

Stuart B. Heinrich

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Research Interests

Computer vision, image processing, structure from motion, multi-view stereo correspondence, feature detection, image segmentation, machine learning, data clustering, robust statistics, numerical optimization, simulation, intelligent systems, computer graphics.

Education

Ph.D. Computer Science, North Carolina State University, March 2011 (4.0 GPA)

Dissertation: Maximum Likelihood Methods for Hierarchical Structure from Motion of Uncalibrated Video

Advisors: Wesley E. Snyder, Jan-Michael Frahm.

M.S. Computer Science, North Carolina State University, 2008 (4.0 GPA)

B.S. Computer Science, University of Vermont, 2006 (3.69 GPA)

Minor in Electrical Engineering

Experience

Senior Computer Vision Engineer, The MITRE Corporation, Mar 2014 - Present.

- *Research and implementation of proprietary/classified 3D computer vision systems.*

Creator of Supertext Messenger, Oct 2012 - Mar 2014.

Lead Developer and Head of Computer Vision at Lumatic, Inc., Jun 2011-Oct 2012.

- *Real-time multi-modal routing algorithms, search, autocomplete, rendering, and image enhancement.*

Computer Science Instructor, Research Apprenticeship Program at Shaw University, 2008-2010.

Instructor for Computer Graphics (CSC 461), North Carolina State University, Summer 2009.

PhD Graduate Research in 3D computer vision, 2006-2011.

Graduate Teaching Assistantships

Computer Graphics (CSC 562), Spring 2009.

Innovation in Technology (CSC 485), Spring 2009.

Operating Systems Principles (CSC 501), Summer 2007.

Advanced Computer Graphics (CSC 462), Spring 2007.

Innovation in Technology (CSC 485), Spring 2007.

Introduction to Artificial Intelligence (CSC 411), Fall 2006.

Research Internship funded by Army Research Lab Army Research Office (ARO), Jan 2007-May 2010.

- *Image registration and analysis of multispectral images for target recognition.*

DOE Summer Research Program (SRP), Argonne National Laboratory, Summer 2006.

- *Analysis and performance metrics of TeraGrid supercomputer usage*

NSF Research Experience for Undergraduates (REU), Texas A&M University, Summer 2005.

- *Research in biological vision using machine learning.*

Database Manager, UVM Extension, Burlington, VT, July 2004–Dec. 2004.

Database Programming Intern, VT HITEC, Williston, VT, Summer 2004.

Publications

S. Heinrich. Efficient and Robust Model Fitting with Unknown Noise Scale. *Image and Vision Computing (IVC)*, 31 (10) : 735-747, Oct. 2013.

S. Heinrich. A Multivariate Two-Sample Test using the Jaccard Distance. *Journal of Multivariate Analysis*, in review.

S. Heinrich and W. Snyder. Robust Maximum Likelihood Structure Invariant Merging of Projective Reconstructions. *Computer Vision and Image Understanding (CVIU)*, in review.

S. Heinrich, W. Snyder, and J.-M. Frahm. Maximum Likelihood Autocalibration. *Image and Vision Computing (IVC)*, 2011. Also featured article in *Advances in Engineering (AIE)*.

S. Heinrich and W. Snyder. Robust Estimation of the Trifocal Tensor: A Performance Evaluation (in preparation).

S. Heinrich and W. Snyder. Internal Constraints of the Trifocal Tensor. *ArXiv e-prints*, <http://arxiv.org/abs/1103.6052>, 2011.

S. Heinrich and W. Snyder. Improved Edge Awareness in Discontinuity Preserving Smoothing Algorithms. *ArXiv e-prints*, <http://arxiv.org/abs/1103.5808>, 2011.

K. Krish, S. Heinrich, W. Snyder, H. Cakir, and S. Khorram. Global Registration of Overlapping Images Using Accumulative Image Features. *Pattern Recognition Letters*, 31 (2) : 112-118, 2010.

K. Krish, S. Heinrich, W. Snyder, H. Cakir, and S. Khorram. A New Feature Based Image Registration Algorithm. In *Proceedings of the 2008 American Society for Photogrammetry and Remote Sensing (ASPRS '08)*, Portland, Oregon, 2008.

S. Heinrich K. Krish, W. Snyder, S. Khorram, and H. Cakir. Matching of Mobile Targets in Overlapping Aerial Images. In *Proceedings of the 2008 American Society for Photogrammetry and Remote Sensing (ASPRS '08)*, Portland, Oregon, 2008.

W. Snyder, S. Khorram, S. Heinrich, K. Krish, and H. Cakir. On-The-Fly Scene-Dependent ATR. Center for Earth Observation (CEO) Technical Report 223, North Carolina State University, 2008.

Academic Honors & Awards

Honored representative of CS at NCSU Graduate Research Symposium, March 2009.

UVM Graduation Speaker, 2006.

UVM Volney Giles Barbour Engineering Essay Contest, 2nd place, 2006.

Vermont Scholarship at UVM, 2002–2006.

Dean's List, University of Vermont, 2002–2006.

Selected Software Skills

Programming: C++ (expert), Java, Visual Studio, C#, DirectX, OpenGL, CUDA, OpenCV

Scientific: \LaTeX , Maple, Gnuplot, MATLAB, Mathematica

Graphics and Design: Photoshop, Illustrator, 3ds Max

Last updated: June 23, 2014