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Computer Science & Software Engineering **boutell@rose-hulman .edu www.rose-hulman.edu/~boutell**

Objectives

Use and develop my skills in computer vision and robotics research, prototyping, software development, teaching, and leadership at an excellent organization, during a summer leave. 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

- Associate 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