

# Tom Botterill

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## CONTACT INFORMATION

81A Roberta Drive, Somerfield,  
Christchurch 8024, New Zealand

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## EDUCATION

*August 2007–August 2010*

Studying for a **PhD in Computer Science at Canterbury University**, NZ

- Topic: *Real-time computer vision for robot navigation*
- Thesis title: *Robot Navigation using the Bag-of-Words Algorithm*, submitted August 2010.

*2001–2005*

MA (hons) in **Maths and Computer Science at Cambridge University**, England

- Final Result: **First Class**, winner of College Prize for best performance
- Consisting of a full three-year Maths degree at Gonville and Caius college (final result 2-1) followed by a one-year Computer Science conversion course at St Edmunds college.

*1995–2001*

William Howard School, Brampton, Cumbria, England

- A-Level results: Mathematics, Physics, Chemistry, General Studies, AS Further Mathematics all at grade A
- GCSE results: 9 at grade A\*, 2 at grade A

## EMPLOYMENT

**Geospatial Research Centre**, Christchurch, NZ

**August 2007–present**

*Research Scientist*

- Developed software to automatically count trees in aerial images, for Nelson Forests Ltd.
- Wrote software implementing several feature trackers in C++ for the NZ Defence Technology Agency
- Jointly designed and implemented a real-time video mosaicing scheme for the NZ Defence Technology Agency
- User interface design and implementation using Qt and C#.NET
- Conducted a survey of NZ Geospatial organisations and co-authored the New Zealand Geospatial Capability report for the New Zealand Geospatial Office

**Infinity Solutions**, Palmerston North, NZ

**October 2006–May 2007**

*Developer Analyst*

- Windows application development using Delphi/SQL Server

**Autonomy Ltd**, Cambridge, England

**October 2005–June 2006**

*Computer Programmer*

- Worked on the IDOL Server development team designing and implementing new query distribution and software load-balancing features for Autonomy's core product: a natural language database server providing search and automatic information processing to many blue chip companies.
- Wrote Perl scripts to automate unit tests and stress tests across networked Unix/Linux machines.
- Worked in a small team refactoring the intelligent agent and user administration components.

**Zircadian Ltd**, London

**July–September 2003**

*Software Developer*

- Wrote a data validation and reporting tool for UK health service, using VB6/T-SQL
- Worked in a team of five developing a reporting and auditing tool

## PHD RESEARCH

*Computer vision for robot navigation*

- Combined and adapted object recognition and machine learning techniques to develop a robust solution to the problem of Simultaneous Localisation and Mapping with a single camera. The proposed scheme allows a mobile robot to navigate unknown environments in real-time, and outperforms all previous schemes at large-scale navigation, and in robustness in visually challenging environments.
- Ongoing collaboration with Chris Hide, currently at the University of Nottingham, England, on the integration of computer vision into Inertial Navigation Systems for accurate, long-term navigation for pedestrians in indoor environments.

## PEER-REVIEWED PUBLICATIONS

- T. Botterill**, S. Mills, and R. Green. Bag-of-words-driven Single Camera Simultaneous Localisation and Mapping. *To appear in the Journal of Field Robotics*, 2010.
- T. Botterill**, S. Mills, and R. Green. Real-time aerial image mosaicing. In *Proceedings of Image and Vision Computing New Zealand*, Queenstown, November 2010.
- T. Botterill**, S. Mills, and R. Green. New conditional sampling strategies for speeded-up RANSAC. In *Proceedings of the British Machine Vision Conference*, September 2009.
- T. Botterill**, R. Green, and S. Mills. A Bag-of-Words Speedometer for Single Camera SLAM. In *Proceedings of Image and Vision Computing New Zealand*, Wellington, November 2009.
- T. Botterill**, S. Mills, and R. Green. Speeded-up Bag-of-Words algorithm for robot localisation through scene recognition. In *Proceedings of Image and Vision Computing New Zealand*, November 2008.

## ADDITIONAL PUBLICATIONS

- C. Hide, **T. Botterill**, and M. Andreotti. An integrated IMU, GNSS and image recognition sensor for pedestrian navigation. In *Proceedings of the Institute of Navigation GNSS Conference*, Fort Worth, Texas, 2009.
- C. Hide and **T. Botterill**. Development of an integrated IMU, image recognition and orientation sensor for pedestrian navigation. In *Proceedings of the International Technical Meeting of the Institute of Navigation*, San Diego, California, 2010.
- C. Hide, **T. Botterill**, and M. Andreotti. Vision-aided IMU for pedestrian navigation. In *Proceedings of the Institute of Navigation GNSS Conference*, Fort Worth, Texas, 2010.
- C. Hide, **T. Botterill**, and M. Andreotti. Low cost vision-aided IMU for pedestrian navigation. In *Proceedings of the Ubiquitous Positioning, Indoor Navigation and Location-Based Service conference*, Helsinki, Finland, 2010.

## CONFERENCES ATTENDED

- The *23rd Image and Vision Computing New Zealand Conference*, Christchurch, 2008
- The *4th Summer School on Simultaneous Localisation and Mapping*, Sydney, 2009
- The *British Machine Vision Conference*, London, 2009
- The *24th Image and Vision Computing New Zealand Conference*, Wellington, 2009
- The *25th Image and Vision Computing New Zealand Conference*, Queenstown, 2010
- The *Asian Conference on Computer Vision*, Queenstown, 2010

## COMPUTER SKILLS

Expert software engineer:

- Proficient in: C++, C, Java, Visual Basic, Delphi, SQL, Perl
- Experienced with the latest development tools under Linux and Windows: Eclipse and Visual Studio, gcc and Valgrind, svn and Perforce, UML, Rational Purify
- Mathematical tools: Maple, Mathematica, R, Matlab

Studied a wide range of topics including algorithms, software design, database design, software engineering, distributed and concurrent systems, numerical analysis, computer graphics, computer design, security, and completed a group project (implementing a CAD package using Java) as part of my computer science course.

OTHER SKILLS  
AND INTERESTS

Nationality: British, NZ Permanent Resident since 2006

DOB: September 1982

Full NZ driving license held since 2007 (UK driving license held since 2000)

Active whitewater kayaker and cyclist

REFEREES

Dr Stephen Mills (*PhD Supervisor and co-worker at the Geospatial Research Centre*)

Dr Richard Green (*PhD Supervisor at Canterbury University*)

*Contact details available on request.*