

# Randolph C. Voorhies

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## Education

### Ph.D. in Computer Science

In Progress  
University of Southern California  
GPA: 3.930

### M.S. in Computer Science - Intelligent Robotics

August 2009  
University of Southern California  
GPA: 3.910

### B.S. in Computer Engineering & Computer Science

December 2006  
University of Southern California  
GPA: 3.497

## Technical Skills

### Programming Languages

C++ (11) · C · Python · MATLAB · Javascript · GLSL · Perl · Spin

### Software Libraries

Boost · ZeroC Ice · Eigen · OpenCV · ROS · Qt · Thrust · Arduino

### Electrical Engineering Tools

Altium Designer · Cadsoft Eagle · Surface Mount Assembly

### Engineering Abilities

Image Processing · Robotic Perception & Localization · Distributed Systems · Circuit Board Design · Mechanical Design

## Experience

### NASA / Jet Propulsion Laboratory

Fall 2013 - Present

Graduate Research Assistant in Larry Matthies' Computer Vision/Robotics Group

- Currently researching the integration of light polarization measurements into 3D reconstruction algorithms.

### USC Computer Science Department

Fall 2007 - Present

Graduate Research Assistant in Laurent Itti's iLab

- Designed and implemented a plane detection algorithm for LiDAR point clouds, as well as a SLAM solution using detected planes.
- Created NRT, a C++ modular programming framework for distributed image processing and robotics.
- Implemented tracking and object recognition systems for DARPA's Neovision2 project.
- Created a distributed visual attention and anomaly detection system for DARPA's Cognitive Technologies Threat Warning System (CT2WS) project.
- Performed circuit design, assembly, and embedded programming for Beobot2.0, iLab's next generation 16-core mobile robot.

### NASA / Jet Propulsion Laboratory

Summer 2012

Intern in the Computer Vision for Surface Applications Group

- Tuned and optimized a vision based monocular stabilization system for use in a quadrotor.
- Built an extensible framework for managing JPL's fleet of quadrotors in ROS.
- Ported a Rapidly Exploring Random Tree path planner for use on the quadrotors.
- Wrote an efficient Alpha/Beta filter to integrate and smooth quadrotor velocity and IMU data.

### South Pasadena Educational Foundation

Summers 2007 - 2011

Teacher Trainer

- Designed a robotics curriculum to be taught to middle school students.
- Provided weekly training sessions for teachers.

### USC Computer Science Department

Fall 2007 - 2009

CS445 Introduction to Robotics Lab Assistant

- Designed and taught curricula for weekly three-hour lab sessions.
- Designed and built a custom robotics controller board based on a 600Mhz Overo processor.
- Built a software architecture and library to help the students cross-compile and upload code, as well as libraries for motion control, data acquisition, image processing, and communication.

### Microsoft

Summer 2004

Intern in the Security Division

- Developed security database migration tools in C#.

## Publications

### Performance Evaluation of Neuromorphic-Vision Object Recognition Algorithms

Rangachar Kasturi\*, Dmitry Goldgof, Rajmadhan Ekambaram, Gill Pratt, Eric Krotkov, Douglas Hackett, Qinfen Zheng, Yang Ran, Rajeev Sharma, Mark Anderson, Mark Alan Peot, Mario

Aguilar, Deepak Khosla, Yang Chen, Kyungnam Kim, Lior Elazary, Randolph Voorhies, Daniel Parks, Laurent Itti  
*Proc. International Conference on Pattern Recognition (ICPR) 2014*

**Finding Planes in LiDAR Point Clouds for Real-Time Registration**

Randolph C. Voorhies\*, Shane Grant\*, Laurent Itti  
*Proc. IEEE/RSH International Conference on Intelligent Robots and Systems (IROS) 2013*

**An Autonomous Manipulation System based on Force Control and Optimization**

Ludovic Righetti, Mrinal Kalakrishnan, Peter Pastor, Jonathan Binney, Jonathan Kelly, Randolph C. Voorhies, Gaurav Sukhatme, Stefan Schaal  
*Autonomous Robots 2013*

**Neuromorphic Bayesian Surprise for Far-Range Event Detection**

*(Winner of the Best Student Paper Award)*  
Randolph C. Voorhies, Lior Elazary, Laurent Itti  
*Proc. IEEE International Conference on Advanced Video and Signal Surveillance (AVSS) 2012*

**Centralized Server Environment for Educational Robotics**

Randolph Voorhies, Christian Siagian, Lior Elazary, Laurent Itti  
*Proc. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2009*

**Application of a Bottom-Up Visual Surprise Model for Event Detection in Dynamic Natural Scenes**

Randolph Voorhies, Lior Elazary, Laurent Itti  
*Vision Science Society Annual Meeting (VSS) 2010*

**Beobot 2.0: Cluster Architecture for Mobile Robotics**

Christian Siagian, Chin-Kai Chang, Randolph Voorhies, Laurent Itti  
*Journal of Field Robotics (JFR) 2010*

## Honors

Member Phi Kappa Phi · Co-Chair of the "Education Robotics" session for IROS 2009