

# Jonathan Daniel Ventura

## Curriculum Vitae

Department of Computer Science  
University of Colorado Colorado Springs  
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### 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*  
M.S. in Computer Science, University of California, Santa Barbara November 2010  
B.S. in Computer Science, University of California, Santa Barbara June 2005

### Professional Experience

Assistant Professor, Department of Computer Science,  
University of Colorado Colorado Springs August 2014 – present  
Postdoc in Computer Science, Graz University of Technology October 2012 – June 2014  
Research Intern, Adobe, Inc., San Jose, CA June 2008 – August 2008

### Honors and Awards

UCCS Engineering and Applied Science Researcher of the Year, 2016.  
Best Paper Award (with C. Arth, C. Pirchheim, D. Schmalstieg, and V. Lepetit), *IEEE International Symposium on Mixed and Augmented Reality (ISMAR '15)*, Fukuoka, Japan, October 2015.  
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.

### Publications

In author lists, my name is in bold font, an asterisk indicates a graduate student researcher and two asterisks indicates an undergraduate student researcher.

## Journal Articles.

1. 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.
2. **Jonathan Ventura** and Tobias Höllerer. Structure and motion in urban environments using upright panoramas. *Virtual Reality*, 17(2), 2013.

## Books and 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. In press.

## Conference Proceedings.

1. Derek Prijatelj\*\*, **Jonathan Ventura**, and Jugal Kalita. Neural networks for semantic textual similarity. *International Conference on Natural Language Processing (ICON)*, 12/2017 2017.
2. Stefanie Zollmann, Christian Poglitsch\*, and **Jonathan Ventura**. VISGIS: Dynamic situated visualization for geographic information systems. *Image and Vision Computing New Zealand*, 2016.
3. **Jonathan Ventura**. Structure from motion on a sphere. In *European Conference on Computer Vision (ECCV)*, Amsterdam, the Netherlands, 2016.
4. **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.
5. 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.
6. 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.
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. **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.
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.
18. **Jonathan Ventura** and Tobias Höllerer. Depth compositing for augmented reality. In *ACM SIGGRAPH 2008 posters*, Los Angeles, CA, USA, 2008.
19. 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.

### Workshop Papers.

1. Marc Moreno López\* and **Jonathan Ventura**. Dilated convolutions for brain tumor segmentation in MRI scans. *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) Brain Lesion (BrainLes) workshop*, 2017.

2. Chloe Bradley\*, Terrance E. Boulton, and **Jonathan Ventura**. Cross-modal facial attribute recognition with geometric features. *International Workshop on Heterogeneous Face Recognition (HFR) co-located with 12th IEEE Conference on Automatic Face & Gesture Recognition*, 2017.
3. **Jonathan Ventura**, Steve Cruz\*\*, and Terrance E. Boulton. Improving teaching and learning through video summaries of student engagement. In *Workshop on Computational Models for Learning Systems and Educational Assessment (CMLA 2016)*, Las Vegas, NV, 2016.
4. **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.
5. **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.
6. **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.
7. 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.
8. 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.
9. 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.

1. Steffen Gauglitz, Christopher Michael Sweeney, **Jonathan Ventura**, Matthew Alan Turk, and Hollerer Tobias. Environment mapping with automatic motion model selection, November 2016. US Patent US9495761 B2.
2. Lukas Gruber, Dieter Schmalstieg, and **Jonathan Ventura**. Augmented reality lighting with dynamic geometry, June 2015. US Patent US 20150262412 A1.
3. Christian Pirchheim\*, **Jonathan Ventura**, Dieter Schmalstieg, Clemens Arth, and Vincent Lepetit. Zero-baseline 3d map initialization, January 2015. US Patent US 20150371440 A1.
4. Stephen J. Diverdi and **Jonathan Ventura**. Generating a depth map based on a single image, May 23 2013. US Patent 20,130,127,823.

## Grants and Scholarship

1. Jugal Kalita, PI and **Jonathan Ventura**, Co-PI. “REU Site: Machine Learning in Natural Language Processing and Computer Vision.” 6/1/2017 – 5/31/2020. National Science Foundation, \$386,374.00.
2. **Jonathan Ventura**, PI. “Deep Learning for Brain Tumor Segmentation.” 5/1/2017 – 4/31/2018. UCCS Center of the BioFrontiers Institute, \$24,891.00.
3. **Jonathan Ventura**, PI and Terrance E. Boulton, Co-PI. “The Graduate Certificate in Innovation at University of Colorado Colorado Springs.” 8/1/2015 – 12/31/2017. VentureWell, \$35,345.00.
4. **Jonathan Ventura**, PI. “High-speed Visual-Inertial Sensor Fusion.” 7/1/2015 – 6/30/2016. UCCS Collaborative Research and Creative Works, \$7,473.00.
5. **Jonathan Ventura**, PI. “CRII: RI: High-Speed Vision-Based Motion Estimation.” 5/1/2015 – 4/30/2018. National Science Foundation, \$174,802.00.
6. Terrance E. Boulton, PI and **Jonathan Ventura**, Co-PI. “IARPA Janus Face Recognition.” 10/1/2014 – 8/1/2018. Sub-contract to University of Maryland. \$569,318.00.

## Courses Taught

### Undergraduate Courses.

Tech Writing, Proposals & Presentations  
Innovation Teams  
Programming with C  
The Innovation Process

### Graduate Courses.

Computer Vision  
Robotics

## Service to Profession

### *Program chair*

ACM Multimedia Systems Conference: Special Session on Augmented Reality, 2015-16.  
IEEE AVSS Workshop on Surveillance for Location-aware Data Protection, 2016.

### *Program committee*

ACM Symposium on Virtual Reality Software & Technology, 2015-17.  
IEEE Virtual Reality, 2015-16.  
IEEE International Symposium on Mixed & Augmented Reality, 2012-14.  
IEEE ISMAR Workshop on Tracking Methods and Applications, 2012-14.

## *Reviewer*

Asian Conference on Computer Vision  
Elsevier Computers & Graphics  
Elsevier Computer Vision and Image Understanding  
Elsevier Image and Vision Computing  
Elsevier International Journal of Human-Computer Studies  
Elsevier Multimedia Systems Journal  
Eurographics Conference  
IEEE Computer Vision and Pattern Recognition  
IEEE International Conference on 3D Vision  
IEEE International Symposium on Mixed & Augmented Reality  
IEEE International Symposium on Wearable Computers  
IEEE Symposium on 3D User Interfaces  
IEEE Transactions on Visualization and Computer Graphics  
IEEE Virtual Reality  
IEEE Winter Conference on Applications of Computer Vision  
Laval Virtual Reality International Conference  
Springer Virtual Reality  
Springer Journal of Mathematical Imaging

## **Professional Organizations**

Member, Institute for Electrical and Electronics Engineers (IEEE) Computer Society.  
Member, Association for Computing Machinery (ACM).