliations

- Student Member, IEEE Nov '14 – Present
- Student Member, IEEE Computational Intelligence Society Nov '14 – Present
- Student Member, IEEE Robotics and Automation Society Mar '15 – Present

Positions of Responsibility

- Class Representative, University of St Andrews September 2014 – Present
- President, St Andrews Computing Society May 2013 – June 2014

Technical Interests

Swarm Robotics, Emergent Behaviour, Complex Systems, Autonomous Systems, Path Planning, Aerial Robotics, Artificial Intelligence, Computational Intelligence, Evolutionary Algorithms, Robotic Middleware, Stochastic Planning, Sampling Based Motion Planning, Evolutionary Robotics, Swarm Intelligence, Consensus Filtering, Mapping, Surveillance, Search & Rescue, Game Theory

Programming Languages

Python, C, C++, Java, JavaScript, Matlab, Go, C#, Maple, Mathematica, Haskell

Programming Libraries

ROS, OpenCV, ZeroMQ, Flask, NumPy, Matplotlib, OpenKinect, SciPy, Scikit-Learn

Publications

Peer-reviewed

1. Wallar A, Plaku E, and Sofge D (2014): “**Reactive Motion Planning for Unmanned Aerial Surveillance of Risk-Sensitive Areas.**”, IEEE Transactions on Automation Science and Engineering, in press
2. Sofge D, Sydney N, Wallar A, and Sullivan K (2015): “**Mobile Autonomous Navy Teams for Information Surveillance and Search (MANTISS).**”, Naval Research Laboratory Review, in press
3. Wallar A and Plaku E (2014): “**Path Planning for Swarms in Dynamic Environments by Combining Probabilistic Roadmaps and Potential Fields.**”, IEEE Symposium on Swarm Intelligence
4. Wallar A, Plaku E, and Sofge D (2014): “**A Planner for Autonomous Risk-Sensitive Coverage (PARCov) by a Team of Unmanned Aerial Vehicles.**”, IEEE Symposium on Swarm Intelligence
5. Wallar A and Plaku E (2014): “**Path Planning for Swarms by Combining Probabilistic Roadmaps and Potential Fields.**”, Springer LNAI Towards Autonomous Robotic Systems, vol. 8069, pp. 417 – 428

Theses

1. Wallar A (2015): “**Generating Safe Trajectories in Stochastic Dynamic Environments by Leveraging Information About Obstacle Motion**”, Undergraduate Thesis, University of St Andrews

Posters & Presentations

1. Sydney N, Wallar A, Sofge D (2015): **Distributed Information-Theoretic Target Detection Using Physics-Inspired Motion Coordination**, 8th International Symposium on Resilient Control Systems, Philadelphia, USA
2. Wallar A, Plaku E, and Sofge D (2014): **Risk Sensitive Surveillance with Optimal Sensor Quality for Distributed Robotic Systems**, Entrepreneur First UnHacked, London, UK
3. Wallar A, Poellabauer C, Sazonovs A, and Flynn P (2014): **Camgaze.js: A JavaScript Library for Eye Tracking and Gaze Prediction**, Edinburgh University Young Scientific Researchers Association (EUYSRA) Conference, Edinburgh, UK
4. Wallar A, Choi C, and Sazonovs A (2013): **Bowtie: In-browser Mobile Aided Sensor Acquisition using HTML5**, Scottish Informatics and Computer Science Alliance (SICSA) DemoFest, Glasgow, UK
5. Wallar A, Poellabauer C, Sazonovs A, and Flynn P (2013): **Camgaze.js: A JavaScript Library for Eye Tracking**, Scottish Informatics and Computer Science Alliance (SICSA) DemoFest, Glasgow, UK