

Objectives

Use and develop my skills in computer vision and robotics research, prototyping, software development, teaching, and leadership at an excellent organization, during a sabbatical leave from June, 2011 – July, 2012. Build a lasting relationship between that organization and Rose-Hulman.

Summary of Skills

A **successful researcher** in image recognition, robotics education, and computing education.

Metrics: 10 journal papers. **19 refereed conference and workshop** papers, most of which are international. **Three U.S. patents** on image recognition algorithms.

A **successful educator** at a leading school in undergraduate engineering education.

Metrics: 4.8/5.0 average rating by Rose-Hulman students, **well above the third quartile at the Institute**, based on my enthusiasm to teach and learn and on my dynamic presentation style.

A **successful leader** in my profession.

Metrics: Direct the Imaging Systems Laboratory and Multidisciplinary Robotics Minor. **Won \$110,000** in grants for curricular innovation. **Supervised** seven independent study students leading to six publications.

Research Experience

Rose-Hulman Institute of Technology (Terre Haute, IN), 2005-present

- Supervisor of image recognition research, including two theses: *Fractured Image Reconstruction* and *Semantic Support Vector Machines*.
- With colleagues, researched, developed, and published an educational robotics curriculum.
- With a colleague, developed and published a pedagogical technique for challenging advanced first-year computer science students.

Eastman Kodak Company (Rochester, NY), 2001-2005

- Research intern/consultant in the Image Understanding group.
- Worked on several image classification problems, including scene and orientation recognition.
- Performed data collection (multiple photo databases of over 2000 images), designed, implemented, and tested several feature extraction algorithms and full classification systems.
- Employed temporal, spatial, and camera metadata cues to improve classification.

University of Rochester (Rochester, NY), 2002-2005

- Research assistant supported by grants from Eastman Kodak Company.
- Investigated graphical models (Markov random fields, Bayes nets, factor graphs) for classification problems.
- Implemented each model and analyzed performance.

Selected Publications

1. M. Boutell, C. Berry, D. Fisher, and S. Chenoweth. A multidisciplinary robotics minor. *ASEE Computers in Education Journal, Special Issue on Novel Approaches to Robotics Education*, 1(3), pp. 102-111, July 2010.
2. A. Hettlinger and M. Boutell. A simulator for teaching robotics using the iRobot Create. *AAAI 2010 Symposium on Educational Advances in Artificial Intelligence*, Atlanta, GA, June 2010.
3. L. Kaczmarczyk, M. Boutell, and Mary Z. Last. Challenging the advanced first-year student's learning process through student presentations. *The Third International Computing Education Research Workshop*, Atlanta, GA, September 15-16, 2007.
4. B. Ayers and M. Boutell. Home interior classification using SIFT keypoint histograms. *International Workshop on Semantic Learning Applications in Multimedia* (in conjunction with CVPR2007), Minneapolis, MN, June 2007.
5. M. Boutell, J. Luo, and C. Brown. Scene parsing using region-based generative models. *IEEE Transactions on Multimedia*, 9(1), pp. 136-146, January 2007.
6. J. Luo, M. Boutell, and C. Brown. Pictures are not taken in a vacuum: An overview of exploiting context for semantic scene content understanding. *IEEE Signal Processing Magazine*, 23(2), pp. 101-114, March 2006.
Nominated for the Best Paper award.
7. M. Boutell, J. Luo, and C. Brown. A generalized temporal context model for classifying image collections. *ACM Multimedia Systems*, 11(1), pp. 82-92, November 2005. Basis of **U.S. Patent 7,680,340 (2010)**.

8. J. Luo and M. Boutell. Automatic image orientation detection via confidence-based integration of low-level and semantic cues. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 27(5), pp. 715-726, May 2005.
9. M. Boutell and J. Luo. Bayesian fusion of camera metadata cues in semantic scene classification. *IEEE Conference on Computer Vision and Pattern Recognition*, Washington, DC, June 2004. **Basis of U.S. Patent 7,555,165 (2009)**.

Teaching Experience

Rose-Hulman Institute of Technology (Terre Haute, IN), 2005-present

- Assistant Professor in the Department of Computer Science and Software Engineering.
- Developed new courses in Image Recognition and a new section of Introduction to Software Development using robotics programming.
- Taught Object-Oriented Software Development and Data Structures & Algorithm Analysis
- Learned and taught Cryptography and Mechatronics as professional development opportunities.

Stonehill College (Easton, MA), 1999-2000

- Adjunct Professor for *Computer Science I and II*, including C++ and introductory data structures.

Norton High School (Norton, MA), 1994-2000

- Teacher of mathematics and computer programming courses with 4300+ hours of classroom time.
- Developed curriculum for and taught the school's first AP C++ course (70% who took it earned a '4' or '5').

Education

University of Rochester (Rochester, NY)

- Ph.D. in Computer Science: Exploiting Context for Semantic Scene Classification (2005)
- M.S. in Computer Science: State of the Art in Semantic Scene Classification (2002)

University of Massachusetts (Amherst, MA)

- M.Ed. in Mathematics Education (1994)

Worcester Polytechnic Institute (Worcester, MA)

- B.S. in Mathematical Science with High Distinction (1993)

Selected Leadership Opportunities and Honors

- **Program Director**, Multidisciplinary Minor in Robotics (<http://robotics.rose-hulman.edu>), 2008-2011. With colleagues, won a 3-year, \$100,000 grant to create a robotics program at Rose-Hulman for students studying Mechanical, Electrical, Computer and Software Engineering and Computer Science.
- **Program Director**, Imaging Systems Laboratory, 2007-2011. Manage a well-established certificate program.
- **Curricular Innovator**, SPLICE: Self-Paced Learning in an Inverted Classroom Environment, 2010. With Curt Clifton, won a \$10,000 grant to develop a series of on-line instructional videos on C Programming.
- **Co-organizer** with Jerod Weinman a special session at ACM SIGCSE, bringing together undergraduate educators in Imaging and Computer Vision, 2010.
- **Program committee**, Workshop on Semantic Learning Applications in Multimedia, IEEE Conference on Computer Vision and Pattern Recognition, 2006-2009.
- **Creator, organizer, and teacher** of APCS Gridworld, a workshop for Indiana high school teachers of Advanced Placement Computer Science, at Rose-Hulman, 2007.
- **Faculty Advisor**, Upsilon Pi Epsilon, Indiana Alpha Chapter, 2008-present. Renewed the activity of this honor society.
- **Coach**, Vigo County Youth Soccer Association, ranging from U5 to U12, 2007-2010.
- **Leader and Financial Coordinator**, Mosaic Church, 2008-present.
- **Winner**, Worcester Polytechnic Institute Class of 1879 Prize for Outstanding Project in the Humanities for "The Flood", an original composition for brass quintet, 1991.

Personal

- US Citizen
- Willing and able to obtain clearances