

Contact Information

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Assistant Professor
Department of Computer Science
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Research Interests

Computer vision, mobile augmented reality, image-based modeling, visual tracking, multi-view image retrieval, image segmentation, human-computer interaction, robotics.

Education

Ph.D. in Computer Science, University of California, Santa Barbara March 2012
Dissertation Title: Wide-Area Visual Modeling and Tracking for Mobile Augmented Reality
Advisor: Professor Tobias Höllerer
M.S. in Computer Science, University of California, Santa Barbara November 2010
B.S. in Computer Science, Minor in English, University of California, Santa Barbara June 2005

Professional Experience

Department of Computer Science, University of Colorado at Colorado Springs
Assistant Professor August 2014 – present
Graz University of Technology, Graz, Austria
Postdoctoral Researcher October 2012 – June 2014
Postdoctoral research at the Christian Doppler Laboratory for Handheld Augmented Reality, within the Institute for Computer Graphics and Vision. Researched new approaches to city-wide visual localization on mobile phones. Collaborated with Qualcomm Research to build system prototypes.
Adobe Systems, Inc., San Jose, CA
Research Intern June 2008 – August 2008
Summer research internship at the Advanced Technology Labs. Developed novel sketch-based techniques for 3D modeling of a single image.

Honors and Awards

Best Paper Award (with S. Gauglitz, C. Sweeney, M. Turk, and T. Höllerer), *IEEE International Symposium on Mixed and Augmented Reality (ISMAR '12)*, Atlanta, GA, November 2012.
Semi-finalist, ACM Student Research Competition, 2008.
Adobe Best Poster Award, UCSB Graduate Student Workshop, 2008.
NSF Integrative Graduate Education and Research Traineeship (IGERT), 2006-2008.

Academic Service

Program chair:

ACM Multimedia Systems Conference: Special Session on Augmented Reality, 2015

Program committee:

IEEE Virtual Reality, 2015

IEEE International Symposium on Mixed & Augmented Reality, 2012-14

IEEE ISMAR Workshop on Tracking Methods and Applications, 2012-14

Reviewer:

Elsevier International Journal of Human-Computer Studies

Elsevier Image and Vision Computing

Elsevier Computers & Graphics

IEEE Transactions on Visualization and Computer Graphics

IEEE Virtual Reality

IEEE International Symposium on Mixed & Augmented Reality

IEEE Symposium on 3D User Interfaces

IEEE International Symposium on Wearable Computers

Eurographics Conference

Springer Virtual Reality

Laval Virtual Reality International Conference

Publications

Book Chapters:

1. Jonathan Ventura and Tobias Höllerer. *Urban Visual Modeling and Tracking*, chapter 8, pages 174–194. CRC Press, Boca Raton, 2nd edition, 2015.

Journal Articles:

2. Steffen Gauglitz, Chris Sweeney, Jonathan Ventura, Matthew Turk, and Tobias Höllerer. Model estimation and selection towards unconstrained real-time tracking and mapping. *IEEE Transactions on Visualization and Computer Graphics*, 2013.
3. Jonathan Ventura and Tobias Höllerer. Structure and motion in urban environments using upright panoramas. *Virtual Reality*, 17(2), 2013.

Conference Papers:

4. Jonathan Ventura. Structure from motion on a sphere. In *European Conference on Computer Vision (ECCV)*, Amsterdam, the Netherlands, 2016.
5. Jonathan Ventura, Clemens Arth, and Vincent Lepetit. An efficient minimal solution for multi-camera motion. In *International Conference on Computer Vision (ICCV)*, Santiago, Chile, 2015.

6. Clemens Arth, Christian Pirchheim, Jonathan Ventura, Dieter Schmalstieg, and Vincent Lepetit. Instant outdoor localization and SLAM initialization from 2.5D maps. In *International Symposium on Mixed and Augmented Reality (ISMAR)*, Fukuoka, Japan, 2015.
7. Lukas Gruber, Jonathan Ventura, and Dieter Schmalstieg. Image-space illumination for augmented reality in dynamic environments. In *IEEE Virtual Reality*, Arles, France, 2015.
8. Jonathan Ventura, Clemens Arth, Gerhard Reitmayr, and Dieter Schmalstieg. A minimal solution to the generalized pose-and-scale problem. In *Computer Vision and Pattern Recognition (CVPR)*, Columbus, OH, USA, 2014.
9. Jonathan Ventura, Clemens Arth, Gerhard Reitmayr, and Dieter Schmalstieg. Global localization from monocular SLAM on a mobile phone. In *IEEE Virtual Reality*, Minneapolis, MN, USA, 2014.
10. Clemens Arth, Jonathan Ventura, and Dieter Schmalstieg. Geospatial management and utilization of large-scale urban visual reconstructions. In *Computing for Geospatial Research & Application (COM.Geo), 4th International Conference on*, San Jose, CA, USA, 2013.
11. Steffen Gauglitz, Chris Sweeney, Jonathan Ventura, Matthew Turk, and Tobias Hollerer. Live tracking and mapping from both general and rotation-only camera motion. In *Mixed and Augmented Reality (ISMAR), 2012 IEEE International Symposium on*, Atlanta, GA, USA, 2012.
12. Jonathan Ventura and Tobias Hollerer. Wide-area scene mapping for mobile visual tracking. In *Mixed and Augmented Reality (ISMAR), 2012 IEEE International Symposium on*, Atlanta, GA, USA, 2012.
13. Lukas Gruber, Steffen Gauglitz, Jonathan Ventura, Stefanie Zollmann, Manuel Huber, Michael Schlegel, Gudrun Klinker, Dieter Schmalstieg, and Tobias Hollerer. The city of sights: Design, construction, and measurement of an augmented reality stage set. In *Mixed and Augmented Reality (ISMAR), 2010 9th IEEE International Symposium on*, Seoul, South Korea, 2010.
14. Jonathan Ventura and Tobias Hollerer. Online environment model estimation for augmented reality. In *Mixed and Augmented Reality, 2009. ISMAR 2009. 8th IEEE International Symposium on*, Orlando, FL, USA, 2009.
15. Jonathan Ventura, Stephen DiVerdi, and Tobias Höllerer. A sketch-based interface for photo pop-up. In *Proceedings of the 6th Eurographics Symposium on Sketch-Based Interfaces and Modeling*, New Orleans, LA, USA, 2009.
16. Jonathan Ventura, Marcus Jang, Tyler Crain, Tobias Höllerer, and Doug Bowman. Evaluating the effects of tracker reliability and field of view on a target following task in augmented reality. In *Proceedings of the 16th ACM Symposium on Virtual Reality Software and Technology*, Kyoto, Japan, 2009.
17. Jason Wither, Chris Coffin, Jonathan Ventura, and Tobias Hollerer. Fast annotation and modeling with a single-point laser range finder. In *Proceedings of the 7th IEEE/ACM International Symposium on Mixed and Augmented Reality*, Cambridge, UK, 2008.

Posters:

18. Christian Poglitsch, Clemens Arth, Dieter Schmalstieg, and Jonathan Ventura. [poster] a particle filter approach to outdoor localization using image-based rendering. In *International Symposium on Mixed and Augmented Reality (ISMAR)*, 2015.

19. Jonathan Ventura and Tobias Hollerer. Outdoor mobile localization from panoramic imagery. In *Mixed and Augmented Reality (ISMAR), 2011 10th IEEE International Symposium on*, Basel, Switzerland, 2011.
20. Jonathan Ventura and Tobias Höllerer. Depth compositing for augmented reality. In *ACM SIGGRAPH 2008 posters*, Los Angeles, CA, USA, 2008.

Workshop Talks:

21. Jonathan Ventura, Steve Cruz, and Terrance E. Boult. Improving teaching and learning through video summaries of student engagement. In *CVPR 2016 Workshop on Computational Models for Learning Systems and Educational Assessment (CMLA 2016)*, Las Vegas, NV, 2016. IEEE.
22. Jonathan Ventura, Clemens Arth, and Vincent Lepetit. Approximated relative pose solvers for efficient camera motion estimation. In *ECCV 2014 Workshop on Computer Vision in Vehicle Technology*, 2014.
23. Jonathan Ventura and Tobias Hollerer. Fast and scalable keypoint recognition and image retrieval using binary codes. In *Applications of Computer Vision (WACV), 2011 IEEE Workshop on*, Kona, HI, USA, 2011.
24. Jonathan Ventura and Tobias Höllerer. Real-time planar world modeling for augmented reality. In *IEEE ISMAR Workshop on Augmented Reality Super Models*, Seoul, South Korea, 2010.
25. Cha Lee, Jonathan Ventura, Chris Coffin, Sehwan Kim, and Tobias Höllerer. “Anywhere access” with annotated environment maps. In *IEEE ISMAR Workshop on AR 2.0: Social Augmented Reality*, Orlando, FL, USA, 2009.
26. Lukas Gruber, Jonathan Ventura, Steffen Gauglitz, Stefanie Zollmann, Dieter Schmalstieg, and Tobias Höllerer. Sightlining: Designing an augmented reality stage set. In *WARM 2010: Winter Augmented Reality Meeting*, Graz, Austria, 2009.

Patents:

27. Stephen J. Diverdi and Jonathan D. Ventura. Generating a depth map based on a single image, May 23 2013. US Patent 20,130,127,823.

Art Presentations:

28. Jonathan Ventura, Angus Forbes, Ben Adams, Swapna Joshi, Karl Grossner, Monica Bulger, Tobias Höllerer, and B.S. Manjunath. Knowledge acquisition via multimedia data. The Future of Interactive Media: Workshop on Media Arts, Science and Technology, 2009.
29. Alex Villacorta, Karl Grossner, Jonathan Ventura, Anne-Marie Hansen, Emily Moxley, Joriz de Guzman, and Matt Peterson. Spheres of influence. ACM SIGGRAPH Art Gallery: Global Eyes, 2007.