

MAURICE FALLON

Address: 11 Douglass Street, Cambridge,
MA 02139, USA. **Email:** mfallon@mit.edu
Date of Birth: 12th June 1982 **Nationality:** Irish
Telephone: +1 857 928 5434

AREAS OF INTEREST

Mobile Robotics, Simultaneous Localisation and Mapping, Sequential Monte Carlo Methods, Acoustic Source Localisation and Tracking, Assistive Technology

WORK AND EDUCATION

- July 2010 – Present **Research Scientist – MIT.** Supervisor: Prof. John J. Leonard
- Research in the field of Probabilistic Mobile Robotics in the Marine and Terrestrial Environments. Implementation and Testing of Algorithms on multi-agent systems
 - Over seeing the research of several undergraduate and graduate students in the group
 - Experience of writing research funding proposals. Several proposals including 2 ONR, an STTR and commercial (Toyota and Ford) successfully funded
 - Peer review of conference and journal articles. (EUSIPCO, ICRA, RSS, IROS, IEEE Trans on Signal Processing, Instruments and Measurement and ACM Trans on Sensor Networks)
 - Interaction and Collaboration with Several Industrial Sponsors and Companies e.g. DARPA, ONR, Ford, Willow Garage, Hydroid and SRI
- Sept 2008 – July 2010 **Post-Doctoral Associate – MIT.** Supervisor: Prof. John J. Leonard
- Research in the field of Mobile Robotics in the Marine and Terrestrial Environments. Implementation and Testing of Algorithms on multi-agent systems.
 - Organised extensive field experiments.
 - Interaction with graduate students and technical staff in large projects.
 - 2 conference publications and 1 journal publication. Several papers under review.
- 2004-June '08 **PhD:Cambridge University** Statistical Signal Processing Department, Information Engineering Division.
- 'Acoustic Source Tracking using Sequential Monte Carlo methods'
 - Supervisor: Prof. Simon J. Godsill. Defended July 2008.
 - Integrated advanced statistical estimation techniques with my own original work to produce a novel solution to an applied problem.
 - Presented 3 papers at internationally refereed conferences. 2 IEEE journal papers accepted.
- 2000-2004 **1st Class Honours Degree:University College Dublin -Electronic Engineering**
- Placed in top 3 in class of 75 each year.
 - Final Year Project: Blind Source Separation and Sparse Representations of Speech Signals. Supervised by Dr. Scott Rickard
 - Presented a paper based on final year project at an international conference in Princeton, New Jersey, CISS2004
- 1998-2000 **Leaving Certificate:** 'A' Average. Highest result in school. (Irish school leaving exam)

TEACHING EXPERIENCE

- Autumn 2010 **Robotics Seminar – MIT**
Taught a seminar on Simultaneous Localization and Mapping as part of a graduate class "Mobile Manipulation" with the PR2 Robot.
- Spring 2009 **Laboratory Professor – MIT**
- Laboratory Demonstration. Advice and tuition of students on technical writing and presentation skills. Interaction with a variety of professors, technicians and students.
- Autumn 2007 **Demonstrator – Cambridge University**
- Demonstration, supervision and marking of students working on engineering

- experiments. Worked as part of a team of 5 such supervisors
- 2005- 2006 **Assistant Lecturer – Anglia Ruskin University**
- Created, taught and examined courses in Scientific Computation and Mathematical Software
 - Modified course to accommodate students of different standards.
- Summer 2004 **Course Organiser – University College Dublin**
- Researched and developed a new and novel course to introduce students to the concept of engineering design - combining electronics, principles of mechanical engineering with computer programming
 - Organised course material and adapted a similar course from MIT to fit the requirements of University College Dublin

PUBLICATIONS

- M. Fallon, H. Johannsson, J. Leonard, “Efficient Scene Simulation for Robust Monte Carlo Localization using an RGB-D Camera”, International Conf. on Robotics and Automation (ICRA) 2012. submitted
- M. Fallon, J. Folkesson, H. McClelland J Leonard, “Relocating Underwater Features Autonomously Using Sonar-Based SLAM”, Journal of Ocean Engineering, Submitted.
- M. Fallon, S.J. Godsill, "Tracking an Unknown and Time Varying Number of Moving Speech Sources using Particle Filters", IEEE Trans. on Audio, Speech, and Language Processing. 2011, To Appear.
- M. Fallon, M. Kaess, H. Johannsson and J. Leonard, “Efficient AUV Navigation Fusing Acoustic Ranging and Side-Scan Sonar”, International Conf. on Robotics and Automation (ICRA). May 2011. **Best Paper Nominee (20 from 2000 submissions)**
- J. Leedeckerken, M. Fallon and J. Leonard, “Mapping Complex Marine Environments with Autonomous Surface Craft”, ISER. December 2010.
- M. Fallon, G. Papadopoulos, J. Leonard, N. Patrikalakis, "Cooperative AUV Navigation using a Single Maneuvering Surface Craft", IJRR. October 2010.
- M. Fallon, G. Papadopoulos, J. Leonard, "A Measurement Distribution Framework for Cooperative Navigation using Multiple AUVs", International Conf. on Robotics and Automation (ICRA). 2010.
- M. Fallon, S.J. Godsill, "Acoustic Source Localisation and Tracking using Track Before Detect", IEEE Trans. ASL. August 2010.
- M. Fallon, G. Papadopoulos, J. Leonard, "Cooperative AUV Navigation using a single surface craft", Field and Service Robots, Cambridge MA, July 2009.
- A. Bahr, J. Leonard, M. Fallon, "Cooperative Localization for Autonomous Underwater Vehicles", International Journal of Robotics Research, 2009.
- M. Fallon, S.J. Godsill, "Multi Target Acoustic Source Tracking with an Unknown and Time Varying Number of Targets", Joint Workshop on Hands-free Speech Communication and Microphone Arrays (HSCMA08). May 2008.
- M. Fallon, S.J. Godsill, "Multi Target Acoustic Source Tracking using Track Before Detect", IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA07). October 2007. One of 20/160 Oral Presentations.
- M. Fallon, S.J. Godsill, A. Blake, "Joint Acoustic Source Location and Orientation Estimation Using Sequential Monte Carlo", 9th International Conference on Digital Audio Effects (DAFX06). October 2006.
- S. Rickard, M. Fallon, "The Gini Index of Speech", 2004 Conference on Information Sciences and Systems (CISS04).

ACADEMIC AWARDS

- 2004-Oct 2007 Microsoft Research European PhD Scholarship. One of nine awarded across Europe. One of only two awards made in Engineering. Value: £60,000 GBP
- 2004-Oct 2007 Cambridge University Engineering Department Internal Scholarship. Fees Bursary for Engineering Research Students. Value: £15,000 GBP
- 2004 Cambridge European Trust Bursary and Fellowship. Open to incoming EU students of Cambridge University. Value: £6,000 GBP
- 2004 Robert Gardiner Research Scholarship for Irish Researchers at Cambridge. One of only a few awarded. Value: £12,000 GBP
- 2003 UCD President’s Prize. Awarded to top two students in Engineering Department at UCD. Value: £150 GBP

SKILLS AND COMPETENCIES

- **Open Source:** Active contributor to a number of open source robotic projects - primarily to Point Cloud Library, LCM, MOOS-IvP, ROS communities
- **Computing:** Languages: Matlab (7 years), C/C++ (7 years). Python (3 years).
Some experience with Perl and Java.
Comfortable with HTML, PHP and mySQL. Created and maintained websites for a number of organisations some with considerable backends.
Other Skills: Linux OS (4 years), LaTeX publication system and MS office applications.
- **Statistics:** Bayesian Probability and Statistics, Monte Carlo Integration, Optimisation.
- **Languages:** English (Native), French (Intermediate), Irish (advanced)
- **Graduate Record Exam (GRE):** Quantative 790, Verbal 550, Analytic Writing 5.5 [2004]

ENTREPRENEURIAL EXPERIENCE

- **2007-2011:** Implemented a sports statistics website, gaainfo.com, drawing on a number of Web 2.0 technologies using PHP, mySQL and Javascript. The site receives 25,000 hits per week and I have had commercial approaches for the site.

MEMBERSHIPS OF PROFESSIONAL ASSOCIATIONS

- Fellow of the Cambridge Philosophical and European Societies
- Member of the Institute of Electrical and Electronics Engineers (IEEE)

EXTRACURRICULAR ACTIVITIES

- 2009-2010 **Boston Kerry Gaelic Football Club & MIT Rugby Club**
- Playing Member
- 2005-2007 **Cambridge University Gaelic Football Club Captain and President**
- Oversaw a dramatic increase in club activity. Arranged substantial sponsorship
 - Qualified to play for a number of representative Gaelic Football teams over the years
- 2004-2006 **Cambridge University Ireland Society Committee Member**
- Co-organised visit of Irish President - Mary McAleese - to the University in May '05
 - Created and maintained the Society's website
- Other Extracurricular Activities**
- Involved in the setting up of CU Energy Network - an energy discussion society
 - I have also completed in a number of Triathlons while representing Cambridge University

REFERENCES

- Prof. John Leonard
CSAIL,
Massachusetts Institute of Technology
Vassar Street, Cambridge,
MA 02139, USA
jleonard@mit.edu
- Prof. Simon Godsill
Department of Engineering,
Trumpington Street,
University of Cambridge,
CB2 1PZ, UK.
sjg30@cam.ac.uk
- Prof. Dave Barrett
Franklin W. Olin College of Engineering,
Olin Way, Needham,
MA 02492, USA
david.barrett@olin.edu
- Prof. Seth Teller
CSAIL,
Massachusetts Institute of Technology
Vassar Street, Cambridge,
MA 02139, USA
teller@csail.mit.edu