Scott Workman

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Areas of Expertise

Computer Vision, Deep Learning, Generative AI, 3D Vision, Multimodal Fusion, Remote Sensing

Education

University of Kentucky 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 | *Magna Cum Laude* with Honors

Appointments

Principal Research Scientist 2021–2025
DZYNE Technologies *Fairfax, VA*

- Led and managed a multidisciplinary research team, overseeing the full R&D process from concept to deployment, with a focus on machine learning and computer vision, while maintaining an active, hands-on role.
- Drove research initiatives, developed novel methodologies, and produced findings that contributed to publications, presentations, and grant proposals.
- Managed project development, actively engaging in experimental design, testing, and presenting results to both technical and non-technical stakeholders.
- Mentored junior researchers, supporting their growth and development.
- Contributed to securing over $\$5M$ in funding for research initiatives, including serving as Co-PI/Co-I on projects funded by agencies such as DARPA, IARPA, and NGA.

Senior Research Scientist 2019–2021
DZYNE Technologies *Fairfax, VA*

- Conducted independent research, developed novel algorithms, and contributed to technical strategy and problem-solving across multiple projects, collaborating with cross-disciplinary teams.
- Led and co-authored publications on topics such as pose estimation [5, 34], depth estimation [6], multi-modal fusion [2, 4], and image-driven traffic modeling [1, 9], in collaboration with academic and institutional partners.

Research Assistant 2011–2018
Multimodal Vision Research Laboratory, University of Kentucky *Lexington, KY*

- Developed multimodal fusion techniques for joint inference across various modalities, including ground-level imagery, overhead imagery, and audio, to improve geospatial world models [12, 14, 15].
- Introduced the first method for cross-view image synthesis, using weak supervision from labeled ground-level imagery to enhance overhead image understanding [16].

- Developed learning-based methods for directly estimating geometric properties of images, such as the horizon line and focal length [17, 24].
- Leveraged overhead imagery to support ground-level image localization, introducing the CVUSA dataset [23].
- Estimated 3D scene geometry for a static outdoor camera, or network of cameras, using videos from several partly cloudy days [28, 33].
- Demonstrated how a single image of a rainbow can be used for camera calibration and image geolocalization [26].
- Estimated radial distortion, focal length, and geo-orientation using long-term observations of outdoor scenes [29].

Research Assistant 2010–2011
Center for Educator Preparation Information Systems, University of Kentucky *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.

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

Network Engineer Intern 2008–2010
Network Engineering Management and Operations Center, University of Kentucky *Lexington, KY*

IT Support Specialist 2007–2010
Engineering Computing Services, University of Kentucky *Lexington, KY*

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

Honors and Awards

- **Research Contributions**
  - Oral Presentation, CVPR, 2020
  - Outstanding Reviewer Recognition:
    - Conference on Neural Information Processing Systems (NeurIPS) [2023]
    - European Conference on Computer Vision (ECCV) [2020]
    - IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2020, 2021, 2022]
    - IEEE/CVF International Conference on Computer Vision (ICCV) [2019]
- **Prestigious Programs**
  - Young Researcher, 5th Heidelberg Laureate Forum, Heidelberg, Germany, 2017
  - Young Researcher, International Computer Vision Summer School (ICVSS), Punta Sampieri, Sicily, 2014
- **Academic Excellence**
  - Outstanding Ph.D. Student in Computer Science, University of Kentucky, 2017
  - Dean's List, University of Kentucky, 2008-2010
- **Fellowships & Grants**
  - Burton E. Heard Graduate Fellowship, 2016-2017
  - NVIDIA Academic Hardware Grant (Tesla K40), 2015
  - Presidential Fellowship (nominated), University of Kentucky, 2015
  - Alltel/Windstream Scholarship, University of Kentucky, 2008-2010

Publications

Conference Papers (Refereed)

[1] Scott Workman and Armin Hadzic. Probabilistic Image-Driven Traffic Modeling via Remote Sensing. In *European Conference on Computer Vision (ECCV)*, 2024.

[2] Connor Greenwell, Jon Crall, Matthew Purri, Kristin Dana, Nathan Jacobs, Armin Hadzic, Scott Workman, and Matt Leotta. WATCH: Wide-Area Terrestrial Change Hypercube. In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2024.

[3] Scott Workman, Armin Hadzic, and M. Usman Rafique. Handling Image and Label Resolution Mismatch in Remote Sensing. In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2023.

[4] Scott Workman, M. Usman Rafique, Hunter Blanton, and Nathan Jacobs. Revisiting Near/Remote Sensing with Geospatial Attention. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022.

[5] Hunter Blanton, Scott Workman, and Nathan Jacobs. A Structure-Aware Method for Direct Pose Estimation. In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2022.

[6] Scott Workman and Hunter Blanton. Augmenting Depth Estimation with Geospatial Context. In *IEEE International Conference on Computer Vision (ICCV)*, 2021.

[7] 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.

[8] 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.

[9] Scott Workman and Nathan Jacobs. Dynamic Traffic Modeling from Overhead Imagery. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020. Oral.

[10] 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.

[11] 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.

[12] 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.

[13] 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.

[14] 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.

[15] Scott Workman, Richard Souvenir, and Nathan Jacobs. Understanding and Mapping Natural Beauty. In *IEEE International Conference on Computer Vision (ICCV)*, 2017.

[16] 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.

[17] Scott Workman, Menghua Zhai, and Nathan Jacobs. Horizon Lines in the Wild. In *British Machine Vision Conference (BMVC)*, 2016.

[18] Menghua Zhai, Scott Workman, and Nathan Jacobs. Camera Geo-Calibration using an MCMC Approach. In *International Conference on Image Processing (ICIP)*, 2016.

[19] 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.

[20] 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.

[21] 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.

[22] 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.

[23] Scott Workman, Richard Souvenir, and Nathan Jacobs. Wide-Area Image Geolocalization with Aerial Reference Imagery. In *IEEE International Conference on Computer Vision (ICCV)*, 2015.

[24] 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.

[25] Mohammad T. Islam, Scott Workman, and Nathan Jacobs. Face2GPS: Estimating Geographic Location from Facial Features. In *International Conference on Image Processing (ICIP)*, 2015. Oral.

[26] 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.

[27] 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.

[28] 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.

[29] Nathan Jacobs, Mohammad Islam, and Scott Workman. Cloud Motion as a Calibration Cue. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2013.

Journal Articles (Refereed)

[30] Zhexiao Xiong, Xin Xing, Scott Workman, Subash Khanal, and Nathan Jacobs. Mixed-View Panorama Synthesis using Geospatially Guided Diffusion. *Transactions on Machine Learning Research (TMLR)*, 2025.

[31] Rafael Padilha, Tawfiq Salem, Scott Workman, Fernanda A Andaló, Anderson Rocha, and Nathan Jacobs. Content-Based Detection of Temporal Metadata Manipulation. *IEEE Transactions on Information Forensics & Security (TIFS)*, 17:1316–1327, March 2022.

[32] Nathan Jacobs, Scott Workman, and Richard Souvenir. Cloudmaps from Static Ground-View Video. *Image and Vision Computing (IVC)*, 52:154–166, August 2016.

[33] 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.

Workshop Papers (Refereed)

[34] 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.

[35] 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.

[36] Connor Greenwell, Scott Workman, and Nathan Jacobs. Implicit land use mapping using social media imagery. In *IEEE Applied Imagery Pattern Recognition Workshop (AIPR)*, 2019.

[37] Tawfiq Salem, Menghua Zhai, Scott Workman, and Nathan Jacobs. A Multimodal Approach to Mapping Soundscapes. In *CVPR Workshop: Sight and Sound*, 2018.

[38] Nathan Jacobs, Scott Workman, and Menghua Zhai. Cross-view Convolutional Networks. In *IEEE Applied Imagery Pattern Recognition Workshop (AIPR)*, 2016.

[39] 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

[40] Scott Workman and Nathan Jacobs. Scene Understanding using Clouds. In *International Computer Vision Summer School (ICVSS)*, 2014.

[41] 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.

[42] 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.

[43] 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.

[44] 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.

Patents

[45] Nathan Jacobs and Scott Workman. Network architecture for generating a labeled overhead image, August 2020. US Patent 10,755,146.

Professional Service

- Lead Area Chair:
  - IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2026]
- Area Chair:

  - IEEE/CVF International Conference on Computer Vision (ICCV) [2025]
  - International Conference on Machine Learning (ICML) [2025]
  - IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [2025, 2026]
  - Conference on Neural Information Processing Systems (NeurIPS) [2024, 2025]
  - IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2024, 2025]

- Reviewing for Journals:
  - ISPRS Journal of Photogrammetry and Remote Sensing (P&RS) [2024]
  - Computer Vision and Image Understanding (CVIU) [2019]
  - IEEE Transactions on Multimedia (TMM) [2016]
  - EURASIP Journal on Image and Video Processing (JIVP) [2015]
  - IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS) [2015]
  - IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) [2015, 2016]

- Program Committee / Reviewer for:
  - Conferences
    * International Conference on Machine Learning (ICML) [2024]
    * Conference on Neural Information Processing Systems (NeurIPS) [2022, 2023]
    * International Conference on Learning Representations (ICLR) [2022-2024]
    * IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [2022-2024]
    * British Machine Vision Conference (BMVC) [2019, 2020]
    * ACM SIGGRAPH [2018]
    * European Conference on Computer Vision (ECCV) [2014, 2020, 2022, 2024]
    * IEEE/CVF International Conference on Computer Vision (ICCV) [2013, 2019, 2021, 2023]
    * IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2013-2023]
  - Workshops
    * IEEE/CVF Workshop on Large Scale Computer Vision for Remote Sensing Imagery (EARTHVISION) [2019-2025]
    * 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

- "Handling Image and Label Resolution Mismatch in Remote Sensing", Jan. 2023, IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), Waikoloa Village, HI.
- "Dynamic Traffic Modeling from Overhead Imagery", Jun. 2020, IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), Virtual.

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

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