

# Ryan DuToit

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## Education

### University of Minnesota

Minneapolis, MN

*PhD in Computer Science, 3.6 GPA*

*2013 - Present*

Selected coursework: Computational Geometry, Computer Vision, Estimation and Detection, Estimation in Robotics, Matrix Theory, Optimization, Probability Theory

### Drake University

Des Moines, IA

*Bachelors of Science, summa cum laude, 3.9 GPA*

*2009-2013*

Majors: Computer Science, Mathematics, and Physics

## Experience

### MARS Lab, University of Minnesota

Minneapolis, MN

*Research Assistant*

*2013 - Present*

Development of real-time, vision-inertial localization and mapping algorithms for mobile devices (cell phones, tablets, wearables). Consistent and efficient 3D map-based localization.

### Drake University

Des Moines, IA

*Research Assistant*

*2011 - 2013*

Developed computer simulations modeling an  $H_2^+$  ion within strong laser fields. Produced highly efficient, parallel code, employing FORTRAN and MPI.

*Programming Intern*

*2010 - 2013*

Designed, developed, and tested web-server and iOS software for Drake University employees and students.

### Auburn University

Auburn, AL

*Undergraduate Researcher*

*2012*

Studied and developed methods for unmanned aerial vehicle collision avoidance. Implemented algorithms in Robot Operating System.

## Honors and Awards

University of Minnesota, Dept. of CSE: Ph.D. Candidate Travel Award

*2016*

Drake University, Dept. of Physics & Astronomy: Helmick Senior Scholar

*2013*

Drake University, Dept. of Physics & Astronomy: Physics Prize Scholarship

*2009 - 2013*

## Skills

○ C/C++

○ MATLAB

○ Java

○ Android

○ iOS

○ Linux

○ Sensor Fusion

○ SLAM

○ Computer Vision

## Journal Publications

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[J3] C.X. Guo, K. Sartipi, R.C. DuToit, G.A. Georgiou, R. Li, J. O'Leary, E.D. Nerurkar, J.A. Hesck, and S.I. Roumeliotis, **"Resource-Aware Large-Scale Cooperative 3D Mapping using Multiple Mobile Devices"**, *IEEE Transactions on Robotics*, submitted May 2016.

[J2] G. Xiaoxu, R.C. DuToit, and K. Bartschat, **"Photoionization of the  $H_2^+$  ion by ultrashort elliptically polarized laser pulses"**, *Physical Review A* 87(5), May 2013

[J1] G. Xiaoxu, E. Secor, R.C. DuToit, and K. Bartschat, **"Diffraction patterns in the ionization of the heteronuclear  $HeH_2^+$  ion by attosecond x-ray radiation"**, *Physical Review A* 86(5), October 2012

## Conference Publications

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[C4] R.C. DuToit, J.A. Hesck, E.D. Nerurkar, and S.I. Roumeliotis, **"Consistent Map-based 3D Localization on Mobile Devices"**, *pre-print, arXiv:1604.08087*, Apr 27, 2016,

[C3] C.X. Guo, K. Sartipi, R.C. DuToit, G.A. Georgiou, R. Li, J. O'Leary, E.D. Nerurkar, J.A. Hesck, and S.I. Roumeliotis, **"Large-Scale Cooperative 3D Visual-Inertial Mapping in a Manhattan World"**, *IEEE International Conference on Robotics and Automation (ICRA'16)*, Stockholm, Sweden, May 16 - 21, 2016.

[C2] C.X. Guo, D.G. Kottas, R.C. DuToit, A. Ahmed, R. Li, and S.I. Roumeliotis, **"Efficient Visual-Inertial Navigation using a Rolling-Shutter Camera with Inaccurate Timestamps"**, *Robotics: Science and Systems (RSS'14)*, Berkeley, CA, July 12 - 16, 2014.

[C1] D.G. Kottas, R.C. DuToit, A. Ahmed, C.X. Guo, G. Georgiou, R. Li, and S.I. Roumeliotis, **"A Resource-aware Vision-aided Inertial Navigation System for Wearable and Portable Computers"**, *Workshop: Long Term Autonomy, IEEE International Conference on Robotics and Automation (ICRA'14)*, Hong Kong, China, May 31 - June 5, 2014.

## Conference Presentations

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[P3] R.C. Dutoit, G. Georgios, C.X. Guo, K. Wu, and S.I. Roumeliotis, **"Vision-Aided Inertial Navigation for Virtual Reality Applications"**, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'16) Live Demo*, Las Vegas, NV, June 27 - 30, 2016.

[P2] C.X. Guo, R.C. DuToit, K. Sartipi, J. O'leary, , R. Li, G. Georgios, E.D. Nerurkar, J.A. Hesck, S.I. Roumeliotis, **"Resource-Aware Large-Scale Cooperative 3D Mapping from Multiple Cell Phones"**, *IEEE International Conference on Robotics and Automation (ICRA'15) Late Breaking Result Poster*, Seattle, WA, May 27 - 29, 2015.

[P1] R.C. DuToit, G. Xiaoxu, and K. Bartschat, **"The Hydrogen Molecular Ion in an Intense Elliptically Polarized XUV Laser Pulse"**, *APS Division of Laser Science, Symposium on Undergraduate Research*, Rochester, NY, October 15, 2012.

## Academic Service

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**Journal Paper Reviewer:** IEEE Transactions on Robotics

**Conference Paper Reviewer:** IEEE International Conference on Robotics and Automation