

# SHAWN M SCHAFFERT

sweb@macrovert.com • <http://www.macrovert.com/shawn>

## EDUCATION

---

### **Ph.D. in Electrical Engineering and Computer Science** (December 2006)

*University of California at Berkeley*

Academic Focus: Control Systems, Robotics, Sensor Networks, Mathematics, Embedded Systems

Research Focus: Autonomous Control and Navigation in Distributed, Real-Time, Networked Systems

Research Advisor: Professor Shankar Sastry

### **M.S. in Electrical Engineering and Computer Science** (May 2001)

*University of California at Berkeley*

Academic Focus: Control Systems, Mathematics

Research Focus: Controller Synthesis for Discrete Time Hybrid Systems with Safety Specifications

Research Advisor: Professor Shankar Sastry

### **B.S. in Electrical Engineering** (May 1998)

*University of Nebraska at Lincoln*

Academic Focus: Circuits, Systems

Honors: Graduated ranked #1 in university. Outstanding electrical engineering senior. 4.00/4.00 GPA

## SELECTED RESEARCH AND WORK EXPERIENCE

---

### **Information-based Robot Navigation for Bandwidth-constrained Sensor Networks** (2005-2006)

*Graduate Student Researcher, University of California at Berkeley*

Improved robot localization accuracy and reduced network bandwidth consumption for robots navigating autonomously in sensor networks by developing automatic path planning routines based on an information localizability metric. Developed sensor network models and demonstrated the performance improvement with simulation results.

### **Large-Scale Wireless Sensor Network for Multi-object Pursuit-Evasion Games** (2005)

*Graduate Student Researcher, University of California at Berkeley*

Designed system enabling sensor network data exfiltration to a remotely piloted fixed wing aerial vehicle. Designed system to relay (GPS-aligned) tracking and pursuit information to a mobile, hand-held graphical display. Supported and managed development of a mobile GPS backpack for sensor network deployment localization. Supported development of multiple object state estimation and pursuit evasion game systems.

### **Outdoor Ground Robot and Mobile Sensor Network Platform** (2005)

*Graduate Student Researcher, University of California at Berkeley*

Designed a robust, outdoor ground robot in its entirety, integrating various hardware systems: D-GPS, mobile PC, wifi networking, sensor network motes, vehicle chassis, motors and controllers, and power systems. Developed client-server software architecture allowing shared access to onboard sensing and actuation resources via socket based or XML-RPC based communication. Developed client-side control applications.

### **Wireless Sensor Network for Mobile Robot Pursuit-Evasion Games** (2003)

*Graduate Student Researcher, University of California at Berkeley*

Developed mobile robot pursuit control system capable of tracking and capturing a human-controlled evading robot. Developed software capable of fusing sensor measurements from a D-GPS system and sensor network – providing localization, navigation, low-level motor control, and evader detection. Collaboratively developed a common message interface for communicating sensor network measurements and remote logging of the robot state.

### **k-SAT Phase Transition Analysis and Solver Benchmarking** (2001)

*Research Intern, Xerox PARC, Palo Alto, CA*

Researched phase transitions and solvers for k-SAT (Boolean satisfiability) problems. Developed component architecture simulator for testing and analyzing hybrid k-SAT solvers.

*continued*

**SELECTED RESEARCH AND WORK EXPERIENCE** *(continuation)*

---

**Maximal Controlled Invariant Sets and Least Restrictive Controller** (1999-2001)*Graduate Student Researcher, University of California at Berkeley*

Developed an algorithm for determining the maximal controlled invariant set and least restrictive controller for linear discrete time and linear discrete time hybrid systems with safety specifications. Determined classes of systems for which the algorithm is decidable.

**Electrical Engineering Teaching Assistant** (1998-1999)*Graduate Student Instructor, University of California at Berkeley*

Lectured discussion sections, graded exams, assisted students, and generated handouts for an introductory electrical engineering class. Received high marks on student exit surveys. Supervised by Professor Roger Howe.

**Sky Reflectivity Visualization and Animation** (1997-1998)*Undergraduate Student Research Assistant, University of Nebraska at Lincoln*

Designed software to generate visual slices and animations of the reflectivity of the sky based on Doppler radar data. Supervised by Professor Robert Palmer.

**Weather Balloon and Radiosonde Hardware and Software Infrastructure** (1997)*Undergraduate Student Research Assistant, University of Nebraska at Lincoln*

Designed hardware for weather balloon radiosondes and data acquisition base-station. Refactored hardware to reduce temperature sensitivity. Performed sensor calibration and field testing. Supervised by Professor Robert Palmer.

**Power Systems Engineering Support** (1996)*Engineering Intern, Omaha Public Power District, Omaha, NE*

Designed test equipment databases. Coordinated relay settings. Configured relay communication devices.

**SELECTED BUSINESS EXPERIENCE**

---

**Web Services for Customer Relationship and Content Management Applications** (2008-present)*Consultant, Freelance*

Worked with clients to create project requirements, providing cost and resource assessments, quality assurance across a product's lifetime, and developing multi-stage launch strategies minimizing time-to-launch while maximizing overall effectiveness. Provided complete solutions encompassing strategy, promotion, design, testing, deployment, and continuity. Developed final builds ensuring usability, performance, security, and third-party integration.

**Local Community Networking and Fundraising Web Portal** (2006-2008)*Principal Architect / Director of Technology, Everylocal LLC*

Contributed to overall business strategy. Established technology requirements to support strategic vision. Assessed utility of third-party tools. Designed and deployed infrastructure. Developed software and database architecture for various services: accounting and business tracking, search efficiency, privileged user security, content optimization, continuity assurance, traffic monitoring, and various frontend and backend services.

**SELECTED COURSE EXPERIENCE** *(UC-Berkeley)*

---

**Graduate Controls**

Linear System Theory, Nonlinear Dynamical Systems, Nonlinear System Theory, Hybrid Systems and Control, MIMO Control Systems

**Graduate Mathematics**

Convex Optimization, Topology and Analysis, Probability and Statistics

**Graduate Real-time, Embedded Systems and Software**

Embedded Systems, Embedded Software, Models of Computation

**Circuits**

Electronic Sensors and Actuators Laboratory

*continued*

## TECHNICAL SKILLS

---

### Programming Languages

Python, C, C++, Matlab, Simulink, Java, Ruby, Pascal, BASIC, Lisp, Assembly, SQL, Shell Script (Bash, ZSH)

### Web-related Programming Languages

(X)HTML, CSS, XML, PHP, Javascript, Smarty Templates

### Specialized Programming Languages and Applications

nesC, Swig, Giotto, Esterel, Ptolemy II, Player/Stage, Excel

### Software Development Tools

SVN, CVS, RCS, Make, GDB

### Operating Systems

TinyOS, Unix, Linux, Cygwin, Mac OS X, Windows, DOS

### Unix Administration

Apache, SSH, MySQL, Iptables, Postfix, Samba, Bind, Cron, CUPS, Awstats

### Publishing and Design Software

LaTeX, ImageMagick, Photoshop, Illustrator, Word, Power Point

### Hardware Design and Integration

Developed robotic hardware and software. Integrated differential GPS hardware and software. Designed circuits. Proficiently utilized lab equipment (oscilloscope, multimeter, etc). Constructed and maintained PCs and servers.

### Vehicle Repair

Repair and maintenance of automobiles/motorcycles: engine restoration, brake maintenance, clutch rebuild

## SELECTED PUBLICATIONS

---

S. Schaffert. *Closing the Loop: Control and Navigation in Wireless Sensor Networks*. Ph.D. Thesis, Electrical Engineering and Computer Sciences, University of California at Berkeley, December 2006.

P. Chen, S. Oh, M. Manzo, B. Sinopoli, C. Sharp, K. Whitehouse, G. Tolle, J. Jeong, P. Dutta, J. Hui, S. Schaffert, S. Kim, J. Taneja, B. Zhu, T. Roosta, M. Howard, D. Culler, and S. Sastry. *Experiments in Instrumenting Wireless Sensor Networks for Real-Time Surveillance*. In Proceedings of the International Conference on Robotics and Automation Video, 2006.

C. Sharp, S. Schaffert, A. Woo, N. Sastry, C. Karlof, S. Sastry, and D. Culler. *Design and Implementation of a Sensor Network System for Vehicle Tracking and Autonomous Interception*. In European Workshop on Wireless Sensor Networks, January-February 2005.

B. Sinopoli, C. Sharp, L. Schenato, S. Schaffert, and S. Sastry. *Distributed Control Applications within Sensor Networks*. In Proceedings of the IEEE, volume 91, issue 8, pages 1235–1246, August 2003.

S. Schaffert. *Controller Synthesis for Discrete Time Hybrid Systems with Safety Specifications*. Masters Thesis, Electrical Engineering and Computer Sciences, University of California at Berkeley, May 2001.

R. Vidal, S. Schaffert, O. Shakernia, J. Lygeros and S. Sastry. *Decidable and Semi-decidable Controller Synthesis for Classes of Discrete Time Hybrid Systems*. In Proceedings of the 40th IEEE Conference on Decision and Control, pages 1243-1248, December 2001.

R. Vidal, S. Schaffert, J. Lygeros and S. Sastry. *Controlled Invariance of Discrete Time Systems*. In Hybrid Systems: Computation and Control, volume 1790, pages 437-450, 2000.

R. Vidal, S. Schaffert, J. Lygeros and S. Sastry. *Controlled Invariance of Discrete Time Systems*. University of California at Berkeley, memorandum number UCB/ERL M99/65, 1999.