

# 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 · 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

## Experience

### USC Computer Science Department

Fall 2007 - Present

Graduate Research Assistant in Laurent Itti's iLab

- Currently working on vision and point cloud perception systems for the DARPA Humanoid Robotics competition.
- Implemented NRT, a C++ modular programming framework for distributed image processing and robotics.
- Implemented tracking and object recognition systems for DARPA's Neovision2 project.
- Implemented a distributed attention 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

### 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