Austin Reiter

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Education

Ph.D.   **Computer Science,** Columbia University, New York, NY. Advisor: Dr. Peter Allen. (January 2013)
Thesis Title: "Assistive Visual Tools for Surgery"

M.Phil. **Computer Science**, Columbia University, New York, NY (January 2012)

M.A.   **Cognitive and Neural Systems,** Boston University, Boston, MA. (May 2005)

B.A.   **Mathematics,** Boston University, Boston, MA. (May 2005)

Professional Experience

COLUMBIA UNIVERSITY – New York, NY   01/13-Present
Adjunct Professor
Professor of Computer Vision Course in the Department of Computer Science

COLUMBIA UNIVERSITY – New York, NY   01/13-Present
Post-Doctoral Researcher
Research and development of a 3D structured light laparoscope for
minimally-invasive surgery

- Hardware and optical design for prototype
- Develop real-time algorithms for generating depth images
- Design user interface for surgeon interaction

INTUITIVE SURGICAL, INC – Sunnyvale, CA   06/11-08/11
Summer Applied Research Intern
Explore concepts for automated tracking of surgical tools.

- Develop a prototype tracking system capable of recovering the full pose of an articulated tool during surgical procedures.

INTUITIVE SURGICAL, INC – Sunnyvale, CA   06/10-08/10
Summer Applied Research Intern
Explore new surgical imaging concepts in cross-disciplinary projects in tele-robotic surgery.

- Work with clinical staff to develop novel vision methods for improved peripheral awareness of the surgical field.
- Prototype new stereo imaging and visualization concepts
- Evaluate and refine prototype concepts with clinical staff
- Programmed in MATLAB and C

BAE SYSTEMS – Advanced Information Technologies, Burlington, MA   01/06-12/08
Software Engineer II, Computer Vision Directorate

Develop technologies and software solutions for improved decision making in real-time, data-intensive environments using C++ for deployable systems and MATLAB for rapid prototyping.

Small UAV Systems Project

- Design/test a real-time tracking/image mosaic toolkit used on a UAV system automatically guiding the UAV, controlling the camera, and tasking GPS waypoints to alter the flight path in an Air Force Research Lab (AFRL) funded project

VIVID – Vivid Verification and Identification

- DARPA funded project of a video processor coupled with a multiple hypothesis tracker and sensor resource manager onboard an embedded system of an unmanned aerial vehicle
- Integrated an embedded platform from a Linux configuration towards a real-time and operational tracking system with automatic target detection and content identification

CHARLES RIVER ANALYTICS, INC., Cambridge, MA   06/05-12/05

Assistant Software Engineer, Computer Vision Department

Applied cutting edge research to create solutions for real world problems using MATLAB for rapid prototyping and C++ for real-time optimized systems.

SESAME – Scene Estimation & Situational Awareness Mapping Engine

- Phase II SBIR grant to build a multi-resolution volumetric map of a scene from online camera data on a moving robotic platform to extract data such as vehicle models and license plate numbers in a parking lot

Publications

Reiter, A., Allen, P.K., and Zhao, T. "Appearance Learning for 3D Tracking of Robotic Surgical Tools", International Journal of Robotics Research, *submitted*   2012

Reiter, A., Allen, P.K., and Zhao, T. "Feature Classification for Tracking Articulated Surgical Tools", International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), October 1-5, 2012, Nice, France.   2012

Reiter, A., Allen, P.K., and Zhao, T. "Learning Features on Robotic Surgical Tools", Workshop on Medical Computer Vision (MCV), IEEE Conference on Computer Vision and Pattern Recognition (CVPR), June 21, 2012, Providence, Rhode Island.   2012

Reiter, A., Bajo, A., Iliopoulos, K., Simaan, N., and Allen, P.K. "Learning-Based Configuration Estimation of a Multi-Segment Continuum Robot", IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob), June 24-27, 2012, Rome, Italy.	2012
Reiter, A., Allen, P.K., and Zhao, T. "Marker-less Articulated Surgical Tool Detection", Computer Assisted Radiology and Surgery (CARS), June 27-30, 2012, Pisa, Italy.	2012
Simaan, N., Bajo, A., Reiter, A., Allen, P., and Fowler, D. "Lessons Learned Using The Insertable Robotic Effector Platform (IREP) for Single Port Access Surgery", The Hamlyn Symposium on Medical Robotics, July 1-2, 2012, Imperial College London, U.K.	2012
Reiter, A., Goldman, R.E., Bajo, A., Iliopoulos, K., Simaan, N., and Allen, P.K. "A Learning Algorithm for Visual Pose Estimation of Continuum Robots", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Sept. 25-30, 2011, San Francisco, CA.	2011
Reiter, A. and Allen, P.K., "An Online Learning Approach To In-Vivo Tracking Using Synergistic Features", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), October 18-22, 2010, Taipei, Taiwan.	2010
Stevens, M., Reiter, A., DelMarco, S., Vinciguerra, L., Antone, M., "Video Aided Navigation for Small UAVs," AIAA Infotech @ Aerospace 2007 Conf and Exhibit, Rohnert Park, CA (May 7-10, 2007).	2007
DelMarco, S., Antone, M., Reiter, A., Jenkins, T., "Local track repair for video tracking on small UAVs," Proc. of SPIE Unmanned/Unattended Sensors and Sensor Networks IV (Vol. 6736).	2007
McBride, J.C., Snorrason, M.S., Checka, N., Reiter, A., Foil, G, and Stevens, M.R. (2006). "Object Detection with Single-Camera Stereo," Proceedings of SPIE Defense & Security, vol. 6230, Orlando, FL (April).	2006

Teaching Experience

COLUMBIA UNIVERSITY, New York, NY **Programming Languages (C++)** Instructor for introductory course in programming languages teaching C++ to non-CS majors from all levels of undergraduate students.	2011

Research Experience

COLUMBIA UNIVERSITY, New York, NY **Graduate Research Assistant**, Robotics Lab, Dept of Computer Science Develop computer vision algorithms in object tracking, object modeling, and	01/09-01/13

image registration as applied to robotic environments. This includes real-time tracking of surgical tools for automated camera servoing, online 3D recovery of camera positions and orientations, and real-time video mosaicing. (See http://www1.cs.columbia.edu/~areiter/CS_Webpage/Research.html for more information).

BOSTON UNIVERSITY, Boston, MA   01/04–05/05

Research Assistant, Active Perception Lab, Dept of Cognitive and Neural Systems
Designed psychophysical experiments using a DPI eye-tracker and MATLAB data analysis. Focus was to examine the influence of motor behavior on perceptual processes and on the representation and coding of visual sensory information.