

Scott Workman

DZYNE Technologies
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Research Interests

Computer Vision, Deep learning, Big Data, Geospatial Analysis, Image Geocalibration, Outdoor Scene Understanding

Education

2012–2018	Ph.D. in Computer Science Adviser: Nathan Jacobs Thesis: Leveraging Overhead Imagery for Localization, Mapping, and Understanding	University of Kentucky
2006–2010	B.S. in Computer Science <i>Magna Cum Laude</i> with Honors	University of Kentucky

Research Experience

Research Scientist DZYNE Technologies
2019–Present Fairfax, VA

Research Assistant Center for Visualization and Virtual Environments, University of Kentucky
2011–2018 Lexington, KY

- Leveraging aerial imagery to support ground-level image localization [19].
- Estimating 3D scene geometry for a static outdoor camera, or network of cameras, using videos from several partly cloudy days [2, 24].
- Using a single image of a rainbow for camera calibration and geolocalization [22].
- Using observations of an outdoor scene over days and weeks to estimate radial distortion, focal length, and geo-orientation [25].

Research Assistant Center for Educator Preparation Information Systems, University of Kentucky
2010–2011 Lexington, KY

- Engaged in research and development on information systems applied to educator preparation.
- Developed an advising management system used by students and faculty of the College of Education.

Other Appointments

Software Engineer Intern CorrectCare - Integrated Health
Summer 2010 Lexington, KY

Network Engineer Intern NEMOC, University of Kentucky
2008–2010 Lexington, KY

Help Desk Technician ECS, University of Kentucky
2007–2010 Lexington, KY

Family Business Deer Run Stables & Horseman's Retreat
1997–Present Richmond, KY

Honors and Awards

- Outstanding Reviewer Recognition (ICCV 2019, CVPR 2020, ECCV 2020)
- 5th Heidelberg Laureate Forum, 2017
- Outstanding Ph.D. Student in Computer Science, University of Kentucky, 2017
- Burton E. Heard Graduate Fellowship, 2016-2017
- NVIDIA Academic Hardware Grant (Tesla K40), 2015
- Presidential Fellowship (nominated), University of Kentucky, 2015
- International Computer Vision Summer School (ICVSS), 2014
- Dean's List, University of Kentucky, 2008-2010
- Alltel/Windstream Scholarship, University of Kentucky, 2008-2010

Publications

Refereed Journal Publications

- [1] Nathan Jacobs, Scott Workman, and Richard Souvenir. Cloudmaps from Static Ground-View Video. *Image and Vision Computing (IVC)*, 52:154–166, August 2016.
- [2] Scott Workman, Richard Souvenir, and Nathan Jacobs. Scene Shape Estimation from Multiple Partly Cloudy Days. *Computer Vision and Image Understanding (CVIU)*, 134:116–129, May 2015.

Refereed Conference Publications

- [3] Scott Workman, M. Usman Rafique, Hunter Blanton, Connor Greenwell, and Nathan Jacobs. Single Image Cloud Detection via Multi-Image Fusion. In *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2020. Oral.
- [4] Tawfiq Salem, Scott Workman, and Nathan Jacobs. Learning a Dynamic Map of Visual Appearance. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020.
- [5] Scott Workman and Nathan Jacobs. Dynamic Traffic Modeling from Overhead Imagery. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020. Oral.
- [6] Menghua Zhai, Tawfiq Salem, Connor Greenwell, Scott Workman, Robert Pless, and Nathan Jacobs. Learning Geo-Temporal Image Features. In *British Machine Vision Conference (BMVC)*, 2018.
- [7] Connor Greenwell, Scott Workman, and Nathan Jacobs. What Goes Where: Predicting Object Distributions from Above. In *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2018.
- [8] Tawfiq Salem, Menghua Zhai, Scott Workman, and Nathan Jacobs. A Multimodal Approach to Mapping Soundscapes. In *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2018.
- [9] Weilian Song, Scott Workman, Armin Hadzic, Xu Zhang, Eric Green, Mei Chen, Reginald Souleyrette, and Nathan Jacobs. FARSA: Fully Automated Roadway Safety Assessment. In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2018.
- [10] Scott Workman, Menghua Zhai, David J. Crandall, and Nathan Jacobs. A Unified Model for Near and Remote Sensing. In *IEEE International Conference on Computer Vision (ICCV)*, 2017.

- [11] Scott Workman, Richard Souvenir, and Nathan Jacobs. Understanding and Mapping Natural Beauty. In *IEEE International Conference on Computer Vision (ICCV)*, 2017.
- [12] Menghua Zhai, Zach Bessinger, Scott Workman, and Nathan Jacobs. Predicting Ground-Level Scene Layout from Aerial Imagery. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017.
- [13] Scott Workman, Menghua Zhai, and Nathan Jacobs. Horizon Lines in the Wild. In *British Machine Vision Conference (BMVC)*, 2016.
- [14] Menghua Zhai, Scott Workman, and Nathan Jacobs. Camera Geo-Calibration using an MCMC Approach. In *International Conference on Image Processing (ICIP)*, 2016.
- [15] Menghua Zhai, Scott Workman, and Nathan Jacobs. Detecting Vanishing Points using Global Image Context in a Non-Manhattan World. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2016.
- [16] R. Paul Mihail, Scott Workman, Zach Bessinger, and Nathan Jacobs. Sky Segmentation in the Wild: An Empirical Study. In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2016.
- [17] Ryan Baltenberger, Menghua Zhai, Connor Greenwell, Scott Workman, and Nathan Jacobs. A Fast Method for Estimating Transient Scene Attributes. In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2016.
- [18] Tawfiq Salem, Scott Workman, Menghua Zhai, and Nathan Jacobs. Analyzing Human Appearance as a Cue for Dating Images. In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2016.
- [19] Scott Workman, Richard Souvenir, and Nathan Jacobs. Wide-Area Image Geolocalization with Aerial Reference Imagery. In *IEEE International Conference on Computer Vision (ICCV)*, 2015.
- [20] Scott Workman, Connor Greenwell, Menghua Zhai, Ryan Baltenberger, and Nathan Jacobs. DeepFocal: A Method for Direct Focal Length Estimation. In *International Conference on Image Processing (ICIP)*, 2015.
- [21] Mohammad T. Islam, Scott Workman, and Nathan Jacobs. Face2GPS: Estimating Geographic Location from Facial Features. In *International Conference on Image Processing (ICIP)*, 2015. Oral.
- [22] Scott Workman, R. Paul Mihail, and Nathan Jacobs. A Pot of Gold: Rainbows as a Calibration Cue. In *European Conference on Computer Vision (ECCV)*, 2014.
- [23] Mohammad T. Islam, Scott Workman, Hui Wu, Richard Souvenir, and Nathan Jacobs. Exploring the Geo-Dependence of Human Face Appearance. In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2014.
- [24] Nathan Jacobs, Scott Workman, and Richard Souvenir. Scene Geometry from Several Partly Cloudy Days. In *ACM/IEEE International Conference on Distributed Smart Cameras (ICDSC)*, 2013.
- [25] Nathan Jacobs, Mohammad Islam, and Scott Workman. Cloud Motion as a Calibration Cue. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2013.

Refereed Workshop Publications

- [26] Hunter Blanton, Connor Greenwell, Scott Workman, and Nathan Jacobs. Extending Absolute Pose Regression to Multiple Scenes. In *CVPR Workshop: Long-Term Visual Localization, Visual Odometry and Geometric and Learning-based SLAM*, 2020.
- [27] Armin Hadzic, Hunter Blanton, Weilian Song, Mei Chen, Scott Workman, and Nathan Jacobs. RasterNet: Modeling Free-Flow Speed using LiDAR and Overhead Imagery. In *CVPR Workshop: Large Scale Computer Vision for Remote Sensing Imagery (EARTHVISION)*, 2020.

- [28] Connor Greenwell, Scott Workman, and Nathan Jacobs. Implicit land use mapping using social media imagery. In *IEEE Applied Imagery Pattern Recognition Workshop (AIPR)*, 2019.
- [29] Tawfiq Salem, Menghua Zhai, Scott Workman, and Nathan Jacobs. A Multimodal Approach to Mapping Soundscapes. In *CVPR Workshop: Sight and Sound*, 2018.
- [30] Nathan Jacobs, Scott Workman, and Menghua Zhai. Cross-view Convolutional Networks. In *IEEE Applied Imagery Pattern Recognition Workshop (AIPR)*, 2016.
- [31] Scott Workman and Nathan Jacobs. On the Location Dependence of Convolutional Neural Network Features. In *IEEE/ISPRS Workshop: Looking from above: When Earth observation meets vision (EARTHVISION)*, 2015. Acceptance rate = 30 %.

Abstracts

- [32] Scott Workman and Nathan Jacobs. Scene Understanding using Clouds. In *International Computer Vision Summer School (ICVSS)*, 2014.
- [33] J. David Smith, Ryan Baltenberger, Scott Workman, and Nathan Jacobs. User-in-the-Loop Calibration and Mensuration. In *National Conference on Undergraduate Research (NCUR)*, 2014.
- [34] Ryan Baltenberger, James Knochelmann, Scott Workman, Mohammad Islam, Nathan Jacobs, and James Griffioen. Constructing a High-Resolution Mosaic of Kentucky Lake. In *Kentucky GIS Conference*, 2013. Best Student Presentation.
- [35] XuZi Zhou, Scott Workman, Mohammad Islam, Nathan Jacobs, and James Griffioen. Cyber Infrastructure for the VOEIS Project. In *Symposium in the Mathematical, Statistical and Computer Sciences*, 2013. Best Student Presentation.
- [36] Scott Workman, James Knochelmann, Nathan Jacobs, David S. White, and Richard Hauer. Registration and Visualization of Scientific Aerial Imagery at Kentucky Lake. In *Kentucky EPSCoR Conference*, 2012.

Professional Service

- Reviewing for Journals:
 - Computer Vision and Image Understanding (2019)
 - IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) (2015, 2016)
 - IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS) (2015)
 - EURASIP Journal on Image and Video Processing (JIVP) (2015)
- Program Committee / Reviewer for:
 - Conferences
 - * British Machine Vision Conference (BMVC) (2019, 2020)
 - * ACM SIGGRAPH (2018)
 - * European Conference on Computer Vision (ECCV) (2014, Outstanding Reviewer 2020)
 - * IEEE Conference on Computer Vision and Pattern Recognition (CVPR) (2013-, Outstanding Reviewer 2020)
 - * IEEE International Conference on Computer Vision (ICCV) (2013, Outstanding Reviewer 2019)
 - Workshops

- * IEEE/ISPRS EARTHVISION (2019, 2020, Held at CVPR)
- * ACM Workshop on Geotagging and Its Applications in Multimedia (GeoMM) (2013, 2014)
- Volunteer / Presenter:
 - Graduate Student Representative, Association for Computing Machinery, UK Student Chapter (2014-2015)
 - Engineers Day (E-Day), University of Kentucky (2013-2014)

Talks

- “Computer Vision Applications of Deep Convolutional Neural Networks”, Nov. 2015, Keeping Current Seminar, Computer Science Department, University of Kentucky
- “Activity Forecasting”, Nov. 2013, Birds of a Feather, Computer Science Department, University of Kentucky
- “Camera Calibration using Atmospheric Cloud Motion”, Feb. 2013, Keeping Current Seminar, Computer Science Department, University of Kentucky

Teaching

Teaching Assistant

- *Special Topics in Computer Science: Learning Based Methods for Computer Vision*, CS 685, (S2015), University of Kentucky
- *Introduction to Machine Learning*, CS 485, (F2013, F2014), University of Kentucky