

# Jeffrey Kane Johnson

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## SUMMARY POINTS

- Specialist in motion planning and collision avoidance in multi-agent systems
- Extensive experience developing for and testing on automated vehicles
- History of professional software development

## WORK & EXPERIENCE

**IEEE ITSS Technical Committee on Self Driving Automobiles** Nov 2018–Current  
*Member*

**Uber ATG**, Pittsburgh, PA Jan 2018–Current  
*Senior Autonomy Engineer*

- Motion planning for urban automated vehicles

**Maeve Automation** May 2017–Current  
*Maintainer*

- Research in vision-based collision avoidance for mobile navigation
- <https://maeveautomation.org>

**Apple, Inc.**, Sunnyvale, CA Jan. 2016–May 2017  
*Engineer*

- Experimental algorithm and software development for autonomous systems

**Robert Bosch, LLC**, Palo Alto, CA Jan. 2014–Nov. 2015  
*Research Engineer*

- Lead development of motion planning/decision making for automated driving

**Robert Bosch, LLC**, Palo Alto, CA May 2013–Aug. 2013  
*Intern*

- Collision detection methods for optimization-based vehicle motion planning

**TRACLabs**, Houston, TX June 2012–Aug. 2012  
*Intern*

- [Software toolkits for coordinated dual-arm manipulation](#)

**Indiana University**, Bloomington, IN Sept. 2006–Sept. 2009  
*Web Developer, School of Journalism*

- Development of school web site and internal web-based applications

**Contract Developer** March 2004–Sept. 2006

- Software development for small to mid-sized clients

## EDUCATION

**Indiana University**, Bloomington, IN June 2012–Sept. 2017  
*PhD in Computer Science*

**Indiana University**, Bloomington, IN Sept. 2009–June 2012  
*Master of Science in Computer Science*

**Trine University**, Angola, IN Aug. 1999–Dec. 2003  
*Bachelor of Science in Computer Science*

## TOOLING & TRAINING

**Programming Languages:** Primarily C++, familiar Python, Matlab, & R

**Libraries/Environments:** ROS, OpenCV, PCL

**Version Control:** Mercurial, Git

**Platforms:** Linux (Ubuntu), macOS

**Workflow:** Certified ScrumMaster 2014–2016 (Scrum Alliance, License 000368544)

**Training:** Safe Driver Training (Simraceway, Sonoma, CA)

## SELECTED PAPERS

Full list of publications available at: <http://jeffreykanejohnson.com>

- *Visual Servoing for Mobile Ground Navigation*, IEEE Connect and Automated Vehicles Symposium (CAVS) 2018
- *On the Relationship Between Dynamics and Complexity in Multi-agent Collision Avoidance*, Autonomous Robots (AURO) 2018
- *Selective Determinism for Autonomous Navigation in Multi-agent Systems*, PhD Dissertation 2017
- *Constant Space Complexity Environment Representation for Vision-based Navigation*, IROS 2017 Workshop on Planning, Perception and Navigation for Intelligent Vehicles
- *A Novel Relationship Between Dynamics and Complexity in Multi-agent Collision Avoidance*, Robotics: Science and Systems (RSS) 2016
- *Identifying Support Surfaces of Climbable Structures from 3D Point Clouds*, ICRA 2014, with Anna Eilering, Victor Yap, & Kris Hauser
- *Optimal Longitudinal Control Planning with Moving Obstacles*, IV 2013, with Kris Hauser
- *Minimizing Driver Interference Under a Probabilistic Safety Constraint in Emergency Collision Avoidance Systems*, ITSC 2012, with Kris Hauser
- *Optimal Acceleration-Bounded Trajectory Planning in Dynamic Environments Along a Specified Path*, ICRA 2012, with Kris Hauser

## SELECTED OPEN SOURCE

The following are ROS libraries maintained at:

[https://bitbucket.org/maeveautomation/maeve\\_automation\\_core/src/](https://bitbucket.org/maeveautomation/maeve_automation_core/src/)

### Maeve Dynamics

This package contains a dynamics library for computing reachability under acceleration constraints in a Path-Speed-Time (PST) space.

### Maeve Geometry

This package contains a library for manipulating simple geometric types and functions, especially interval sets and quadratic polynomials.

### ISP Controller 2D

This package defines a subsumption-based visual servoing controller that computes command messages given input guidance command and ISP fields.

### ISP Fields

This package defines a library for handling Image Space Potential (ISP) fields. The fields themselves are represented as plain OpenCV data structures, so all algebraic operations are supplied by that library.