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Areas of Expertise

Computer Vision, Deep Learning, Remote Sensing, Medical Imaging, Multimodal Integration

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1 Education

2005–2010	Ph.D. in Computer Science Adviser: Robert Pless, Ph.D. Thesis: Calibrating and Using the Global Network of Outdoor Webcams	Washington University in St. Louis
1995–1999	B.S. in Computer Science (Minor in Mathematics) <i>Summa Cum Laude</i> with Honors	University of Missouri

2 Appointments and Affiliations

Active

Professor (with Tenure) 2022–	Dept. of Computer Science & Engineering, Washington University <i>St. Louis, MO</i>
Affiliated Faculty 2022–	Division of Computational & Data Sciences, Washington University <i>St. Louis, MO</i>
Affiliated Faculty 2022–	Imaging Science Program, Washington University <i>St. Louis, MO</i>

Affiliated Faculty	Electrical and Systems Engineering, Washington University <i>St. Louis, MO</i>
2023–	
Affiliated Faculty	AI for Health Institute, Washington University <i>St. Louis, MO</i>
2023–	
Associate Faculty	Taylor Geospatial Institute <i>St. Louis, MO</i>
2022–	
Faculty Scholar	Center for the Environment, Washington University <i>St. Louis, MO</i>
2023–	
Biodiversity Fellow	Living Earth Collaborative <i>St. Louis, MO</i>
2022–	
Technical Consultant / Owner / Founder	Multidomain Vision Research, LLC <i>St. Louis, MO</i>
2019–present	

Prior

Professor (with Tenure)	Dept. of Computer Science, University of Kentucky <i>Lexington, KY</i>
2021–2022	
Director of Graduate Studies (Data Science)	Dept. of Computer Science, University of Kentucky <i>Lexington, KY</i>
2020–2022	
Member	Institute for Biomedical Informatics, University of Kentucky <i>Lexington, KY</i>
2017–2022	
Associate Professor (with Tenure)	Dept. of Computer Science, University of Kentucky <i>Lexington, KY</i>
2016–2021	
Co-Department Chair (interim)	Dept. of Computer Science, University of Kentucky <i>Lexington, KY</i>
2019–2020	
Affiliated Faculty	Center for Visualization and Virtual Environments, University of Kentucky <i>Lexington, KY</i>
2010–2019	
Visiting Research Scientist (sabbatical)	Orbital Insight, Inc. <i>Mountain View, CA</i>
2017–2018	
Assistant Professor	Dept. of Computer Science, University of Kentucky <i>Lexington, KY</i>
2010–2016	
Computer Vision Research Intern	ObjectVideo, Inc. <i>Reston, VA</i>
2008	
Graduate Research Assistant	Dept. of Computer Science & Engineering, Washington University <i>St. Louis, MO</i>
2005–2010	

3 Awards

- Best Paper Award (out of 75 valid submissions) [EarthVision Workshop 2024 at IEEE/CVF Computer Vision and Pattern Recognition (CVPR)]
- Highlighted Reviewer Recognition (top 8%) [ICLR 2022]
- Outstanding Reviewer Recognition [BMVC 2021]

- Outstanding Reviewer Recognition (top 10%) [NeurIPS 2020]
- Outstanding Reviewer Recognition [ICCV 2019]
- University of Kentucky, College of Engineering Dean's Award for Excellence in Research [2018]
- Google Faculty Research Award [2018]
- Outstanding Reviewer Recognition [CVPR 2017]
- National Science Foundation CAREER Award [2016]
- Google Faculty Research Award [2016]
- Best Student Paper Award at Applied Imagery Pattern Recognition [2009]
- Ph.D. Forum Prize at the ACM/IEEE International Conference on Distributed Smart Cameras [2009]
- Best Talk Award for the Doctoral Student Seminar, Department of Computer Science, the Washington University in St. Louis, [Fall 2006]

4 Publications

Preprints

- [1] Z. Xiong, X. Ye, B. Yaman, S. Cheng, Y. Lu, J. Luo, N. Jacobs, and L. Ren, *UniDrive-WM: Unified understanding, planning and generation world model for autonomous driving*, Jan. 2026. arXiv: [2601.04453](https://arxiv.org/abs/2601.04453) [cs.CV].
- [2] K. Klemmer, E. Rolf, M. Russwurm, G. Camps-Valls, M. Czerkawski, S. Ermon, A. Francis, N. Jacobs, H. R. Kerner, L. Mackey, G. Mai, O. M. Aodha, M. Reichstein, C. Robinson, D. Rolnick, E. Shelhamer, V. Sitzmann, D. Tuia, and X. Zhu, *Earth Embeddings: Towards AI-centric representations of our planet*, Dec. 2025. DOI: <https://doi.org/10.31223/X5HX9S>
- [3] S. Sastry, S. Khanal, A. Dhakal, J. Lin, D. Cher, P. Jarosz, and N. Jacobs, *ProM3E: Probabilistic masked multimodal embedding model for ecology*, Nov. 2025. arXiv: [2511.02946](https://arxiv.org/abs/2511.02946) [cs.CV].
- [4] S. Khanal, S. Sastry, A. Dhakal, A. Ahmad, and N. Jacobs, *Sat2Sound: A unified framework for zero-shot soundscape mapping*, May 2025. arXiv: [2505.13777](https://arxiv.org/abs/2505.13777) [cs.CV].
- [5] F. Qiao, Z. Xiong, X. Zhu, Y. Ma, Q. He, and N. Jacobs, *MCPDepth: omnidirectional depth estimation via stereo matching from multi-cylindrical panoramas*, Aug. 2024. arXiv: [2408.01653](https://arxiv.org/abs/2408.01653) [cs.CV].

Refereed Conference Papers

- [1] A. Sarkar, S. Sastry, A. Pirinen, N. Jacobs, and Y. Vorobeychik, “DiffVAS: Diffusion-guided visual active search in partially observable environments,” in *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, May 2026.
- [2] D. Cher, B. Wei, S. Sastry, and N. Jacobs, “VectorSynth: Fine-grained satellite image synthesis with structured semantics,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Mar. 2026. arXiv: [2511.07744](https://arxiv.org/abs/2511.07744) [cs.CV].
- [3] A. Wollam, K. Ashley, M. Shugaev, O. Arend, I. Y. Semenov, H. Dashtestani, S. Ravi, and N. Jacobs, “Towards unconstrained cross-view pose estimation,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Mar. 2026.

- [4] A. Elallaf, N. Jacobs, X. Ye, M. Chen, and G. Liang, “Beta distribution learning for reliable roadway crash risk assessment,” in *Association for the Advancement of Artificial Intelligence (AAAI)*, Jan. 2026. arXiv: [2511.04886](https://arxiv.org/abs/2511.04886) [cs.CV].
- [5] E. Xing, A. Stylianou, R. Pless, and N. Jacobs, “QuARI: Query adaptive retrieval improvement,” in *Neural Information Processing Systems (NeurIPS)*, vol. 2505.21647, Dec. 2025. arXiv: [2505.21647](https://arxiv.org/abs/2505.21647) [cs.CV].
- [6] F. Qiao, Z. Xiong, E. Xing, and N. Jacobs, “Towards open-world generation of stereo images and unsupervised matching,” in *IEEE International Conference on Computer Vision (ICCV)*, Oct. 2025. arXiv: [2503.12720](https://arxiv.org/abs/2503.12720) [cs.CV].
- [7] S. Sastry, A. Dhakal, E. Xing, S. Khanal, and N. Jacobs, “Global and local entailment learning for natural world imagery,” in *IEEE International Conference on Computer Vision (ICCV)*, vol. 2506.21476, Oct. 2025. arXiv: [2506.21476](https://arxiv.org/abs/2506.21476) [cs.CV].
- [8] A. Dhakal, S. Sastry, S. Khanal, A. Ahmad, E. Xing, and N. Jacobs, “RANGE: Retrieval augmented neural fields for multi-resolution geo-embeddings,” in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2025. arXiv: [2502.19781](https://arxiv.org/abs/2502.19781) [cs.CV].
- [9] E. Xing, P. Kolouju, R. Pless, A. Stylianou, and N. Jacobs, “ConText-CIR: Learning from concepts in text for composed image retrieval,” in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2025. arXiv: [2505.20764](https://arxiv.org/abs/2505.20764) [cs.CV].
- [10] H. R. Kerner, S. Chaudhari, A. Ghosh, C. Robinson, A. Ahmad, E. Choi, N. Jacobs, C. Holmes, M. Mohr, R. Dodhia, J. M. L. Ferres, and J. Marcus, “Fields of The World: A machine learning benchmark dataset for global agricultural field boundary segmentation,” in *Association for the Advancement of Artificial Intelligence (AAAI)*, vol. 2409.16252, Feb. 2025. arXiv: [2409.16252](https://arxiv.org/abs/2409.16252) [cs.CV].
- [11] A. Sarkar, A. DiChristofano, S. Das, P. Fowler, N. Jacobs, and Y. Vorobeychik, “Active geospatial search for efficient tenant eviction outreach,” in *Association for the Advancement of Artificial Intelligence (AAAI)*, Feb. 2025. arXiv: [2412.17854](https://arxiv.org/abs/2412.17854) [cs.LG].
- [12] S. Sastry, S. Khanal, A. Dhakal, A. Ahmad, and N. Jacobs, “TaxaBind: A unified embedding space for ecological applications,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Feb. 2025. arXiv: [2411.00683](https://arxiv.org/abs/2411.00683) [cs.CV].
- [13] M. Lanier, Y. Xu, N. Jacobs, C. Zhang, and Y. Vorobeychik, “Learning interpretable policies in hindsight-observable POMDPs through partially supervised reinforcement learning,” in *IEEE International Conference on Machine Learning and Applications*, Dec. 2024. arXiv: [2402.09290](https://arxiv.org/abs/2402.09290) [cs.LG].
- [14] A. Sarkar, S. Sastry, A. Pirinen, C. Zhang, N. Jacobs, and Y. Vorobeychik, “GOMAA-Geo: Goal modality agnostic active geo-localization,” in *Neural Information Processing Systems (NeurIPS)*, Dec. 2024. arXiv: [2406.01917](https://arxiv.org/abs/2406.01917) [cs.CV].
- [15] S. Khanal, E. Xing, S. Sastry, A. Dhakal, Z. Xiong, A. Ahmad, and N. Jacobs, “PSM: Learning probabilistic embeddings for multi-scale zero-shot soundscape mapping,” in *ACM Multimedia*, Oct. 2024. DOI: [10.1145/3664647.3681620](https://doi.org/10.1145/3664647.3681620) arXiv: [2408.07050](https://arxiv.org/abs/2408.07050) [cs.CV].
- [16] O. Skean, A. Dhakal, N. Jacobs, and L. G. S. Giraldo, “FroSSL: Frobenius norm minimization for self-supervised learning,” in *European Conference on Computer Vision (ECCV)*, Oct. 2024. arXiv: [2310.02903](https://arxiv.org/abs/2310.02903) [cs.LG].
- [17] A. Sarkar, A. DiChristofano, S. Das, P. Fowler, N. Jacobs, and Y. Vorobeychik, “Geospatial active search for preventing evictions,” in *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, May 2024.
- [18] C. Greenwell, M. Leotta, J. Crall, N. Jacobs, M. Purri, K. Dana, A. Hadzic, and S. Workman, “Watch: Wide-area terrestrial change hypercube,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Jan. 2024.
- [19] A. Sarkar, M. Lanier, S. Alfeld, J. Feng, R. Garnett, N. Jacobs, and Y. Vorobeychik, “A visual active search framework for geospatial exploration,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Jan. 2024.

- [20] S. Sastry, S. Khanal, A. Dhakal, D. Huang, and N. Jacobs, “BirdSat: Cross-view contrastive masked autoencoders for bird species classification and mapping,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Jan. 2024.
- [21] M. Shugaev, I. Semenov, K. Ashley, M. Klaczynski, N. Cuntoor, M. W. Lee, and N. Jacobs, “ArcGeo: Localizing limited field-of-view images using cross-view matching,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Jan. 2024.
- [22] A. Sarkar, N. Jacobs, and Y. Vorobeychik, “A partially-supervised reinforcement learning framework for visual active search,” in *Neural Information Processing Systems (NeurIPS)*, Dec. 2023.
- [23] S. Khanal, S. Sastry, A. Dhakal, and N. Jacobs, “Learning tri-modal embeddings for zero-shot soundscape mapping,” in *British Machine Vision Conference (BMVC)*, Nov. 2023.
- [24] Z. Xiong, F. Qiao, Y. Zhang, and N. Jacobs, “StereoFlowGAN: Co-training for stereo and flow with unsupervised domain adaptation,” in *British Machine Vision Conference (BMVC)*, Nov. 2023.
- [25] X. Xing, C. Peng, Y. Zhang, A.-L. Lin, and N. Jacobs, “AssocFormer: Association transformer for multi-label classification,” in *British Machine Vision Conference (BMVC)*, Nov. 2022.
- [26] E. Xing, X. Xing, L. Liu, N. Jacobs, Y. Qu, and G. Liang, “Neural network decision-making criteria consistency analysis via inputs sensitivity,” in *International Conference on Pattern Recognition (ICPR 2022)*, Aug. 2022. DOI: [10.1109/ICPR56361.2022.9956394](https://doi.org/10.1109/ICPR56361.2022.9956394)
- [27] S. Workman, M. U. Rafique, H. Blanton, and N. Jacobs, “Revisiting near/remote sensing with geospatial attention,” in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 25.33%, Jun. 2022. DOI: [10.1109/CVPR52688.2022.00182](https://doi.org/10.1109/CVPR52688.2022.00182)
- [28] X. Xing, G. Liang, Y. Zhang, S. Khanal, A.-L. Lin, and N. Jacobs, “ADViT: Vision transformer on multi-modality pet images for alzheimer disease diagnosis,” in *IEEE International Symposium on Biomedical Imaging (ISBI)*, Mar. 2022. DOI: [10.1109/ISBI52829.2022.9761584](https://doi.org/10.1109/ISBI52829.2022.9761584)
- [29] H. Blanton, S. Workman, and N. Jacobs, “A structure-aware method for direct pose estimation,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Jan. 2022. DOI: [10.1109/WACV51458.2022.00028](https://doi.org/10.1109/WACV51458.2022.00028)
- [30] Y. Zhang, G. Liang, and N. Jacobs, “Dynamic feature alignment for semi-supervised domain adaptation,” in *British Machine Vision Conference (BMVC)*, Nov. 2021.
- [31] G. Liang, X. Xing, L. Liu, Y. Zhang, Q. Ying, A.-L. Lin, and N. Jacobs, “Alzheimer’s disease classification using 2d convolutional neural networks,” in *International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Oct. 2021. DOI: [10.1109/EMBC46164.2021.9629587](https://doi.org/10.1109/EMBC46164.2021.9629587)
- [32] Q. Ying, X. Xing, L. Liu, A.-L. Lin, N. Jacobs, and G. Liang, “Multi-modal data analysis for Alzheimer’s disease diagnosis: An ensemble model using imagery and genetic features,” in *International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Oct. 2021. DOI: [10.1109/EMBC46164.2021.9630174](https://doi.org/10.1109/EMBC46164.2021.9630174)
- [33] Y. Zhang, G. Liang, Y. Su, and N. Jacobs, “Multi-branch attention networks for classifying galaxy clusters,” in *International Conference on Pattern Recognition (ICPR 2020)*, Acceptance rate: 28.47%, Jan. 2021. DOI: [10.1109/ICPR48806.2021.9412498](https://doi.org/10.1109/ICPR48806.2021.9412498)
- [34] G. Liang, Y. Zhang, X. Wang, and N. Jacobs, “Improved trainable calibration method for neural networks,” in *British Machine Vision Conference (BMVC)*, Sep. 2020.
- [35] M. U. Rafique, H. Blanton, N. Snavely, and N. Jacobs, “Generative Appearance Flow: A hybrid approach for outdoor view synthesis,” in *British Machine Vision Conference (BMVC)*, Sep. 2020.
- [36] G. Liang, X. Wang, Y. Zhang, and N. Jacobs, “Weakly-supervised self-training for breast cancer localization,” in *International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, (oral), 2020. DOI: [10.1109/EMBC44109.2020.9176617](https://doi.org/10.1109/EMBC44109.2020.9176617)

- [37] T. Salem, S. Workman, and N. Jacobs, “Learning a dynamic map of visual appearance,” in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 25%, 2020. DOI: [10.1109/CVPR42600.2020.01245](https://doi.org/10.1109/CVPR42600.2020.01245)
- [38] S. Workman and N. Jacobs, “Dynamic traffic modeling from overhead imagery,” in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 5.7% (oral), 2020. DOI: [10.1109/CVPR42600.2020.01233](https://doi.org/10.1109/CVPR42600.2020.01233)
- [39] Z. Bessinger and N. Jacobs, “A generative model of worldwide facial appearance,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, (oral), 2019. DOI: [10.1109/WACV.2019.00172](https://doi.org/10.1109/WACV.2019.00172)
- [40] G. Liang, S. Fouladvand, J. Zhang, M. A. Brooks, N. Jacobs, and J. Chen, “GANai: Standardizing CT images using generative adversarial network with alternative improvement,” in *IEEE International Conference on Healthcare Informatics (ICHI)*, 2019. DOI: [10.1109/ICHI.2019.8904763](https://doi.org/10.1109/ICHI.2019.8904763)
- [41] G. Liang, X. Wang, Y. Zhang, X. Xing, H. Blanton, T. Salem, and N. Jacobs, “Joint 2d-3d breast cancer classification,” in *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, Acceptance rate: 18% (oral), 2019. DOI: [10.1109/BIBM47256.2019.8983048](https://doi.org/10.1109/BIBM47256.2019.8983048)
- [42] Y. Zhang, X. Wang, H. Blanton, G. Liang, X. Xing, and N. Jacobs, “2d convolutional neural networks for 3d digital breast tomosynthesis classification,” in *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, Acceptance rate: 18% (oral), 2019. DOI: [10.1109/BIBM47256.2019.8983097](https://doi.org/10.1109/BIBM47256.2019.8983097)
- [43] C. Greenwell, S. Workman, and N. Jacobs, “What goes where: Predicting object distributions from above,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2018. DOI: [10.1109/IGARSS.2018.8519251](https://doi.org/10.1109/IGARSS.2018.8519251)
- [44] N. Jacobs, A. Kraft, M. U. Rafique, and R. D. Sharma, “A weakly supervised approach for estimating spatial density functions from high-resolution satellite imagery,” in *ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL)*, Acceptance rate: 22.5% (oral), 2018. DOI: [10.1145/3274895.3274934](https://doi.org/10.1145/3274895.3274934)
- [45] D. Jones, J. Bopaiyah, F. Alghamedy, N. Jacobs, H. Weiss, W. A. D. Jong, and S. Ellingson, “Polypharmacology within the full kinome: A machine learning approach,” in *AMIA Informatics Summit*, 2018.
- [46] R. P. Mihail and N. Jacobs, “Automatic hand skeletal shape estimation from radiographs,” in *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, Acceptance rate: 19.6%, 2018. DOI: [10.1109/BIBM.2018.8621196](https://doi.org/10.1109/BIBM.2018.8621196)
- [47] T. Salem, M. Zhai, S. Workman, and N. Jacobs, “A multimodal approach to mapping soundscapes,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2018. DOI: [10.1109/IGARSS.2018.8517977](https://doi.org/10.1109/IGARSS.2018.8517977)
- [48] S. Schulter, M. Zhai, N. Jacobs, and M. Chandraker, “Learning to look around objects for top-view representations of outdoor scenes,” in *European Conference on Computer Vision (ECCV)*, Acceptance rate: 31.8%, 2018. DOI: [10.1007/978-3-030-01267-0_48](https://doi.org/10.1007/978-3-030-01267-0_48)
- [49] W. Song, S. Workman, A. Hadzic, R. Souleyrette, E. Green, M. Chen, X. Zhang, and N. Jacobs, “FARSA: Fully automated roadway safety assessment,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2018. DOI: [10.1109/WACV.2018.00063](https://doi.org/10.1109/WACV.2018.00063)
- [50] M. Zhai, T. Salem, C. Greenwell, S. Workman, R. Pless, and N. Jacobs, “Learning geo-temporal image features,” in *British Machine Vision Conference (BMVC)*, Acceptance rate: 29.5%, 2018.
- [51] N. Vo, N. Jacobs, and J. Hays, “Revisiting IM2GPS in the deep learning era,” in *IEEE International Conference on Computer Vision (ICCV)*, Acceptance rate: 28.9%, 2017. DOI: [10.1109/ICCV.2017.286](https://doi.org/10.1109/ICCV.2017.286)
- [52] S. Workman, R. Souvenir, and N. Jacobs, “Understanding and mapping natural beauty,” in *IEEE International Conference on Computer Vision (ICCV)*, Acceptance rate: 28.9%, 2017. DOI: [10.1109/ICCV.2017.596](https://doi.org/10.1109/ICCV.2017.596)
- [53] S. Workman, M. Zhai, D. Crandall, and N. Jacobs, “A unified model for near and remote sensing,” in *IEEE International Conference on Computer Vision (ICCV)*, Acceptance rate: 28.9%, 2017. DOI: [10.1109/ICCV.2017.293](https://doi.org/10.1109/ICCV.2017.293)

- [54] M. Zhai, Z. Bessinger, S. Workman, and N. Jacobs, “Predicting ground-level scene layout from aerial imagery,” in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 29.2%, 2017. DOI: [10.1109/CVPR.2017.440](https://doi.org/10.1109/CVPR.2017.440)
- [55] X. Zhang, Y. Zhang, E. Han, N. Jacobs, Q. Han, X. Wang, and J. Liu, “Whole mammogram image classification with convolutional neural networks,” in *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, Acceptance rate: 19%, 2017. DOI: [10.1109/BIBM.2017.8217738](https://doi.org/10.1109/BIBM.2017.8217738)
- [56] R. Baltenberger, M. Zhai, C. Greenwell, S. Workman, and N. Jacobs, “A fast method for estimating transient scene properties,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Acceptance rate: 42.3%, 2016, pp. 1–8. DOI: [10.1109/WACV.2016.7477713](https://doi.org/10.1109/WACV.2016.7477713)
- [57] Z. Bessinger and N. Jacobs, “Quantifying curb appeal,” in *IEEE International Conference on Image Processing (ICIP)*, Acceptance rate: 45%, 2016. DOI: [10.1109/ICIP.2016.7533189](https://doi.org/10.1109/ICIP.2016.7533189)
- [58] Z. Bessinger, C. Stauffer, and N. Jacobs, “Who goes there? Approaches to mapping facial appearance diversity,” in *ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL)*, 2016. DOI: [10.1145/2996913.2996997](https://doi.org/10.1145/2996913.2996997)
- [59] R. P. Mihail, S. Workman, Z. Bessinger, and N. Jacobs, “Sky segmentation in the wild: An empirical study,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Acceptance rate: 42.3%, 2016, pp. 1–6. DOI: [10.1109/WACV.2016.7477637](https://doi.org/10.1109/WACV.2016.7477637)
- [60] T. Salem, S. Workman, M. Zhai, and N. Jacobs, “Analyzing human appearance as a cue for dating images,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Acceptance rate: 42.3%, 2016, pp. 1–8. DOI: [10.1109/WACV.2016.7477678](https://doi.org/10.1109/WACV.2016.7477678)
- [61] S. Workman, M. Zhai, and N. Jacobs, “Horizon lines in the wild,” in *British Machine Vision Conference (BMVC)*, Acceptance rate: 39.4%, 2016.
- [62] M. Zhai, S. Workman, and N. Jacobs, “Camera geo-calibration using an MCMC approach,” in *IEEE International Conference on Image Processing (ICIP)*, Acceptance rate: 45%, 2016. DOI: [10.1109/ICIP.2016.7532905](https://doi.org/10.1109/ICIP.2016.7532905)
- [63] M. Zhai, S. Workman, and N. Jacobs, “Detecting vanishing points using global image context in a non-Manhattan world,” in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 29.9%, 2016. DOI: [10.1109/CVPR.2016.610](https://doi.org/10.1109/CVPR.2016.610)
- [64] M. T. Islam, S. Workman, and N. Jacobs, “Face2GPS: Estimating geographic location from facial features,” in *IEEE International Conference on Image Processing (ICIP)*, Acceptance rate: 45% (overall), 2015. DOI: [10.1109/ICIP.2015.7351072](https://doi.org/10.1109/ICIP.2015.7351072)
- [65] C. Murdock, N. Jacobs, and R. Pless, “Building dynamic cloud maps from the ground up,” in *IEEE International Conference on Computer Vision (ICCV)*, Acceptance rate: 30.3%, 2015, pp. 1–9. DOI: [10.1109/ICCV.2015.85](https://doi.org/10.1109/ICCV.2015.85)
- [66] S. Workman, C. Greenwell, M. Zhai, R. Baltenberger, and N. Jacobs, “DeepFocal: A method for direct focal length estimation,” in *IEEE International Conference on Image Processing (ICIP)*, Acceptance rate: 45% (overall), 2015. DOI: [10.1109/ICIP.2015.7351024](https://doi.org/10.1109/ICIP.2015.7351024)
- [67] S. Workman, R. Souvenir, and N. Jacobs, “Wide-area image geolocation with aerial reference imagery,” in *IEEE International Conference on Computer Vision (ICCV)*, Acceptance rate: 30.3%, 2015, pp. 1–9. DOI: [10.1109/ICCV.2015.451](https://doi.org/10.1109/ICCV.2015.451)
- [68] M. T. Islam, S. Workman, H. Wu, R. Souvenir, and N. Jacobs, “Exploring the geo-dependence of human face appearance,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Acceptance rate: 40%, 2014, pp. 1042–1049. DOI: [10.1109/WACV.2014.6835989](https://doi.org/10.1109/WACV.2014.6835989)
- [69] N. Jacobs, J. King, D. Bowers, and R. Souvenir, “Estimating cloud maps from outdoor image sequences,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Acceptance rate: 40%, 2014, pp. 961–968. DOI: [10.1109/WACV.2014.6836000](https://doi.org/10.1109/WACV.2014.6836000)

- [70] R. P. Mihail, G. Blomquist, and N. Jacobs, “A CRF approach to fitting a generalized hand skeleton model,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Acceptance rate: 40%, 2014, pp. 409–416. DOI: [10.1109/WACV.2014.6836070](https://doi.org/10.1109/WACV.2014.6836070)
- [71] F. Shi, M. Zhai, D. Duncan, and N. Jacobs, “MPCA: EM-based PCA for mixed-size image datasets,” in *IEEE International Conference on Image Processing (ICIP)*, Acceptance rate: 40%, 2014, pp. 1807–1811. DOI: [10.1109/ICIP.2014.7025362](https://doi.org/10.1109/ICIP.2014.7025362)
- [72] A. Whitney, J. Fessler, J. Parker, and N. Jacobs, “Received signal strength indication signature for passive UHF tags,” in *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, 2014, pp. 1183–1187. DOI: [10.1109/AIM.2014.6878242](https://doi.org/10.1109/AIM.2014.6878242)
- [73] S. Workman, R. P. Mihail, and N. Jacobs, “A Pot of Gold: Rainbows as a calibration cue,” in *European Conference on Computer Vision (ECCV)*, Acceptance rate: 25%, 2014, pp. 820–835. DOI: [10.1007/978-3-319-10602-1_53](https://doi.org/10.1007/978-3-319-10602-1_53)
- [74] M. Zhai, F. Shi, D. Duncan, and N. Jacobs, “Covariance-based PCA for multi-size data,” in *International Conference on Pattern Recognition (ICPR)*, Acceptance rate: 56.2%, 2014, pp. 1603–1608. DOI: [10.1109/ICPR.2014.284](https://doi.org/10.1109/ICPR.2014.284)
- [75] N. Jacobs, M. T. Islam, and S. Workman, “Cloud motion as a calibration cue,” in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 26.2%, 2013, pp. 1344–1351. DOI: [10.1109/CVPR.2013.177](https://doi.org/10.1109/CVPR.2013.177)
- [76] N. Jacobs, S. Workman, and R. Souvenir, “Scene geometry from several partly cloudy days,” in *ACM/IEEE International Conference on Distributed Smart Cameras (ICDSC)*, 2013, pp. 1–6. DOI: [10.1109/ICDSC.2013.6778227](https://doi.org/10.1109/ICDSC.2013.6778227)
- [77] R. P. Mihail, J. Goldsmith, N. Jacobs, and J. Jaromczyk, “Teaching graphics for games using Microsoft XNA,” in *International Conference on Computer Games (CGAMES)*, Best Student Paper Award (runner-up), 2013, pp. 36–40. DOI: [10.1145/2538862.2538898](https://doi.org/10.1145/2538862.2538898)
- [78] M. Dixon, A. Abrams, N. Jacobs, and R. Pless, “On analyzing video with very small motions,” in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 26.4%, 2011, pp. 1–8. DOI: [10.1109/CVPR.2011.5995703](https://doi.org/10.1109/CVPR.2011.5995703)
- [79] N. Jacobs, B. Bies, and R. Pless, “Using cloud shadows to infer scene structure and camera calibration,” in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 4.5% (oral), Jun. 2010, pp. 1102–1109. DOI: [10.1109/CVPR.2010.5540093](https://doi.org/10.1109/CVPR.2010.5540093)
- [80] N. Jacobs, S. Schuh, and R. Pless, “Compressive sensing and differential image motion estimation,” in *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Acceptance rate = 10% (oral), Mar. 2010, pp. 718–721. DOI: [10.1109/ICASSP.2010.5495053](https://doi.org/10.1109/ICASSP.2010.5495053)
- [81] A. Abrams, N. Fridrich, N. Jacobs, and R. Pless, “Participatory integration of live webcams into GIS,” in *International Conference on Computing for Geospatial Research and Applications (COM.GEO)*, (oral), 2010, pp. 1–8. DOI: [10.1145/1823854.1823867](https://doi.org/10.1145/1823854.1823867)
- [82] N. Jacobs, W. Burgin, N. Fridrich, A. Abrams, K. Miskell, B. H. Braswell, A. D. Richardson, and R. Pless, “The global network of outdoor webcams: Properties and applications,” in *ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL)*, Acceptance rate: 20.9%, Nov. 2009, pp. 111–120. DOI: [10.1145/1653771.1653789](https://doi.org/10.1145/1653771.1653789)
- [83] M. Dixon, N. Jacobs, and R. Pless, “An efficient system for vehicle tracking in multi-camera networks,” in *ACM/IEEE International Conference on Distributed Smart Cameras (ICDSC)*, Sep. 2009, pp. 1–8. DOI: [10.1109/ICDSC.2009.5289383](https://doi.org/10.1109/ICDSC.2009.5289383)
- [84] N. Jacobs, S. Satkin, N. Roman, R. Speyer, and R. Pless, “Geolocating static cameras,” in *IEEE International Conference on Computer Vision (ICCV)*, Acceptance rate: 23%, Oct. 2007, pp. 1–6. DOI: [10.1109/ICCV.2007.4408995](https://doi.org/10.1109/ICCV.2007.4408995)

- [85] N. Jacobs, N. Roman, and R. Pless, “Consistent temporal variations in many outdoor scenes,” in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 23.4%, Jun. 2007, pp. 1–6. DOI: [10.1109/CVPR.2007.383258](https://doi.org/10.1109/CVPR.2007.383258)
- [86] T. Anderson, A. Hussam, B. Plummer, and N. Jacobs, “Pie charts for visualizing query term frequency in search results,” English, in *International Conference on Asian Digital Libraries (ICADL)*, 2002. DOI: [10.1007/3-540-36227-4_52](https://doi.org/10.1007/3-540-36227-4_52)
- [87] A. Hussam, T. Anderson, N. Jacobs, D. Eckhoff, A. Merayyan, and Y. Yang, “Semantic highlighting: Enhancing search engine display and web document interactivity,” in *IFIP Conference on Human-Computer Interaction (INTERACT)*, Sep. 1999. DOI: [10.1007/3-540-36227-4_52](https://doi.org/10.1007/3-540-36227-4_52)

Journal Articles

- [1] A. Ahmad, S. Sastry, A. Dhakal, S. Khanal, A. Levering, H. Gilani, and N. Jacobs, “Canopy height mapping in the western himalayas, pakistan: A deep learning approach using gedi and sentinel-2 fusion,” *International Journal of Applied Earth Observation and Geoinformation*, vol. 146, p. 105 030, Feb. 2026, ISSN: 1569-8432. DOI: <https://doi.org/10.1016/j.jag.2025.105030> [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S1569843225006776>
- [2] Z. Xiong, W. Xiong, J. Shi, H. Zhang, Y. Song, and N. Jacobs, *GroundingBooth: Grounding text-to-image customization*, Feb. 2026. arXiv: [2409.08520 \[cs.CV\]](https://arxiv.org/abs/2409.08520).
- [3] Z. Xiong, X. Xing, S. Workman, S. Khanal, and N. Jacobs, “Mixed-view panorama synthesis using geospatially guided diffusion,” *Transactions on Machine Learning Research (TMLR)*, May 2025. arXiv: [2407.09672 \[cs.CV\]](https://arxiv.org/abs/2407.09672).
- [4] A. L. Favarão Leão, B. Banda, E. Xing, S. Gudapati, A. Ahmad, J. Lin, S. Sastry, N. Jacobs, and R. Siqueira Reis, “Applications of artificial intelligence in public health: Analyzing the built environment and addressing spatial inequities,” *Journal of Public Health*, Mar. 2025, ISSN: 1613-2238. DOI: [10.1007/s10389-025-02444-x](https://doi.org/10.1007/s10389-025-02444-x)
- [5] S.-C. Lin, Y. Su, F. Gastaldello, and N. Jacobs, “Semisupervised learning for detecting inverse compton emission in galaxy clusters,” *Astrophysical Journal*, vol. 977, no. 2, p. 176, Dec. 2024. DOI: [10.3847/1538-4357/ad8888](https://doi.org/10.3847/1538-4357/ad8888) arXiv: [2410.12943 \[astro-ph.CO\]](https://arxiv.org/abs/2410.12943).
- [6] S. J. Hormozabad, N. Jacobs, and M. G. Soto, “Reinforcement learning for integrated structural control and health monitoring,” *Practice Periodical on Structural Design and Construction*, vol. 29, no. 3, Aug. 2024. DOI: [10.1061/PPSCFX.SCENG-1455](https://doi.org/10.1061/PPSCFX.SCENG-1455)
- [7] S. Shen, C. Li, A. van Donkelaar, N. Jacobs, C. Wang, and R. V. Martin, “Enhancing global estimation of fine particulate matter concentrations by including geophysical a priori information in deep learning,” *ACS ES&T Air*, Mar. 2024. DOI: [10.1021/acsestaair.3c00054](https://doi.org/10.1021/acsestaair.3c00054)
- [8] A. Levering, D. Marcos, N. Jacobs, and D. Tuia, “Prompt-guided and multimodal landscape scenicness assessments with vision-language models,” *PLOS ONE*, 2024.
- [9] G. Liang, J. Zulu, X. Xing, and N. Jacobs, “Unveiling roadway hazards: Enhancing fatal crash risk estimation through multi-scale satellite imagery and self-supervised cross-matching,” *Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS)*, Nov. 2023. DOI: [10.1109/JSTARS.2023.3331438](https://doi.org/10.1109/JSTARS.2023.3331438)
- [10] X. Xing, G. Liang, C. Wang, N. Jacobs, and A.-L. Lin, “Self-supervised learning application on covid-19 chest x-ray image classification using masked autoencoder,” *Bioengineering*, vol. 10, no. 8, 2023, ISSN: 2306-5354. DOI: [10.3390/bioengineering10080901](https://doi.org/10.3390/bioengineering10080901)
- [11] X. Xing, M. U. Rafique, G. Liang, H. Blanton, Y. Zhang, C. Wang, N. Jacobs, and A.-L. Lin, “Efficient training on alzheimer’s disease diagnosis with learnable weighted pooling for 3d pet brain image classification,” *Electronics*, vol. 12, no. 2, 2023, Impact factor: 2.69. DOI: [10.3390/electronics12020467](https://doi.org/10.3390/electronics12020467)

- [12] X. X. Zhu, Y. Wang, M. Kochupillai, M. Werner, M. Haberle, E. J. Hoffmann, H. Taubenbock, D. Tuia, A. Levering, N. Jacobs, A. Kruspe, and K. Abdulahhad, “Geoinformation harvesting from social media data: A community remote sensing approach,” *IEEE Geoscience and Remote Sensing Magazine*, vol. 10, no. 4, pp. 150–180, Dec. 2022, Impact factor: 8.225. DOI: [10.1109/MGRS.2022.3219584](https://doi.org/10.1109/MGRS.2022.3219584)
- [13] G. Liang, H. Ganesh, D. Steffe, L. Liu, N. Jacobs, and J. Zhang, “Development of cnn models for the enteral feeding tube positioning assessment on a small scale data set,” *BMC Medical Imaging*, vol. 22, Mar. 2022, ISSN: 1471-2342. DOI: [10.1186/s12880-022-00766-w](https://doi.org/10.1186/s12880-022-00766-w)
- [14] R. Padilha, T. Salem, S. Workman, F. A. Andaló, A. Rocha, and N. Jacobs, “Content-based detection of temporal metadata manipulation,” *IEEE Transactions on Information Forensics and Security*, pp. 1316–1327, Mar. 2022. DOI: [10.1109/TIFS.2022.3159154](https://doi.org/10.1109/TIFS.2022.3159154)
- [15] S.-C. Lin, Y. Su, G. Liang, Y. Zhang, N. Jacobs, and Y. Zhang, “Estimating cluster masses from SDSS multi-band images with transfer learning,” *Monthly Notices of the Royal Astronomical Society (MNRAS)*, vol. 512, pp. 3885–3894, 3 Mar. 2022, Impact factor: 5.287. DOI: [10.1093/mnras/stac725](https://doi.org/10.1093/mnras/stac725)
- [16] M. U. Rafique, J. Zhu, and N. Jacobs, “Automatic segmentation of sinkholes using a convolutional neural network,” *Earth and Space Science*, p. 19, Dec. 2021, Impact factor: 3.138. DOI: [10.1002/essoar.10509794.1](https://doi.org/10.1002/essoar.10509794.1)
- [17] G. Liang, C. Greenwell, Y. Zhang, X. Xing, X. Wang, R. Kavuluru, and N. Jacobs, “Contrastive cross-modal pre-training: A general strategy for small sample medical imaging,” *IEEE Journal of Biomedical and Health Informatics*, vol. 26, 4 Sep. 2021, Impact factor: 5.223, ISSN: 2168-2184. DOI: [10.1109/JBHI.2021.3110805](https://doi.org/10.1109/JBHI.2021.3110805)
- [18] D. Tuia, R. Roscher, J. D. Wegner, N. Jacobs, X. X. Zhu, and G. Camps-Valls, “Towards a collective agenda on ai for earth science data analysis,” *IEEE Geoscience and Remote Sensing Magazine*, vol. 9, no. 2, pp. 88–104, Jun. 2021, Impact factor: 8.225. DOI: [10.1109/MGRS.2020.3043504](https://doi.org/10.1109/MGRS.2020.3043504)
- [19] J. Zhu, A. Nolte, N. Jacobs, and M. Ye, “Machine learning in identifying karst sinkholes from LiDAR-derived topographic depressions in the Bluegrass region of Kentucky,” *Journal of Hydrology*, Sep. 2020, Impact factor: 4.405. DOI: [10.1016/j.jhydrol.2020.125049](https://doi.org/10.1016/j.jhydrol.2020.125049)
- [20] Y. Su, Y. Zhang, G. Liang, J. ZuHone, D. Barnes, N. Jacobs, M. Ntampaka, W. Forman, P. Nulsen, R. Kraft, and C. Jones, “A deep learning view of the census of galaxy clusters in IllustrisTNG,” *Monthly Notices of the Royal Astronomical Society (MNRAS)*, Sep. 2020, Impact factor: 5.356. DOI: [10.1093/mnras/staa2690](https://doi.org/10.1093/mnras/staa2690)
- [21] T. C. Hammond, X. Xing, C. Wang, D. Ma, K. Nho, P. K. Crane, F. Elahi, D. A. Ziegler, G. Liang, Q. Cheng, L. M. Yanckello, N. Jacobs, and A.-L. Lin, “Beta-amyloid and tau drive early Alzheimer’s disease decline while glucose hypometabolism drives late decline,” *Communications Biology*, vol. 3, no. 1, p. 352, Jul. 2020, Impact factor: 6.268. DOI: [10.1038/s42003-020-1079-x](https://doi.org/10.1038/s42003-020-1079-x)
- [22] X. Wang, G. Liang, Y. Zhang, H. Blanton, Z. Bessinger, and N. Jacobs, “Inconsistent performance of deep learning models on mammogram classification,” *Journal of the American College of Radiology*, Jun. 2020, Impact factor: 3.785. DOI: [10.1016/j.jacr.2020.01.006](https://doi.org/10.1016/j.jacr.2020.01.006)
- [23] R. V. Maretto, L. M. G. Fonseca, N. B. Jacobs, T. S. Körtig, H. N. Bendini, and L. L. Parente, “Spatio-temporal deep learning approach to map deforestation in Amazon rainforest,” *IEEE Geoscience and Remote Sensing Letters*, vol. 18, no. 5, pp. 771–775, Apr. 2020, Impact factor: 3.534. DOI: [10.1109/LGRS.2020.2986407](https://doi.org/10.1109/LGRS.2020.2986407)
- [24] H. Hamraz, N. B. Jacobs, M. A. Contreras, and C. H. Clark, “Deep Learning for Conifer/Deciduous Classification of Airborne LiDAR 3D Point Clouds Representing Individual Trees,” *ISPRS Journal of Photogrammetry and Remote Sensing*, vol. 158, pp. 219–230, Dec. 2019, Impact factor: 6.946, ISSN: 0924-2716. DOI: [10.1016/j.isprsjprs.2019.10.011](https://doi.org/10.1016/j.isprsjprs.2019.10.011)
- [25] R. P. Mihail, G. Liang, and N. Jacobs, “Automatic hand skeletal shape estimation from radiographs,” *IEEE Transactions on NanoBioscience*, vol. 18, no. 3, pp. 296–305, Apr. 2019, Impact factor: 1.927. DOI: [10.1109/TNB.2019.2911026](https://doi.org/10.1109/TNB.2019.2911026)

- [26] H. Sajid, N. Jacobs, and S.-c. S. Cheung, “Motion and appearance based background subtraction for freely moving cameras,” *Signal Processing: Image Communication*, 2019, Impact factor: 2.814. DOI: [10.1016/j.image.2019.03.003](https://doi.org/10.1016/j.image.2019.03.003)
- [27] X. Zhang, Y. Zhang, E. Han, N. Jacobs, Q. Han, X. Wang, and J. Liu, “Classification of whole mammogram and tomosynthesis images using deep convolutional neural networks,” *IEEE Transactions on NanoBioscience*, Jul. 2018, Impact factor: 1.927. DOI: [10.1109/TNB.2018.2845103](https://doi.org/10.1109/TNB.2018.2845103)
- [28] N. Jacobs, S. Workman, and R. Souvenir, “Cloudmaps from static ground-view video,” *Image and Vision Computing (IVC)*, vol. 52, pp. 154–166, Aug. 2016, Impact factor: 1.766. DOI: [10.1016/j.imavis.2016.05.013](https://doi.org/10.1016/j.imavis.2016.05.013)
- [29] H. Sajid, S.-c. S. Cheung, and N. Jacobs, “Appearance based background subtraction for PTZ cameras,” *Signal Processing: Image Communication*, Jul. 2016, Impact factor: 1.602. DOI: [10.1016/j.image.2016.07.008](https://doi.org/10.1016/j.image.2016.07.008)
- [30] M. T. Islam, C. Greenwell, R. Souvenir, and N. Jacobs, “Large-scale geo-facial image analysis,” *EURASIP Journal on Image and Video Processing (JIVP)*, no. 1, pp. 1–14, Jun. 2015, Impact factor: 1.060. DOI: [10.1186/s13640-015-0070-9](https://doi.org/10.1186/s13640-015-0070-9)
- [31] S. Workman, R. Souvenir, and N. Jacobs, “Scene shape estimation from multiple partly cloudy days,” *Computer Vision and Image Understanding (CVIU)*, pp. 116–129, Apr. 2015, Impact factor: 1.54. DOI: [10.1016/j.cviu.2014.10.002](https://doi.org/10.1016/j.cviu.2014.10.002)
- [32] N. Jacobs, A. Abrams, and R. Pless, “Two cloud-based cues for estimating scene structure and camera calibration,” *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, vol. 35, no. 10, pp. 2526–2538, Aug. 2013, Impact factor: 5.694, ISSN: 0162-8828. DOI: [10.1109/TPAMI.2013.55](https://doi.org/10.1109/TPAMI.2013.55)
- [33] N. Jacobs and R. Pless, “Time scales in video surveillance,” *IEEE Transactions on Circuits and Systems for Video Technology (CSVT)*, vol. 18, no. 8, pp. 1106–1113, Aug. 2008, Impact factor: 2.615. DOI: [10.1109/TCSVT.2008.928215](https://doi.org/10.1109/TCSVT.2008.928215)

Workshop Papers

- [1] S. Sastry, X. Xing, A. Dhakal, S. Khanal, A. Ahmad, and N. Jacobs, “LD-SDM: Language-driven hierarchical species distribution modeling,” in *Computer Vision for Ecology (IEEE International Conference on Computer Vision (ICCV) Workshops)*, Oct. 2025. arXiv: [2312.08334 \[cs.CV\]](https://arxiv.org/abs/2312.08334).
- [2] P. Kolouju, E. Xing, R. Pless, N. Jacobs, and A. Stylianou, “Good4cir: Generating detailed synthetic captions for composed image retrieval,” in *SyntaGen: 2nd Workshop on Harnessing Generative Models for Synthetic Visual Datasets (IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops)*, Jun. 2025. arXiv: [2503.17871 \[cs.CV\]](https://arxiv.org/abs/2503.17871).
- [3] W. Liu, Z. Xiong, X. Li, and N. Jacobs, “DeclutterNeRF: Generative-free 3d scene recovery for occlusion removal,” in *4th Computer Vision for Metaverse Workshop (IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops)*, Jun. 2025.
- [4] Z. Xiong, Z. Chen, Z. Li, Y. Xu, and N. Jacobs, “PanoDreamer: Consistent text to 360 scene generation,” in *4th Computer Vision for Metaverse Workshop (IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops)*, Jun. 2025.
- [5] J. Nascimento, N. Jacobs, and A. Rocha, “Interactive event sifting using bayesian graph neural networks,” in *IEEE International Workshop on Information Forensics and Security (WIFS)*, Dec. 2024. arXiv: [2410.05359 \[cs.CV\]](https://arxiv.org/abs/2410.05359).
- [6] A. Dhakal, A. Ahmad, S. Khanal, S. Sastry, H. R. Kerner, and N. Jacobs, “Sat2Cap: Mapping fine-grained textual descriptions from satellite images,” in *IEEE/ISPRS Workshop: Large Scale Computer Vision for Remote Sensing (EARTHVISION)*, (Best Paper Award), Jun. 2024. arXiv: [2307.15904 \[cs.CV\]](https://arxiv.org/abs/2307.15904).

- [7] S. Sastry, S. Khanal, A. Dhakal, and N. Jacobs, “GeoSynth: Contextually-aware high-resolution satellite image synthesis,” in *IEEE/ISPRS Workshop: Large Scale Computer Vision for Remote Sensing (EARTHVISION)*, Jun. 2024. arXiv: [2404.06637 \[cs.CV\]](https://arxiv.org/abs/2404.06637).
- [8] X. Xing, Z. Xiong, A. Stylianou, S. Sastry, L. Gong, and N. Jacobs, “Vision-language pseudo-labels for single-positive multi-label learning,” in *Workshop on Representation Learning with Very Limited Images*, (oral), Jun. 2024. arXiv: [2310.15985 \[cs.CV\]](https://arxiv.org/abs/2310.15985).
- [9] M. Lanier, A. Dhakal, Z. Xiong, A. Li, N. Jacobs, and Y. Vorobeychik, “Eroding trust in aerial imagery: Comprehensive analysis and evaluation of adversarial attacks in geospatial systems,” in *IEEE Applied Imagery Pattern Recognition Workshop (AIPR)*, Sep. 2023. arXiv: [2312.07389 \[cs.CV\]](https://arxiv.org/abs/2312.07389).
- [10] S. Khanal, B. Brodie, X. Xing, A.-L. Lin, and N. Jacobs, “Causality for inherently explainable transformers: Cat-xplain,” in *XAI4CV: Explainable Artificial Intelligence for Computer Vision (IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops)*, Acceptance rate: 15% (spotlight), Jun. 2022. eprint: [2206.14841 \(cs.CV\)](https://arxiv.org/abs/2206.14841).
- [11] S. Khanal, J. Chen, N. Jacobs, and A.-L. Lin, “Alzheimer’s disease classification using genetic data,” in *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, Dec. 2021.
- [12] M. U. Rafique, Y. Zhang, B. Brodie, and N. Jacobs, “Unifying guided and unguided outdoor image synthesis,” in *New Trends in Image Restoration and Enhancement (IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops)*, Jun. 2021, pp. 776–785. DOI: [10.1109/CVPRW53098.2021.00087](https://doi.org/10.1109/CVPRW53098.2021.00087)
- [13] H. Blanton, C. Greenwell, S. Workman, and N. Jacobs, “Extending absolute pose regression to multiple scenes,” in *Joint Workshop on Long-Term Visual Localization, Visual Odometry and Geometric and Learning-based SLAM (CVPR Workshop)*, 2020. DOI: [10.1109/CVPRW50498.2020.00027](https://doi.org/10.1109/CVPRW50498.2020.00027)
- [14] A. Hadzic, H. Blanton, W. Song, M. Chen, S. Workman, and N. Jacobs, “RasterNet: Modeling free-flow speed using lidar and overhead imagery,” in *IEEE/ISPRS Workshop: Large Scale Computer Vision for Remote Sensing (EARTHVISION)*, Acceptance rate: 26%, 2020. DOI: [10.1109/CVPRW50498.2020.00112](https://doi.org/10.1109/CVPRW50498.2020.00112)
- [15] X. Xing, G. Liang, H. Blanton, M. U. Rafique, C. Wang, A.-L. Lin, and N. Jacobs, “Dynamic image for 3d MRI image Alzheimer’s disease classification,” in *ECCV Workshop on BioImage Computing (BIC)*, (oral), 2020.
- [16] M. U. Rafique, H. Blanton, and N. Jacobs, “Weakly supervised fusion of multiple overhead images,” in *IEEE/ISPRS Workshop: Large Scale Computer Vision for Remote Sensing (EARTHVISION)*, Acceptance rate: 23.5%, 2019. DOI: [10.1109/CVPRW.2019.00189](https://doi.org/10.1109/CVPRW.2019.00189)
- [17] Y. Zhang, G. Liang, T. Salem, and N. Jacobs, “Defense-PointNet: Protecting PointNet against adversarial attacks,” in *The Next Frontier of Big Data From LiDAR Workshop (co-located with IEEE Big Data)*, 2019. DOI: [10.1109/BigData47090.2019.9006307](https://doi.org/10.1109/BigData47090.2019.9006307) arXiv: [2002.11881 \[cs.CV\]](https://arxiv.org/abs/2002.11881).
- [18] S. Workman and N. Jacobs, “On the location dependence of convolutional neural network features,” in *IEEE/ISPRS Workshop: Large Scale Computer Vision for Remote Sensing (EARTHVISION)*, Acceptance rate: 30%, 2015, pp. 1–9. DOI: [10.1109/CVPRW.2015.7301385](https://doi.org/10.1109/CVPRW.2015.7301385)
- [19] C. Greenwell, S. Spurlock, R. Souvenir, and N. Jacobs, “GeoFaceExplorer: Exploring the geo-dependence of facial attributes,” in *ACM SIGSPATIAL International Workshop on Crowdsourced and Volunteered Geographic Information (GEOCROWD)*, 2014, pp. 32–37. DOI: [10.1145/2676440.2676443](https://doi.org/10.1145/2676440.2676443)
- [20] M. T. Islam, N. Jacobs, H. Wu, and R. Souvenir, “Images+Weather: Collection, validation, and refinement,” in *IEEE CVPR Workshop on Ground Truth*, Acceptance rate: 67%, 2013, pp. 1–7.
- [21] C. Murdock, N. Jacobs, and R. Pless, “Webcam2Satellite: Estimating cloud maps from webcam imagery,” in *IEEE Workshop on Applications of Computer Vision (WACV)*, Acceptance rate: 40%, 2013, pp. 214–221. DOI: [10.1109/WACV.2013.6475021](https://doi.org/10.1109/WACV.2013.6475021)
- [22] A. Abrams, J. Tucek, J. Little, N. Jacobs, and R. Pless, “LOST: Longterm observation of scenes (with tracks),” in *IEEE Workshop on Applications of Computer Vision (WACV)*, Acceptance rate: 44%, 2012, pp. 297–304. DOI: [10.1109/WACV.2012.6163032](https://doi.org/10.1109/WACV.2012.6163032)

- [23] R. P. Mihail, N. Jacobs, and J. Goldsmith, “Real time gesture recognition with 2 Kinect sensors,” in *International Conference on Image Processing, Computer Vision, and Pattern Recognition (IPCV)*, 2012, pp. 1–7.
- [24] N. Jacobs, K. Miskell, and R. Pless, “Webcam geo-localization using aggregate light levels,” in *IEEE Workshop on Applications of Computer Vision (WACV)*, (oral), 2011, pp. 132–138. DOI: [10.1109/WACV.2011.5711494](https://doi.org/10.1109/WACV.2011.5711494)
- [25] N. Jacobs, M. Dixon, S. Satkin, and R. Pless, “Efficient tracking of many objects in structured environments,” in *IEEE ICCV Workshop on Visual Surveillance*, Oct. 2009, pp. 1161–1168. DOI: [10.1109/ICCVW.2009.5457477](https://doi.org/10.1109/ICCVW.2009.5457477)
- [26] N. Jacobs and R. Pless, “Calibrating and using the global network of outdoor webcams,” in *ACM/IEEE International Conference on Distributed Smart Cameras (ICDSC)*, Winner PhD Forum Prize, Sep. 2009, pp. 1–2. DOI: [10.1109/ICDSC.2009.5289404](https://doi.org/10.1109/ICDSC.2009.5289404)
- [27] N. Jacobs, W. Burgin, R. Speyer, D. Ross, and R. Pless, “Adventures in archiving and using three years of webcam images,” in *IEEE CVPR Workshop on Internet Vision*, Jun. 2009, pp. 39–46. DOI: [10.1109/CVPRW.2009.5204185](https://doi.org/10.1109/CVPRW.2009.5204185)
- [28] N. Jacobs, R. Souvenir, and R. Pless, “Passive Vision: The global webcam imaging network,” in *IEEE Applied Imagery and Pattern Recognition (AIPR)*, Best Student Paper, 2009, pp. 1–8. DOI: [10.1109/AIPR.2009.5466314](https://doi.org/10.1109/AIPR.2009.5466314)
- [29] R. Pless, N. Jacobs, M. Dixon, R. Hartley, P. Baker, D. Brock, N. Cassimatis, and D. Perzanowski, “Persistence and Tracking: Putting vehicles and trajectories in context,” in *IEEE Applied Imagery and Pattern Recognition (AIPR)*, 2009. DOI: [10.1109/AIPR.2009.5466307](https://doi.org/10.1109/AIPR.2009.5466307)
- [30] N. Jacobs, M. Dixon, and R. Pless, “Location-specific transition distributions for tracking,” in *IEEE Workshop on Motion and Video Computing (WMVC)*, Acceptance rate: 33.3%, Jan. 2008. DOI: [10.1109/WMVC.2008.4544061](https://doi.org/10.1109/WMVC.2008.4544061)
- [31] N. Jacobs, N. Roman, and R. Pless, “Toward fully automatic geo-location and geo-orientation of static outdoor cameras,” in *IEEE Workshop on Applications of Computer Vision (WACV)*, Acceptance rate: 33.3%, Jan. 2008, pp. 1–6. DOI: [10.1109/WACV.2008.4544040](https://doi.org/10.1109/WACV.2008.4544040)
- [32] N. Jacobs and R. Pless, “Shape Background Modeling: The shape of things that came,” in *IEEE Workshop on Motion and Video Computing (WMVC)*, Feb. 2007, pp. 1–6. DOI: [10.1109/WMVC.2007.35](https://doi.org/10.1109/WMVC.2007.35)
- [33] N. Jacobs and R. Pless, “Real-time constant memory visual summaries for surveillance,” in *ACM International Workshop on Visual Surveillance and Sensor Networks (VSSN)*, Oct. 2006. DOI: [10.1145/1178805](https://doi.org/10.1145/1178805)
- [34] M. Dixon, N. Jacobs, and R. Pless, “Finding minimal parameterizations of cylindrical image manifolds,” in *IEEE CVPR Workshop on Perceptual Organization in Computer Vision (POCV)*, Jun. 2006, pp. 1–8. DOI: [10.1109/CVPRW.2006.82](https://doi.org/10.1109/CVPRW.2006.82)

Book Chapters

- [1] R. P. Mihail, N. Jacobs, J. Goldsmith, and K. Lohr, “Using visual analytics to inform rheumatoid arthritis patient choices,” in *Serious Games Analytics*, ser. Advances in Game-Based Learning, C. S. Loh, Y. Sheng, and D. Ifenthaler, Eds., Springer International Publishing, 2015, pp. 211–231, ISBN: 978-3-319-05833-7. DOI: [10.1007/978-3-319-05834-4_9](https://doi.org/10.1007/978-3-319-05834-4_9)

Abstracts

- [1] R. Badzioch, N. Jacobs, E. B. Rastetter, and A. V. Rocha, “Mapping post-fire polygonal ice wedge degradation in arctic tundra using high resolution satellite imagery and computer learning,” in *American Geophysical Union (AGU) Fall Meeting Abstracts*, Dec. 2025.

- [2] R. O. Balogun, T. Chakraborty, G. Muhamenayo, H. R. Kerner, A. M. Tárano, Z. Fang, N. Jacobs, S. Khanal, R. Abedi, and L. D. Estes, “Combining open labeled datasets with varying domains to improve large-scale agricultural field boundary delineation,” in *American Geophysical Union (AGU) Fall Meeting Abstracts*, Dec. 2025.
- [3] G. Muhamenayo, Z. Fang, S. Khanal, A. Wollam, I. Corley, C. Robinson, M. Mohr, C. Holmes, J. Marcus, L. D. Estes, N. Jacobs, A. M. Tárano, and H. R. Kerner, “Global field boundary delineation model zoo and tooling,” in *American Geophysical Union (AGU) Fall Meeting Abstracts*, Dec. 2025.
- [4] S. Shen, A. van Donkelaar, N. Jacobs, C. Li, and R. V. Martin, “Enhancing estimation of daily 1-km resolution fine particulate matter concentrations for north america with deep learning from geophysical a priori information,” in *American Geophysical Union (AGU) Fall Meeting Abstracts*, Dec. 2025. DOI: [10.1021/acsestair.5c00251](https://doi.org/10.1021/acsestair.5c00251)
- [5] M. Mohr, M. Roby, I. Bosloper, H. R. Kerner, N. Jacobs, and C. Robinson, “Fields of The World and fiboa: Towards interoperable worldwide agricultural field boundaries through standardization and machine-learning,” in *Living Planet Symposium (LPS)*, Jun. 2025.
- [6] A. Ahmad, A. Dhakal, S. Sastry, S. Khanal, E. Xing, and N. Jacobs, “Improved canopy vertical structural diversity mapping across varied topographies using deep learning techniques,” in *American Geophysical Union (AGU) Fall Meeting Abstracts*, Dec. 2024.
- [7] H. R. Kerner, S. Chaudhari, C. Robinson, A. Ghosh, A. Ahmad, E. Choi, N. Jacobs, C. Holmes, M. Mohr, and J. Marcus, “Fields of The World (FTW!): A new machine learning dataset for agricultural field boundary segmentation on four continents,” in *American Geophysical Union (AGU) Fall Meeting Abstracts*, Dec. 2024.
- [8] S. Sastry, A. Ahmad, A. Dhakal, S. Khanal, E. Xing, and N. Jacobs, “ClimSatDiff: Synthesizing the earth’s surface conditioned on climatic variables using diffusion models,” in *American Geophysical Union (AGU) Fall Meeting Abstracts*, Dec. 2024.
- [9] S. Sastry, X. Xing, A. Dhakal, S. Khanal, A. Ahmad, and N. Jacobs, “LD-SDM: Language-driven hierarchical species distribution modeling,” in *American Geophysical Union (AGU) Fall Meeting Abstracts*, Dec. 2024.
- [10] S. Shen, A. van Donkelaar, N. Jacobs, C. Li, and R. V. Martin, “Enhancing estimation of fine particulate matter species concentrations over north america by including geophysical a priori information in deep learning,” in *American Geophysical Union (AGU) Fall Meeting Abstracts*, Dec. 2024.
- [11] A. Dhakal, S. Khanal, S. Sastry, A. Ahmad, and N. Jacobs, “GeoBind: Binding text, image, and audio through satellite images,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, (oral), Jul. 2024. arXiv: [2404.11720](https://arxiv.org/abs/2404.11720).
- [12] P. Jain, D. Marcos, D. Ienco, R. Interdonato, A. Dhakal, N. Jacobs, and T. Berchoux, “Aligning geo-tagged CLIP representations and satellite imagery for few-shot land use classification,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, (oral), Jul. 2024.
- [13] C. Archbold, B. Brodie, A. A. Ogholbake, and N. Jacobs, “Fine-grained property value assessment using probabilistic disaggregation,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, Jul. 2023.
- [14] B. Brodie, S. Sastry, J. Birge, R. Pless, and N. Jacobs, “A cost-sensitive approach to dimensionality reduction for multispectral imagery,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, Jul. 2023.
- [15] S. Sastry, A. Dhakal, B. Brodie, S. Khanal, and N. Jacobs, “Explorations in self-supervised learning for change detection,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, (oral), Jul. 2023.
- [16] S. Sastry, N. Jacobs, M. Belgiu, and R. V. Maretto, “Task agnostic cost prediction module for semantic labeling in active learning,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, (oral), Jul. 2023.
- [17] Y. Zhang, M. U. Rafique, G. Christie, and N. Jacobs, “CrossAdapt: Cross-scene adaptation for multi-domain depth estimation,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, Jul. 2023.

- [18] Y. Zhang, M. U. Rafique, and N. Jacobs, “CrossSeg: Cross-scene few-shot aerial segmentation using probabilistic prototypes,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, (oral), Jul. 2023.
- [19] S. Shen, A. van Donkelaar, R. V. Martin, N. Jacobs, and C. Wang, “Improving representation of the aod to $PM_{2.5}$ relationship with a convolutional neural network,” in *American Geophysical Union (AGU) Fall Meeting Abstracts*, Dec. 2022.
- [20] B. Brodie, S. Khanal, M. U. Rafique, C. Greenwell, and N. Jacobs, “Hierarchical probabilistic embeddings for multi-view image classification,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, Jul. 2021. DOI: [10.1109/IGARSS47720.2021.9554405](https://doi.org/10.1109/IGARSS47720.2021.9554405)
- [21] D. Jones and N. Jacobs, “Intensity harmonization for airborne LiDAR,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, Jul. 2021. DOI: [10.1109/IGARSS47720.2021.9553605](https://doi.org/10.1109/IGARSS47720.2021.9553605)
- [22] M. Chen, A. Hadzic, W. Song, and N. Jacobs, “Applications of deep machine learning to highway safety and usage assessment,” in *Transportation Research Board Workshop (Sponsored by AED50)*, (oral), Jan. 2021.
- [23] G. Liang, Y. Su, S.-C. Lin, Y. Zhang, Y. Zhang, and N. Jacobs, “Optical wavelength guided self-supervised feature learning for galaxy cluster richness estimate,” in *Workshop on Machine Learning and the Physical Sciences at the 34th Conference on Neural Information Processing Systems*, Dec. 2020.
- [24] A. Hadzic, G. Christie, J. Freeman, A. Dismer, S. Bullard, A. Greiner, N. Jacobs, and R. Mukherjee, “Estimating displaced populations from overhead,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, Sep. 2020. DOI: [10.1109/IGARSS39084.2020.9324617](https://doi.org/10.1109/IGARSS39084.2020.9324617)
- [25] H. Blanton, S. Grate, and N. Jacobs, “Surface modeling for airborne LiDAR,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, (oral), 2020. DOI: [10.1109/IGARSS39084.2020.9323522](https://doi.org/10.1109/IGARSS39084.2020.9323522)
- [26] G. Liang, Y. Zhang, and N. Jacobs, “Neural network calibration for medical imaging classification using DCA regularization,” in *ICML 2020 workshop on Uncertainty and Robustness in Deep Learning (UDL)*, 2020.
- [27] S. Workman, M. U. Rafique, H. Blanton, C. Greenwell, and N. Jacobs, “Single image cloud detection via multi-image fusion,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, (oral), 2020. DOI: [10.1109/IGARSS39084.2020.9323759](https://doi.org/10.1109/IGARSS39084.2020.9323759)
- [28] C. Greenwell, S. Workman, and N. Jacobs, “Implicit land use mapping using social media imagery,” in *IEEE Applied Imagery and Pattern Recognition (AIPR)*, (oral), 2019. DOI: [10.1109/AIPR47015.2019.9174570](https://doi.org/10.1109/AIPR47015.2019.9174570)
- [29] T. Hammond, X. Xing, N. Jacobs, and A.-L. Lin, “Phase-dependent importance of amyloid-beta, phosphorylated-tau, and hypometabolism in determining mild cognitive impairment and Alzheimer’s disease: A machine learning study,” in *Alzheimer’s Disease Therapeutics: Alternatives to Amyloid*, 2019.
- [30] G. Liang, N. Jacobs, J. Liu, K. Luo, W. Owen, and X. Wang, “Translational relevance of performance of deep learning models on mammograms,” in *SBI/ACR Breast Imaging Symposium*, 2019.
- [31] G. Liang, N. Jacobs, and X. Wang, “Training deep learning models as radiologists: Breast cancer classification using combined whole 2d mammography and full volume digital breast tomosynthesis,” in *Radiological Society of North America (RSNA)*, (oral), 2019.
- [32] M. U. Rafique and N. Jacobs, “Weakly supervised building segmentation from aerial images,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2019. DOI: [10.1109/IGARSS.2019.8898812](https://doi.org/10.1109/IGARSS.2019.8898812)
- [33] T. Salem, C. Greenwell, H. Blanton, and N. Jacobs, “Learning to map nearly anything,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, (oral), 2019. DOI: [10.1109/IGARSS.2019.8900646](https://doi.org/10.1109/IGARSS.2019.8900646)
- [34] W. Song, T. Salem, H. Blanton, and N. Jacobs, “Remote estimation of free-flow speeds,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, (oral), 2019. DOI: [10.1109/IGARSS.2019.8900286](https://doi.org/10.1109/IGARSS.2019.8900286)

- [35] Y. Zhang, G. Liang, N. Jacobs, and X. Wang, "Unsupervised domain adaptation for mammogram image classification: A promising tool for model generalization," in *Conference on Machine Intelligence in Medical Imaging (CMIMI)*, (oral), 2019.
- [36] J. Zhu, A. M. Nolte, N. Jacobs, and M. Ye, "Incorporating machine learning with LiDAR for delineating sink-holes," in *Kentucky Water Resources Annual Symposium*, 2019.
- [37] D. Jones, N. Jacobs, and S. Ellingson, "Learning deep feature representations for kinase polypharmacology," in *ACM Richard Tapia Celebration of Diversity in Computing Conference*, 2018.
- [38] G. Liang, X. Wang, and N. Jacobs, "Evaluating the publicly available mammography datasets for deep learning model training," in *SBI/ACR Breast Imaging Symposium*, 2018.
- [39] W. Song, T. Salem, N. Jacobs, and M. Johnson, "Detecting the presence of bird vocalizations in audio segments using a convolutional neural network architecture," in *International Symposium on Acoustic Communication by Animals*, 2017.
- [40] N. Jacobs, S. Workman, and M. Zhai, "Crossview convolutional networks," in *IEEE Applied Imagery and Pattern Recognition (AIPR)*, (oral), 2016. DOI: [10.1109/AIPR.2016.8010593](https://doi.org/10.1109/AIPR.2016.8010593)
- [41] J. D. Smith, R. Baltenberger, S. Workman, and N. Jacobs, "User-in-the-loop calibration and mensuration," in *National Conference on Undergraduate Research (NCUR)*, 2014.
- [42] X. Zhou, S. Workman, M. T. Islam, N. Jacobs, and J. Griffioen, "Cyber infrastructure for the VOEIS project," in *Symposium in the Mathematical, Statistical and Computer Sciences*, Best Student Presentation, 2013.
- [43] E. Welty, T. Pfeffer, S. O'Neil, and N. Jacobs, "Calving dynamics of the Columbia Glacier, AK (2000-2011 update)," in *Workshop on the Dynamics and Mass Budget of Arctic Glaciers*, 2012.
- [44] S. Workman, J. Knochelmann, N. Jacobs, D. S. White, and R. Hauer, "Registration and visualization of scientific aerial imagery at Kentucky Lake," in *Kentucky EPSCoR Conference*, 2012.
- [45] T. Milliman, K. Hufkins, I. Lavine, N. Jacobs, R. Pless, A. Richardson, and S. Frolking, "The PhenoCam Website: Adventures in "crowd-sourcing" data collection, distribution and analysis," in *American Geophysical Union Annual Meeting*, 2011.
- [46] P. Wang, S. Bhattacharyya, D. White, and N. Jacobs, "Visualization of Kentucky Lake," in *Kentucky EPSCoR Conference*, 2011.

Technical Reports

- [1] A. Abrams, C. Hawley, K. Miskell, A. Stoica, N. Jacobs, and R. Pless, "Shadow estimation method for "the episolar constraint: Monocular shape from shadow correspondence"," *arXiv*, vol. preprint 1304.4112 [cs.CV], 2013.
- [2] N. Jacobs, S. Schuh, and R. Pless, "On unusual pixel shapes and image motion," Computer Science and Engineering, Washington University in St. Louis, MO, USA, Tech. Rep. WUCSE-2009-16, Jun. 2009.

Datasets

- [1] A. Abrams, J. Tucek, J. Little, N. Jacobs, and R. Pless, *LOST: Longterm observation of scenes (with tracks)*, <http://mvrl.github.io/LOST>.
- [2] M. T. Islam, C. Greenwell, and N. Jacobs, *GeoFaces: A large database of geolocated face patches*, <http://mvrl.github.io/GeoFaces>.
- [3] N. Jacobs, R. Pless, A. Abrams, and many others (see website for details), *AMOS: The archive of many outdoor scenes*, <https://mvrl.github.io/AMOS>.

- [4] P. Mihail, S. Workman, Z. Bessinger, and N. Jacobs, *SkyFinder: A large dataset of webcam images annotated with sky regions*, <https://mvrl.github.io/SkyFinder>.
- [5] M. U. Rafique, H. Blanton, and N. Jacobs, *Brooklyn Panorama Synthesis: A large dataset of panoramic images suitable for view synthesis evaluation*. <https://mvrl.github.io/GAF>.
- [6] T. Salem, S. Workman, M. Zhai, and N. Jacobs, *Cross-View Time (CVT)*, <https://mvrl.github.io/CVT>.
- [7] T. Salem, S. Workman, M. Zhai, and N. Jacobs, *Face2Year: A large number of images extracted from highschool yearbooks*, <https://mvrl.github.io/Face2Year>.
- [8] S. Workman and N. Jacobs, *Cross-View ScenicOrNot (CVSoN)*, <https://mvrl.github.io/CVSoN>.
- [9] S. Workman and N. Jacobs, *Crossview USA (CVUSA): A large dataset containing millions of pairs of ground-level and aerial/satellite images from across the United States*. <https://mvrl.github.io/CVUSA>.
- [10] S. Workman, M. Zhai, and N. Jacobs, *Horizon Lines in the Wild (HLW): A large database of images with known horizon-line location*, <http://mvrl.github.io/HLW>.

Patents

- [1] N. Jacobs and S. Workman, *Network architecture for generating a labeled overhead image*, US Patent App. 16/045,606, Jan. 2020.
- [2] J. A. G. Whitney, J. T. Fessler, Z. C. N. Kratzer, N. B. Jacobs, A. M. Whitney, et al., *Method and system for estimating error in predicted distance using RSSI signature*, Jan. 2016.

5 Funding

Summary of funding to University of Kentucky as grants, contracts, or unrestricted gifts (Last updated: Nov 23, 2021):

- Total funding: \$10,203,326
 - by role:
 - * PI: \$4,234,003
 - * Co-PI/Co-I: \$5,969,323
 - by source:
 - * Federal: \$9,799,904 (inc. subcontracts on Federal awards)
 - * Industry: \$199,107
 - * Foundation: \$159,000
 - * Internal: \$45,315 (only includes competitively awarded funds)

This excludes a \$28,861,434 NIH CTSA grant, on which I don't deem my contribution essential to the success of this award.

Grants (awarded/active)

1. *Learning-Based Visual Event Demarcation*
 PI: **Nathan Jacobs**
 Co-PI(s)/Co-I(s): Anderson Rocha (UNICAMP)
 Sponsor: Global Incubator Seed Grant (WashU Internal Funding)
 Total Award: \$25,000
 Duration: 2022–2023

2. *WATCH: Wide Area Terrestrial Change Hypercube*
PI: **Nathan Jacobs**
Sponsor: Kitware / Intelligence Advanced Research Projects Activity (IARPA)
Total Award: \$305,941.48 (Phase 1); \$851,489 (Phase 1–3)
Duration: 2020–2022 (Phase 1); 2020–2024 (Phase 1–3)
3. *Measures of Information via Representation Learning*
PI: Luis Sanchez-Giraldo
Co-PI(s)/Co-I(s): **Nathan Jacobs**
Sponsor: Department of Defense (DEPSCoR)
Total Award: \$582,376
Duration: 2021–2024
4. *GeoSearch: Image-based Geolocation using Rank Aggregated Hash Index (Phase 2, direct)*
PI: **Nathan Jacobs**
Sponsor: Blue Halo / National Geospatial-Intelligence Agency (NGA)
Total Award: \$250,000
Duration: 2021–2023
5. *Spatio-Temporal Association and Curve Kernel Networks (STACKNet)*
PI: **Nathan Jacobs**
Sponsor: Blue Halo / MDA
Total Award: \$483,000 (Phase 1 and 2)
Duration: 2020–2023
6. *Geolocalization Pipeline for Ground Level Images*
PI: **Nathan Jacobs**
Sponsor: Blue Halo / National Geospatial-Intelligence Agency (NGA)
Total Award: \$19,944 (Phase 1), \$249,988 (Phase 2), \$153,261 (Phase 3, Year 1)
Duration: 2018–2022

Grants (completed)

1. *NURI: Semantic Representations for Multi-Viewpoint Multimodal Geolocation*
PI: **Nathan Jacobs**
Sponsor: Johns Hopkins University, Applied Physics Laboratory / National Geospatial-Intelligence Agency (NGA)
Total Award: \$196,000 (base)
Duration: 2020–2022
2. *R01: Ex vivo single molecule tools to analyze membrane receptor dynamics*
PI: Christopher Richards
Co-PI(s)/Co-I(s): Jim Pauly, Ahmed Abdel-Latif, David Heidary, **Nathan Jacobs**
Sponsor: National Institutes of Health (NIH)
Total Award: \$1,510,803
Duration: 2021–2022 (my role ended when I left the University of Kentucky)
3. *UL1: Kentucky Center for Clinical and Translational Science*
PI: Philip A. Kern
Co-PI(s)/Co-I(s): **Nathan Jacobs** and many others
Sponsor: National Institutes of Health (NIH)
Total Award: \$28,893,663
Duration: 2021–2022 (my role ended when I left the University of Kentucky)

4. *CCT: Context and Colorization for Tracking (Phase 2)*
PI: **Nathan Jacobs**
Sponsor: Intelligent Automation Inc. / Defense Advanced Research Projects Agency (DARPA)
Total Award: \$200,000
Duration: 2020–2021
5. *Video to Feature Data Association and Geolocation*
PI: **Nathan Jacobs**
Sponsor: Novateur Research Solutions / National Geospatial-Intelligence Agency (NGA)
Total Award: \$29,503 (Phase 1), \$149,883 (Phase 2)
Duration: 2018–2021
6. *CAREER: Learning and Using Models of Geo-Temporal Appearance*
PI: **Nathan Jacobs**
Sponsor: National Science Foundation (NSF)
Total Award: \$499,426
Duration: 2016–2021
7. *R01: Monomeric G-proteins and Cardioprotection from Heart Failure*
PI: John Satin
Co-PI(s)/Co-I(s): Douglas Andres, Ahmed Abdel-Latif, **Nathan Jacobs**, Peter Kekenes-Huskey
Sponsor: National Institutes of Health (NIH)
Total Award: \$1,575,279
Duration: 2016–2020
8. *Group Travel Grant for the Doctoral Consortium to be Held in Conjunction with IEEE Conference on Computer Vision and Pattern Recognition*
PI: **Nathan Jacobs**
Sponsor: National Science Foundation (NSF)
Total Award: \$22,500
Duration: 2019–2020
9. *DLALA: Deep Learning for Airborne LiDAR Analysis*
PI: **Nathan Jacobs**
Sponsor: Orbital Insight
Total Award: \$104,927
Duration: 2019–2020
10. *Listening to Markets: A Temporal Convolutional Net (TCN) Analysis of Conservatism in Company Reporting*
PI: Dan Stone
Co-PI(s)/Co-I(s): **Nathan Jacobs**, Mark Lauersdorf, Hong Xie
Sponsor: University of Kentucky
Total Award: \$33,315
Duration: 2018–2019
11. *Calibrated Pose Regression Networks*
PI: **Nathan Jacobs**
Sponsor: The Design Knowledge Company / Air Force Research Lab (Wright-Patterson AFB)
Total Award: \$155,700 (Phase 3)
Duration: 2018–2019
12. *Group Travel Grant for the PhD Forum to be Held in Conjunction with IEEE Winter Conference on Applications of Computer Vision*
PI: **Nathan Jacobs**

Sponsor: National Science Foundation (NSF)

Total Award: \$13,625

Duration: 2018–2019

13. *ASER Multi Center Review of Blunt Splenic Trauma: Optimal CT Diagnosis, Characterization*

PI: James Lee (Radiology)

Co-PI(s)/Co-I(s): David Nickels, **Nathan Jacobs**, Emily Slade

Sponsor: American Society of Emergency Radiology

Total Award: \$5,000

Duration: 2018–2019

14. *Mechanism of a Novel Stable Compensatory Cardiac Hypertrophy Model*

PI: Jonathan Satin

Co-PI(s)/Co-I(s): Douglas Andres, **Nathan Jacobs**, Moriel Vandsburger

Sponsor: American Heart Association

Total Award: \$154,000

Duration: 2016–2018

15. *NIP: GeoLookbook: Modeling Worldwide Human Visual Appearance*

PI: **Nathan Jacobs**

Sponsor: National Geospatial-Intelligence Agency (NGA)

Total Award: \$299,204

Duration: 2014–2018

16. *Crossview ConvNets for Near/Remote Sensing*

PI: **Nathan Jacobs**

Sponsor: Google

Total Award: \$46,209

Duration: 2016–2017

17. *WALDO: Wide Area Localization of Depicted Objects*

PI: **Nathan Jacobs**

Sponsor: Object Video / Intelligence Advanced Research Projects Activity (IARPA)

Total Award: \$373,395

Duration: 2012–2016

18. *CSSG: ContextualEyes: A Context-Aware Surveillance System*

PI: **Nathan Jacobs**

Sponsor: Defense Advanced Research Projects Agency (DARPA)

Total Award: \$743,131

Duration: 2011–2015

19. *Image-Net: Discriminatory Imaging and Network Advancement for Missiles, Aviation, and Space*

PI: Brent Seales

Co-PI(s)/Co-I(s): Ken Calvert, James Griffioen, Jane Hayes, **Nathan Jacobs**, Victor Marek, Thomas Seigler, Suzanne Smith, Miroslaw Truszcynski, Ruigang Yang

Sponsor: United States Army Space and Missile Defense Command / United States Army Forces Strategic Command

Total Award: \$2,092,905

Duration: 2011–2012

Donations

1. <i>Google Cloud Compute Research Credits</i> Sponsor: Google	Amount/Value: \$5,000	PI: Nathan Jacobs Date: Aug 2018
2. <i>NVIDIA Titan X GPU</i> Sponsor: NVIDIA	Amount/Value: \$778	PI: Nathan Jacobs Date: Oct 2016
3. <i>AWS Research Education Grant</i> Sponsor: Amazon	Amount/Value: \$5,000	PI: Nathan Jacobs Date: Jul 2015
4. <i>NVIDIA Tesla K40 GPU</i> Sponsor: NVIDIA	Amount/Value: \$3,900	PI: Nathan Jacobs Date: Dec 2014

6 Talks

1. “From Social Media to Sanderlings: Multimodal Tools for Understanding and Mapping Biodiversity” (Keynote), Dec 2025, Workshop on Imageomics @ NeurIPS, San Diego, CA
2. “Learning to Map Anything, Anywhere, Anytime” (Sanghi College of Engineering Dean’s Special Invited Speaker), Dec 2025, Northern Arizona University, Flagstaff, AZ
3. “Learning to Map Anything, Anywhere, Anytime” (Invited Talk), Nov 2025, National Geospatial-Intelligence Agency, St. Louis, MO
4. “(Almost) Two Decades of Vision Across Altitudes” (Keynote), Oct 2025, Workshop on 3D-VAST From street to space: 3D Vision Across Altitudes (ICCV 2025 Workshop), Honolulu, Hawaii
5. “World Foundation Models for GeoAI” (Expert Panel), Sep 2025, Trillion Pixel Challenge Workshop, St. Louis, MO
6. “Toward Agentic GEOINT” (Lightning Talk), May 2025, GEOINT Symposium, St. Louis, MO
7. “Mapping and Multimodal Embeddings for Biodiversity” (Invited Talk), Mar 2025, Beyond Counting Trees (Bezos Earth Fund), Washington, DC
8. “Learning to Map Anything, Anywhere, Anytime” (Keynote), Nov 2023, The International Conference on Digital Image Computing: Techniques and Applications (DICTA), Port Macquarie, Australia
9. “Learning to Map Anything, Anywhere, Anytime” (Keynote), Oct 2023, ACM Multimedia Workshop (UAVs in Multimedia: Capturing the World from a New Perspective), Ottawa, Canada
10. “A Cost-Sensitive Approach To Dimensionality Reduction for Multispectral Imagery”, Jul 2023, International Geoscience and Remote Sensing Symposium, Pasadena, CA
11. “Explorations in Self-Supervised Learning for Change Detection”, Jul 2023, International Geoscience and Remote Sensing Symposium, Pasadena, CA
12. “Toward Dynamic Multimodal Remote Sensing: From Buildings and Populations to Soundscapes and Aesthetics”, Apr 2023, Living Earth Collaborative, Washington University, St. Louis, MO
13. “Domain-Inspired Deep Learning for Computer Vision, Remote Sensing, and Medical Imaging”, Oct 2022, Imaging Science Seminar, Washington University, St. Louis, MO
14. “Computer Vision for Multimodal Remote Sensing”, Aug 2022, WashU Geospatial Working Group Research Workshop, Washington University, St. Louis, MO

15. “A Structure-Aware Method for Direct Pose Estimation”, Jan 2022, IEEE Winter Conference on Applications of Computer Vision (WACV), Waikoloa Village, HI
16. Panelist for “Non-Traditional Careers in Computer Science” Nov 2021, ACM-W, University of Kentucky, Lexington, KY
17. “Mapping the Visual World Using Webcams, Cell Phones, and Satellites”, Oct 2021, Washington University in St. Louis, MO
18. “Learning Geo-Temporal Scene Models from Webcams, Cell Phones, and Satellites” (Keynote), Oct 2021, International Workshop on Distributed Smart Cameras, an ICCV Workshop (virtual)
19. “Mapping the Visual World Using Webcams, Cell Phones, and Satellites”, Dec 2020, University of Campinas, Unicamp, Brazil (virtual)
20. “Exploring the Intersection of Localization, Mapping, and Image Understanding” (Keynote), Aug 2020, ECCV Workshop on Long-Term Visual Localization (virtual)
21. “Deep Convolutional Neural Networks: Foundations to Frontiers (a 2-day short course)”, Mar 2020, Brazilian Space Agency (INPE), Sao Jose dos Campos, Brazil
22. “What, Where, and When: Mapping the World Using Webcams, Cell Phones, and Satellites”, Mar 2020, Brazilian Space Agency (INPE), Sao Jose dos Campos, Brazil
23. “Learning to Map Visual Appearance”, Feb 2020, Keeping Current Seminar, University of Kentucky (Computer Science), Lexington, KY
24. “Learning to Map Visual Appearance”, Jan 2020, Wageningen University, Netherlands
25. “What, Where, and When: Mapping the World Using Webcams, Cell Phones, and Satellites”, Nov 2019, University of Kentucky (Forestry), Lexington, KY
26. “Learning to Map the Visual World”, Jul 2019, Wright State University, Dayton, OH
27. “Understanding Places Using Ground-Level and Overhead Views” (Keynote), May 2019, Kentucky Geological Society (Annual Symposium), Lexington, KY
28. “Understanding Places Using Ground-Level and Overhead Views”, Feb 2019, Notre Dame University, South Bend, IN
29. “A Generative Model of Worldwide Facial Appearance” (Keynote), Jan 2019, Workshop on Demographic Variations in Performance of Biometric Algorithms, Waikoloa Village, HI
30. “A Generative Model of Worldwide Facial Appearance”, Jan 2019, IEEE Winter Conference on Applications of Computer Vision, Waikoloa Village, HI
31. “A Weakly Supervised Approach for Estimating Spatial Density Functions from High-Resolution Satellite Imagery”, Nov 2018, ACM SIGSPATIAL, Seattle, WA
32. “Understanding Places Using Ground-Level and Overhead Views”, Oct 2018, Commonwealth Computational Summit, Lexington, KY
33. “GeoLookbook: Modeling Worldwide Human Visual Appearance (Year 4)”, Sep 2018, National Academy of Sciences (IC Academic Research Symposium), Washington, DC
34. “Understanding Places Using Ground-Level and Overhead Views”, Aug 2018, Oak Ridge National Lab, Oak Ridge, TN

35. "WhatGoesWhere: Predicting Object Distributions from Above", Jul 2018, IGARSS, Valencia, Spain
36. "Building World Models for Situated Training and Planning", May 2018, Air Force Science and Technology 2030 Workshop, Bloomington, IN
37. "Recent Advances in Image Understanding", May 2018, DASC, Lexington, KY
38. "(Tutorial) Recent Advances in Deep Learning: Fusing Overhead and Ground-Level Views for Remote Sensing", April 2018, USGIF Annual Symposium, Tampa, FL
39. "Understanding Places Using Ground-Level and Overhead Views", Feb 2018, CVPR Area Chair Meeting, Toronto, Canada
40. "GeoLookbook: Modeling Worldwide Human Visual Appearance (Year 3)", Sep 2017, National Academy of Sciences (IC Academic Research Symposium), Washington, DC
41. "GPU Accelerated Computer Vision, Remote Sensing, and Machine Learning", Aug 2017, Kentucky Geological Service, Lexington, KY
42. "Fusing Overhead and Ground-Level Imagery to Improve Scene Understanding", Jul 2017, Planet, San Francisco, CA
43. "Learning about When and Where from Imagery", Jun 2017, Orbital Insight, Mountain View, CA
44. "(Tutorial) Recent Advances in Deep Learning: Fusing Overhead and Ground-Level Views for Remote Sensing", Jun 2017, USGIF Annual Symposium, San Antonio, TX
45. "How Computers See People (extended)", May 2017, CCTS Biomedical Informatics Seminar Series, Lexington, KY
46. "Understanding Places Using Ground-Level and Overhead Views", May 2017, Midwest Vision Meeting, Chicago, IL
47. "How Computers See People", Feb 2017, Suds'n'Science Speaker Series, West Sixth Brewing, Lexington, KY
48. "Learning about When and Where from Imagery", Feb 2017, University of Missouri, Department of Computer Science
49. "Localization, Mapping, and Image Understanding", Feb 2017, USGIF Machine Learning Symposium
50. "Deep Convolutional Neural Networks: Concepts and Examples (in Computer Vision)", Nov 2016, University of Kentucky, Society of Industrial and Applied Mathematics
51. "Crossview Convolutional Networks", Oct 2016, Applied Imagery and Pattern Recognition, Washington, D.C.
52. "GeoLookbook: Modeling Worldwide Human Visual Appearance (Year 2)", Sep 2016, National Academy of Sciences (IC Academic Research Symposium), Washington, DC
53. "Deep Convolutional Neural Networks: Concepts and Examples", Jul 2016, University of Kentucky: Systems Biology and Omics Integration Seminar
54. "Crossview Methods for Localization and Mapping", Jun 2016, IEEE CVPR Workshop on "Vision from Satellite to Street" (invited talk)
55. "A Fast Method for Estimating Transient Scene Properties", Mar 2016, Winter Conference on Applications of Computer Vision, Lake Placid, NY
56. "Novel Cues for Geocalibration", Feb 2016, Indiana University, Bloomington, IN

57. "Novel Cues for Camera Geocalibration", Jan 2016, Uber Advanced Technology Center, Pittsburgh, PA
58. "Novel Cues for Geocalibration: Cloudy Days, Rainbows, and More", Oct 2015, Carnegie Mellon University, Pittsburgh, PA
59. "Using Geotagged Internet Imagery to Understand the World", Sep 2015, Université Laval, Quebec City, Canada
60. "face2gps: Estimating Geographic Location from Facial Features", Sep 2015, International Conference on Image Processing, Quebec City, Canada
61. "GeoLookbook: Modeling Worldwide Human Visual Appearance", Sep 2015, National Academy of Sciences (IC Academic Research Symposium), Washington, DC
62. "Exploring the Geo-Dependence of Human Face Appearance", Mar 2014, Winter Conference on Applications of Computer Vision, Steamboat Springs, CO
63. "Estimating Cloudmaps from Outdoor Image Sequences", Mar 2014, Winter Conference on Applications of Computer Vision, Steamboat Springs, CO
64. "Scene Geometry from Several Partly Cloudy Days", Oct 2013, International Conference on Distributed Smart Cameras, Palm Springs, CA
65. "Unlocking the Potential of the Global Network of Outdoor Webcams", Apr 2013, Rochester Institute of Technology
66. "Geo-temporal Computer Vision: Applications to the NGA", Nov 2011, National Geospatial-Intelligence Agency
67. "Geo-temporal Computer Vision: Applications to the Army", Oct 2011, Army Research Lab
68. "Localizing, Calibrating, and Using Thousands of Outdoor Webcams", Feb 2011, University of North Carolina–Charlotte
69. "Using Clouds Shadows to Infer Scene Structure and Camera Calibration", Jun 2010, CVPR, San Francisco, CA
70. "Passive Vision and The Power of Collective Imaging", Apr 2010, Object Video Inc., Reston, VA
71. "Localizing, Calibrating, and Using Thousands of Outdoor Webcams", Apr 2010, University of Kentucky
72. "Time-Lapse Vision: Localizing, Calibrating, and Using Thousands Outdoor Webcams", Apr 2010, Google, Mountain View, CA
73. "Passive Vision and The Power of Collective Imaging", Jan 2010, Google, Mountain View, CA
74. "Incorporating Domain Constraints in Urban Vehicle Tracking", Nov 2010, University of Missouri, Columbia, MO
75. "Compressive Sensing and Differential Image-Motion Estimation", Mar 2010, ICASSP, Dallas, TX
76. "The Global Network of Outdoor Webcams: Properties and Applications ", Nov 2009, ACM GIS, Seattle, WA
77. "Passive Vision: The Global Webcam Imaging Network", Oct 2009, AIPR, Washington, DC
78. "Calibrating and Using the Global Network of Outdoor Webcams", Aug 2009, ICDSC, Italy
79. "Adventures in Archiving and Using Three Years of Webcam Images", Jun 2009, CVPR Workshop on Internet Vision, Miami, FL
80. "Recent Work: Webcams and Grooves", Aug 2009, Object Video, Reston, VA

81. "Location-Specific Models for Tracking", Jan 2008, WMVC, Copper Mountain, CO
82. "Using natural cues to geo-locate and geo-orient distributed cameras", Jan 2008, VISN, Copper Mountain, CO
83. "Foreground Modeling: The Shape of Things That Came", Feb 2007, WMVC, Austin, Texas

7 Service

University Service

- Washington University in St. Louis (2022–present)
 - 2025–present: Assistant Vice Provost for Digital Transformation
 - 2022–present: Co-Director, Geospatial Research Initiative
 - 2022–present: Research Council, Taylor Geospatial Institute
 - 2023–present: Director of PhD Admissions, Department of Computer Science & Engineering
 - 2023–present: Faculty Technology Advisory Committee, James McKelvey School of Engineering
 - 2023–present: Curriculum Committee, Imaging Science Program
 - 2023–present: Faculty Advisor, WashU Robomaster Club
 - F2024: Faculty Search Committee, Imaging Science Program
 - F2023, F2024: Faculty Search Committee, Computer Science & Engineering Department
 - 2022–2023: Leadership Team, Geospatial Working Group
 - 2022–2023: Strategic Planning Steering Committee, James McKelvey School of Engineering
- University of Kentucky (2010–2022)
 - 2021–2022: Institute for Biomedical Informatics: Steering Committee
 - 2019–2022: Computer Science Department: Executive Committee
 - 2019–2022: College of Engineering: Master Planning/Space Committee
 - 2018–2019, 2020–2022: College of Engineering: Research Advisory Committee
 - 2020–2022: College of Engineering: Graduate Studies Team
 - 2013–2017, 2018–2022: Computer Science Department: Faculty Search Committee
 - 2020–2021: Computer Science Department: Chair Search Committee
 - 2020: College of Engineering: Recruiting Advisory Committee
 - 2018–2019: University Senate (Academic Facilities Committee, Technology Committee)
 - 2017: Member (Information Technology Task Force for Research Enablement and Outreach)
 - 2015–2016: Computer Science Department: ABET Committee
 - 2010–2012, 2015–2016: Computer Science Department: Media and Outreach
 - 2013: Center for Visualization and Virtual Environment: Director Search Committee
 - 2013: Computer Science Department: Chair Search Committee
 - 2012–2013: Computer Science Department: Curriculum Development Committee
 - 2012–2013, 2015: Engineering Day (oral presentation and/or software demonstration)

Professional Service

- Area Chair:
 - IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2018, 2019, 2021, 2023, 2024 (senior), 2025 (lead), 2026 (senior)]
 - European Conference on Computer Vision (ECCV) [2022, 2024 (lead)]
 - IEEE/CVF International Conference on Computer Vision (ICCV) [2023, 2025 (lead)]
 - Conference on Neural Information Processing Systems (NeurIPS) [2024]
 - IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [2014, 2022, 2023]
- Organizing Committees:
 - IEEE/ISPRS Workshop on Large Scale Computer Vision for Remote Sensing Imagery (EARTHVISION) [2019–2023, 2025–2026]
 - Foundational Models Beyond the Visual Spectrum (workshop at IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)) [2026]
 - Doctoral Consortium Co-Chair: IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2017, 2019, 2024, 2025]
 - Industrial/Government Relations Chair: IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [2024]
 - Doctoral Consortium Chair: IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [2018, 2022]
 - Video Proceedings Chair: IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2015]
 - IEEE Workshop on Motion and Video Computing (WMVC) [2011]
- Guest Editor:
 - ISPRS Journal of Photogrammetry and Remote Sensing [2024], Special Issue “Vision Language Models for Remote Sensing Analysis and Interpretation”
 - IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (J-STARS) [2021], Special Issue “Integrating User Generated Contents for Remote Sensing Applications”
 - Elsevier Computer Vision and Image Understanding (CVIU) [2019], Special Issue “Computer Vision for Remote Sensing”
- Panelist:
 - Roundtable Discussion at 1st Workshop on Computer Vision for Earth Observation (CV4EO) Applications 2024 (Hosted as part of IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) 2024)
- Session Chair:
 - IEEE International Geoscience and Remote Sensing Symposium (IGARSS) [2020,2023]
 - IEEE/ISPRS Workshop on Large Scale Computer Vision for Remote Sensing Imagery (EARTHVISION) [2019]
 - IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [2016, 2019, 2022, 2024]
 - IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2018, 2024, 2025]
 - IEEE/ACM International Conference on Distributed Smart Cameras [2013]

- Reviewing for Journals:
 - Proceedings of the National Academy of Sciences [2024]
 - IEEE Transactions on Geoscience and Remote Sensing [2020]
 - ISPRS Journal of Photogrammetry and Remote Sensing [2020]
 - IEEE Transactions on Pattern Analysis and Machine Intelligence [2011×2, 2012, 2018, 2019]
 - ISPRS Journal of Photogrammetry and Remote Sensing [2019]
 - IEEE Transactions on Geoscience and Remote Sensing [2017]
 - IEEE Transactions on Multimedia [2011, 2016]
 - Elsevier Computer Vision and Image Understanding [2010, 2013, 2016×2]
 - IEEE Transactions on Computational Imaging [2016]
 - IEEE Journal on Selected Topics in Remote Sensing [2015]
 - Springer Machine Vision and Applications [2014]
 - IEEE Sensors [2014]
 - Elsevier Image and Vision Computing [2013]
 - IEEE Transactions on Circuits and Systems for Video Technology [2007–2011]
 - IEEE Computer Graphics and Applications [2010]
 - IEEE Transactions on Aerospace and Electronic Systems [2010]
 - Elsevier Computers and Electronics in Agriculture [2010]
 - Cartography and Geographic Information Science [2010]
- Program Committee / Reviewer for:
 - Conferences
 - * International Conference on Learning Representations (ICLR) [2022, 2025]
 - * IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [2021, 2024, 2025]
 - * IEEE International Geoscience and Remote Sensing Symposium (IGARSS) [2020]
 - * British Machine Vision Conference (BMVC) [2020]
 - * IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2006–2017, 2020]
 - * European Conference on Computer Vision (ECCV) [2010, 2014, 2020]
 - * Neural Information Processing Systems (NeurIPS) [2010–2012, 2020]
 - * AAAI Conference on Artificial Intelligence (AAAI) [2020, 2026 (social impact track)]
 - * IEEE/CVF International Conference on Computer Vision (ICCV) [2007, 2009, 2019, 2021]
 - * Asian Conference on Computer Vision (ACCV) [2010, 2016]
 - * IEEE International Conference on Robotics and Automation (ICRA) [2016]
 - * International Conference on Machine Learning (ICML) [2012]
 - * IEEE International Conference on Advanced Video and Signal-Based Surveillance (AVSS) [2010]
 - Workshops
 - * ICLR Workshop on Machine Learning for Remote Sensing [2023]
 - * IEEE/ISPRS Workshop on Large Scale Computer Vision for Remote Sensing Imagery (EARTHVISION) [2017, 2019, 2020]
 - * CVPR Workshop on Photogrammetric Computer Vision [2019]
 - * CVPR Workshop on DeepGlobe Satellite Challenge [2018]

- * ACM International Workshop on Geotagging and Its Applications [2013]
 - * ICCV Workshop on Computer Vision for Converging Perspectives [2013]
 - * IEEE Workshop on Applications of Computer Vision [2012–2013]
 - * ECCV Workshop on Visual Analysis and Geo-Localization of Large-Scale Imagery [2012]
 - * ACM Workshop on Geotagging and Its Applications in Multimedia [2012]
 - * IEEE Workshop on Motion and Video Computation [2009–2011]
- Reviewing for Funding Agencies:
 - Panelist for NSF Information and Intelligent Systems Division [2019]
 - Panelist for NSF Information and Intelligent Systems Division [2018]
 - Panelist for NSF Information and Intelligent Systems Division [2017]
 - Panelist for NSF Division of Industrial Innovation and Partnerships [2016]
 - Panelist for NSF Information and Intelligent Systems Division [2016]
 - Panelist for NSF Information and Intelligent Systems Division [2015]
 - External reviewer for NSF Information and Intelligent Systems Division [2015]
 - External reviewer for Fonds de recherche du Quebec [2014]
 - Advisory Committee for:
 - 1st Workshop on Computer Vision for Earth Observation (CV4EO) Applications 2024 (Hosted as part of IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) 2024)

Memberships

- Senior Member: Institute of Electrical and Electronics Engineers
- Full Member: British Machine Vision Association and Society for Pattern Recognition
- Affiliate Member: International Association of Pattern Recognition

8 Teaching and Mentoring

Courses Taught

The following list summarizes the traditional, classroom courses I have taught:

- *Advances in Computer Vision*, CSE 659a/5519, [F2024,F2025], Washington University in St. Louis
- *Computer Vision*, CSE 559a/5509, [S2023, S2024, S2025, S2026], Washington University in St. Louis
- *Machine Learning*, CS 460g, [F2012, F2013, F2014, F2016, F2018, F2019], University of Kentucky
- *Computer Vision*, CS 636, [S2011, S2013, S2017], University of Kentucky
- *Learning-Based Methods for Computer Vision*, CS 585/685, [S2015], University of Kentucky
- *Advanced Topics in Computer Science: Machine Learning*, CS 685, [S2012], University of Kentucky
- *Intermediate Topics in Computer Science: Computational Photography*, CS 585, [F2010, F2011], University of Kentucky
- *Theory of Computation*, CECS 341, [F2002], University of Missouri

Mentoring

Postdoctoral Scholars

1. Benjamin Brodie (Ph.D. Mathematics, University of Kentucky) Dates: 2020–2022
Research Focus: Change Detection, Object Tracking, Re-Identification, Metric Learning
2. Adeel Ahmad (Ph.D. Geomatics, University of Punjab—Lahore) Dates: 2023–2024
Research Focus: Remote Sensing, Deep Learning, Land-Use Modeling
3. [Subash Khanal](#) Dates: 2025–present
Research Focus: Geospatial Representation Learning, Remote Sensing

Ph.D. Students

1. [Paul Mihail](#) [*co-chair* with Judy Goldsmith] Degree: Ph.D., Computer Science
Title: Visualizing and Predicting the Effects of Rheumatoid Arthritis on Hands Date: May 2014
Employment: Professor, Computer Science, Valdosta State University
2. [Mohammad T. Islam](#) Degree: Ph.D., Computer Science
Title: Analyzing the Geo-Dependence of Human Face Appearance and Its Applications Date: Jul 2016
Employment: Associate Professor, Computer Science, Southern Connecticut State University
3. [Hamid Hamraz](#) Degree: Ph.D., Computer Science
Title: Computational Forest Modeling using Airborne Remote Sensing LiDAR Date: Apr 2018
Employment: Computational and Data Scientist, Microsoft
4. [Scott Workman](#) Degree: Ph.D., Computer Science
Title: Leveraging Overhead Imagery for Localization, Mapping, and Understanding Date: Apr 2018
Employment: Research Scientist, DZYNE Technologies
5. Menghua “Ted” Zhai Degree: Ph.D., Computer Science
Title: Deep Probabilistic Models for Camera Geo-Calibration Date: Dec 2018
Employment: Computer Vision Engineer, MatrixTime (startup)
6. [Zach Bessinger](#) Degree: Ph.D., Computer Science
Title: Modeling and Mapping Location-Dependent Human Appearance Date: Dec 2018
Employment: Senior Applied Scientist, Zillow
7. [Tawfiq Salem](#) Degree: Ph.D., Computer Science
Title: Learning to Map the Visual and Auditory World Date: Jul 2019
Employment: Visiting Assistant Professor, Computer and Information Technology, Purdue University
8. [Gongbo Liang](#) Degree: Ph.D., Computer Science
Title: Clinical-Inspired Multi-Modal Deep Learning Medical Imaging Analysis Date: Oct 2020
Employment: Assistant Professor, Computer Science, Eastern Kentucky University
9. [Usman Rafique](#) [*co-chair* with Samson Cheung] Degree: Ph.D., Electrical Engineering
Title: Weakly Supervised Learning for Multi-Image Synthesis Date: Jul 2021
Employment: Research Scientist, Kitware Inc.
10. [Hunter Blanton](#) Degree: Ph.D., Computer Science
Title: Revisiting Absolute Pose Regression Date: Aug 2021
Employment: Senior Computer Vision Engineer, Yembo (startup)

11. Connor Greenwell
 Title: Probabilistic Cross-Domain Representation Learning
 Employment: Senior R&D Engineer, Kitware Inc.
 Degree: Ph.D., Computer Science
 Date: Jun 2022
12. Yu Zhang
 Title: Multimodal Domain Generalization
 Employment: Assistant Professor, Computer Science, Boise State University
 Degree: Ph.D., Computer Science
 Date: Mar 2023
13. Xin Xing [*co-chair* with Ai-Ling Lin]
 Title: Structured Attention for Image Analysis
 Employment: Assistant Professor, University of Nebraska-Omaha
 Degree: Ph.D., Computer Science
 Date: Nov 2023
14. Subash Khanal
 Title: Multimodal Representation Learning for Geospatial Soundscape Mapping
 Degree: Ph.D., Computer Science
 Date: Jul 2025
15. Lydia Reader [*co-chair* with Ross Hammond]
 Title: Toward an Understanding of Heterogeneous Effects of Walkability on Children's Physical Activity
 Date: May 2026 (est)
 Degree: Ph.D., Computational & Data Sciences
16. Aayush Dhakal
 Title: TBD
 Degree: Ph.D., Computer Science
 Date: Dec 2026 (est)
17. Srikanth Sastry
 Title: Task-Aligned Multimodal Representation Learning
 Degree: Ph.D., Imaging Science
 Date: Dec 2026 (est)
18. Michael Lanier [*co-chair* with Yevgeniy Vorobeychik]
 Title: TBD
 Degree: Ph.D., Computer Science
 Date: May 2027 (est)
19. Zhexiao Xiong
 Title: TBD
 Degree: Ph.D., Computer Science
 Date: May 2027 (est)
20. Alex Wollam
 Title: TBD
 Degree: Ph.D., Computer Science
 Date: TBD
21. Nia Hodges
 Title: TBD
 Degree: Ph.D., Electrical and Systems Engineering
 Date: TBD
22. Tong Li [*co-chair* with Joshua Oltmanns]
 Title: TBD
 Degree: Ph.D., Computational & Data Sciences
 Date: TBD
23. Eric Xing
 Title: TBD
 Degree: Ph.D., Computer Science
 Date: TBD
24. Daniel Cher
 Title: TBD
 Degree: Ph.D., Computational & Data Sciences
 Date: TBD
25. Carlos Lopez de la Cerdá
 Title: TBD
 Degree: Ph.D., Computational & Data Sciences
 Date: TBD
26. Feng Qiao
 Title: TBD
 Degree: Ph.D., Computer Science
 Date: TBD
27. Tianyi Gao
 Title: TBD
 Degree: Ph.D., Computer Science
 Date: TBD
28. Danni Beaulieu
 Title: TBD
 Degree: Ph.D., Computer Science
 Date: TBD

Visiting Ph.D. Students

1. Patrick Tutzauer (University of Stuttgart)
Topic: Geospatial Trajectory Modeling Dates: Fall 2017
2. Raian Vargas Maretto (INPE, Brazil)
Topic: Deforestation Detection Dates: 2018–2019
3. Rafael Padilha (UNICAMP, Brazil)
Topic: Image Forensics Dates: 2019–2020
4. Alex Levering (Wageningen University)
Topic: Landscape Quality Assessment Dates: 2022–2023
5. Clemens Mosig (Leipzig University)
Topic: Deep Learning for Tree Mortality Detection Dates: 2025

Masters Students

1. Feiyu Shi
Title: Principal Component Analysis For Multi-size Images Degree: MS, Computer Science
Date: Dec 2013
2. Ryan Baltenberger
Title: Estimating Transient Scene Attributes Using Deep Convolutional Neural Networks Degree: MS, Computer Science
Date: May 2016
3. William “Derek” Jones [*co-chair* w/ Sally Ellingson]
Title: Scalable Feature Selection and Extraction with Applications in Kinase Polypharmacology Degree: MS, Computer Science
Date: May 2018
4. Weilian “William” Song
Title: Image-Based Roadway Assessment using Convolutional Neural Networks Degree: MS, Computer Science
Date: May 2019
5. Armin Hadzic
Title: Estimating Free-Flow Speed with LiDAR and Overhead Imagery Degree: MS, Computer Science
Date: May 2020
6. David Jones
Title: Intensity Harmonization for Airborne LiDAR Degree: MS, Computer Science
Date: May 2021
7. Jacob Birge
Title: A Cost-Sensitive Approach To Multimodal Fusion Degree: MS, Computer Science
Date: Dec 2021
8. Alex Greene
Title: Using Aerial Imagery to Estimate Ground-level Object Distributions Degree: MS, Computer Science
Date: May 2023
9. Alex Wollam
Title: Exploring Sequential Outdoor Panorama Synthesis with Diffusion Models Degree: MS, Computer Science
Date: Jul 2023
10. Hongzhang Wang
Title: Monocular Depth Estimation Degree: MS, Computer Science
Date: Dec 2023
11. Nia Hodges
Title: Wide-Area Image Localization Degree: MS, Engineering Data Analytics & Statistics
Date: May 2024
12. Wanzhou Liu
Title: High Efficiency Generalizable Driving World Model Degree: MS, Computer Science
Date: Fall 2024

13. Lunchi Guo Degree: MS, Computer Engineering
Title: Deep Learning-Based Coordinate Prediction from Medical Fluoroscopic Images for Improved Radiation Date: Fall 2024
14. Lunchi Guo Degree: MS, Computer Engineering
Title: MedVid-Align: Intelligent Analysis of Medical Procedure Videos Date: Spring 2025
15. Myan Sudharsanan Degree: MS, Computer Engineering
Title: VisionLLMs in the Automotive Domain: Finegrained Details of Traffic Signs and Passenger Vehicles Date: Spring 2025
16. Ethan Weilheimer Degree: MS (thesis), Computer Science
Title: Partially Supervised Reinforcement Learning for GPS-Denied Navigation Date: Spring 2025
17. Vinh Pham Degree: MS, Engineering Data Analytics and Statistics
Title: Automated Satellite Imagery Analysis for Global Agricultural Field Boundary Detection Date: Spring 2025
18. Shuhan (Steven) Zhang Degree: MS, Computer Science
Title: Query-Specific Feature Transformation for Fine-Grained Image Retrieval Date: Spring 2025
19. Jingyun Ma Degree: MS, Computer Science
Title: Large Language Models for MCNP Input Generation Date: Spring 2025
20. Jackson McCall Degree: MS, Computer Science
Title: GeoSynth++: Large-Scale Satellite Image Synthesis Date: Spring 2025
21. Haris Naveed Degree: MS, Computer Science
Title: Deep Learning for Tree Canopy Height Estimation Date: Spring 2025
22. Yitao Yu Degree: MS, Computer Science
Title: Probabilistic Cross-Modal Embeddings Date: Fall 2025
23. Rukai Gao Degree: MS, Computer Science
Title: 3D Laryngeal Tumor Mapping via Near-Field SLAM Date: Spring 2026
24. Mohammad Rouie Miab Degree: MS, Computer Science
Title: Enhancing Semantic Precision in Text-to-Image Generation Date: Spring 2026

Undergraduate Research Students

1. Jim Knochelmann Dates: 2011–2012
Title: User-Tools for Aerial Image Registration
2. Kyle Kolpek Dates: 2012
Title: Aerial Image Registration
3. Noora Aljabi Dates: 2013
Title: Using Flickr to Map Phenological Trends
4. J. David Smith Dates: 2013–2015
Title: User-in-the-loop Camera Calibration
5. Angelo Stekardis Dates: 2014–2015
Title: Understanding Facial Expressions

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| 6. Ryan Baltenberger | Dates: 2012–2015 |
| Title: Understanding Outdoor Scene Appearance | |
| 7. Connor Greenwell | Dates: 2014–2016 |
| Title: Interactive Methods for Aerial Imagery Understanding | |
| 8. Sam Davidson | Dates: 2016–2017 |
| Title: Applications of Generative Adversarial Networks to Social Media Imagery | |
| 9. Aaron Mueller | Dates: 2018 |
| Title: Deep Learning for Educational Data | |
| 10. Weilian Song | Dates: 2016–2019 |
| Title: Applications of Deep Convolutional Neural Networks to Geometric Computer Vision | |
| 11. Yuhan Long | Dates: 2019 |
| Title: Deep Learning for Medical Imaging | |
| 12. Thomas Barber | Dates: 2019 |
| Title: Deep Learning for Remote Sensing | |
| 13. Sean Grate | Dates: 2019–2020 |
| Title: Deep Learning for Point Clouds | |
| 14. Shashank Bhatt | Dates: 2020–2022 |
| Title: Multi-Object Tracking | |
| 15. Evan Bolton | Dates: 2021 |
| Title: Generating Synthetic Training Data using a Game Engine | |
| 16. Julia Stekardis | Dates: 2021–2022 |
| Title: Large-Scale Image Geo-Localization | |
| 17. Gareth Walker | Dates: 2022 |
| Title: Remote Sensing for Social Good | |
| 18. Matthew Mitchell | Dates: 2022 |
| Title: Remote Sensing for Social Good | |
| 19. Cohen Archbold | Dates: 2020–2022 |
| Title: Automatic Real-Estate Price Estimation | |
| 20. Brian Wei | Dates: Fall 2025 |
| Title: Stereo Video Analysis | |
| 21. Dev Gupta | Dates: Fall 2025 |
| Title: Temporally-Consistent Stereo Video Generation | |
| 22. Ice Cui | Dates: Fall 2025 |
| Title: Leveraging Diffusion Transformers to Improve GeoSynth Scalability and Cross-Scale Consistency | |

High School Research Students

1. Ryan Baltenberger
Title: Gesture-Based User Interaction with the Microsoft Kinect
Dates: 2011–2012
2. Alex Lucas
Title: Evaluation of Automatic Face Detection Methods
Dates: 2014–2013
3. Andrew Tapia
Title: Estimating Surface Reflectivity
Dates: 2014–2015
4. Andrew Albrecht
Title: Mapping Social Media Imagery
Dates: 2016–2017
5. C. J. Labianca
Title: Evaluation of Optimization Algorithms for Deep Convolutional Neural Networks
Dates: 2016–2017
6. Ryan Landry
Title: RRADCL: Rapid Roadway Assessment with Deep Convolutional Learning
Dates: 2017–2018
7. Cohen Archbold
Title: Photo-Geolocation using Convolutional Neural Networks
Dates: 2017–2018
8. Nicole Wong
Title: Learning-Based View Synthesis
Dates: 2019–2020
9. Chris Wang
Title: Multimodal Medical Imaging for Alzheimer’s Disease Classification
Dates: 2019–2021
10. William Greenlee
Title: Deep Learning for Computer Vision
Dates: 2021–2022
11. Krishna Bhatraju
Title: Deep Motion Estimation
Dates: 2021–2022

Graduate Committees (as regular member or external examiner)

1. Edwin Prem Kumar Sathiyamoorthy
Role: member
Title: Global Change Reactive Background Subtraction
Degree: M.S., Electrical Engineering
Date: Spring 2011
2. Ju Shen
Role: member
Title: Computational Multimedia for Video Self Modeling
Degree: Ph.D., Electrical Engineering
Date: Spring 2014
3. Hasan Sajid
Role: member
Title: A Universal Background Subtraction System
Degree: M.S., Electrical Engineering
Date: Summer 2014
4. Chenxi Zhang
Role: member
Title: Depth-assisted Image Segmentation, Enhancement and Visualization
Degree: Ph.D., Computer Science
Date: Fall 2014
5. Mao Ye
Role: member
Title: 3D Reconstruction and Motion Analysis of Deformable Objects with Consumer Depth Cameras
Degree: Ph.D., Computer Science
Date: Fall 2014

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| 6. | Yan Huang | Degree: Ph.D., Computer Science |
| | Role: member | Date: Fall 2014 |
| | Title: Novel Computational Methods for Transcript Reconstruction and Quantification using RNA-SEQ Data | |
| 7. | Shaoceng Wei | Degree: Ph.D., Statistics |
| | Role: outside examiner | Date: Spring 2015 |
| | Title: Multi-state Models for Interval Censored Data with Competing Risk | |
| 8. | Bo Fu | Degree: Ph.D., Computer Science |
| | Role: member | Date: Spring 2015 |
| | Title: Towards Intelligent Telerobotics: Visualization and Control of Remote Robot | |
| 9. | Harikrishnan Unnikrishnan | Degree: Ph.D., Electrical Engineering |
| | Role: member | Date: Fall 2015 |
| | Title: Analysis of Vocal Fold Kinematics using High Speed Video | |
| 10. | Sean Karlage | Degree: M.S., Computer Science |
| | Role: member | Date: Spring 2016 |
| | Title: Diachronic Volume Registration for Analysis of Antiquities | |
| 11. | Hasan Sajid | Degree: Ph.D., Electrical Engineering |
| | Role: member | Date: Summer 2016 |
| | Title: Robust Background Subtraction for Moving Cameras and their Applications in Ego-vision Systems | |
| 12. | Stanley Rosenbaum | Degree: M.S., Computer Science |
| | Role: member | Date: Fall 2016 |
| | Title: A method for presenting volume and color of 3D objects via audio for the visually impaired | |
| 13. | DhiShankar Bhattacharya | Degree: M.S., Computer Science |
| | Role: member | Date: Spring 2017 |
| | Title: Analyzing Sybil Attacks and Similar Phenomena in Twitter Data | |
| 14. | Wesley Hough | Degree: Ph.D., Computer Science |
| | Role: outside examiner | Date: Spring 2017 |
| | Title: On Independence, Matching, and Homomorphism Complexes | |
| 15. | Qingguo Xu | Degree: M.S., Computer Science |
| | Role: member | Date: Spring 2017 |
| | Title: 3D Body Tracking using Deep Learning | |
| 16. | Xiaofei Zhang | Degree: M.S., Computer Science |
| | Role: member | Date: Summer 2017 |
| | Title: Mammogram and Tomosynthesis Classification Using Convolutional Neural Networks | |
| 17. | Yajie Zhao | Degree: Ph.D., Computer Science |
| | Role: member | Date: Fall 2017 |
| | Title: 3D Human Face Reconstruction and 2D Appearance Synthesis | |
| 18. | Po-Chang Su | Degree: Ph.D., Electrical Engineering |
| | Role: member | Date: Fall 2017 |
| | Title: Real-time Capture and Rendering of Physical Scene with an Efficiently Calibrated RGB-D Camera Network | |
| 19. | Anthony Rios | Degree: Ph.D., Computer Science |
| | Role: member | Date: Summer 2018 |
| | Title: Deep Neural Networks for Multi-Label Text Classification: Application to Coding Electronic Medical Records | |

20. Ethan Welty (University of Colorado–Boulder)
 Role: member
 Title: High-Precision Photogrammetry for Glaciology
- Degree: Ph.D., Environmental Studies
 Date: Summer 2018
21. Yannick Hold-Geoffroy (Laval University, Quebec, CA)
 Role: member
 Title: Learning Geometric and Lighting priors from Natural Images
- Degree: Ph.D., Computer Science
 Date: Summer 2018
22. Nkiruka Uzuegbunam
 Role: member
 Title: Self-Image Multimedia Technologies for Feedforward Observational Learning
- Degree: Ph.D., Electrical Engineering
 Date: Oct 2018
23. Nam Vo (Georgia Institute of Technology)
 Role: member
 Title: Image Geolocalization with Deep Learning
- Degree: Ph.D., Computer Science
 Date: Spring 2019
24. Jinping Zhuge
 Role: outside examiner
 Title: Boundary layers in periodic homogenization
- Degree: Ph.D., Math
 Date: Spring 2019
25. Ryan Zembrodrt
 Role: member
 Title: Open-World Story Generation with Sequence-to-Sequence and Hierarchical Recurrent Encoder-Decoder Models
- Degree: M.S., Computer Science
 Date: Spring 2019
26. Jonathan Dingess
 Role: member
 Title: Epsilon-Superposition and Truncation Dimension in Average and Probabilistic Settings for Infinite-Variate Linear Problems
- Degree: M.S., Computer Science
 Date: Spring 2019
27. Genghis Goodman
 Role: member
 Title: A Machine Learning Approach to Artificial Floorplan Generation
- Degree: M.S., Computer Science
 Date: Summer 2019
28. Xinxin Zuo
 Role: member
 Title: Depth Enhancement and Surface Reconstruction with RGB-D sequence
- Degree: Ph.D., Computer Science
 Date: Oct 2019
29. Sifei Han
 Role: member
 Title: Text Mining Methods for Analyzing Online Health Information and Communication
- Degree: Ph.D., Computer Science
 Date: Fall 2019
30. Shivangi Srivastava (Wageningen University, Netherlands)
 Role: member
 Title: Mapping of urban landuse and landcover with multiple sensors: joining close and remote sensing with deep learning
- Degree: Ph.D., Computer Science
 Date: Feb 2020
31. Raian Maretto (National Institute for Space Research)
 Role: member
 Title: Deep Learning techniques applied to classification of Remote Sensing Images
- Degree: Ph.D., Geoinformation Science
 Date: Feb 2020
32. Kyle Helfrich
 Role: member
 Title: Orthogonal Recurrent Neural Networks and Batch Normalization in Deep Neural Networks
- Degree: Ph.D., Math
 Date: Spring 2020

33. Subash Khanal
Role: member
Title: Mispronunciation Detection and Diagnosis in Mandarin Accented English Speech

34. Narjes Bozorg
Role: member
Title: Articulatory-Wavenet: Deep Autoregressive Model for Acoustic-to-Articulatory Inversion

35. Céline Portenier (University of Bern)
Role: external referee
Title: High-resolution snow cover retrieval using public webcams

36. Ahmed Nassar (IRISA, Université Bretagne Sud, Vannes)
Role: external referee
Title: Learning to map street-side objects using multiple views

37. Alireza Shirvani
Role: member
Title: Personality and Emotion for Virtual Characters in Strong-story Narrative Planning

38. Sajad Javadinasab Hormozabad
Role: member
Title: Artificial Intelligence and Soft Computing in Smart Structural Systems

39. Chengxi Li
Role: member
Title: Supporting Stylized Language Models using Multi-Modality Features

40. Tarannum Shaila Zaman
Role: member
Title: An Automated Framework to Debug System-Level Concurrency Failures

41. David Adeniji
Role: member
Title: Establishing a Digital Process Twin for Aerospace Alloy Machining using In-situ Process Characterization and Physics Embedded Machine Learning Models

42. Eike Jens Hoffmann (Technical University of Munich)
Role: reviewer
Title: Predicting Building Functions on Large Scale by Fusing Social Media and Remote Sensing Data

43. Arnab Sarkar
Role: member
Title: Understanding the Physics of Galaxy Clusters Out to their Virial Radii and Beyond

44. Yuan Liu
Role: member
Title: Skeleton-Based Analysis of Melt Networks

45. Aiden McIlraith
Role: member
Title: Spatial Transcriptome Visualizer

46. Zhou Chu
Role: member
Title: Adapting at time series machine learning models to a real informatics pipe

47. Zihao Zou	Degree: M.S., Computer Science Date: Fall 2022
Role: member	
Title: Deep Model-Based Architectures using Explicit Regularizers for Computational Imaging	
48. Ashutosh Timilsina	Degree: Ph.D., Computer Science Date: Spring 2023
Role: member	
Title: Peer-to-peer Energy Trading in Smart Residential Environment with User Behavioral Modeling	
49. Nan Huang	Degree: M.S., Computer Science Date: Spring 2023
Role: member	
Title: Toward Continuous Regularizer for Imaging Inverse Problems	
50. Md Selim	Degree: Ph.D., Computer Science Date: Spring 2023
Role: member	
Title: Deep Learning Models for CT Image Standardization	
51. Di Huang	Degree: M.S., Computer Science Date: Spring 2023
Role: member	
Title: Deep Neural Networks for Infant Pose Estimation	
52. Peizhen Tong	Degree: M.S., Computer Science Date: Spring 2023
Role: member	
Title: Adversarial Patch Attacks on Deep Reinforcement Learning	
53. David Sarpong	Degree: M.S., Computer Science Date: Spring 2023
Role: member	
Title: Adversarial Defenses against Interpolation Attacks on Semi-Supervised Learning Systems	
54. Yihang Xu	Degree: M.S., Computer Science Date: Spring 2023
Role: member	
Title: Real-Time Action Segmentation in a Smart Kitchen System	
55. Stephen Parsons	Degree: Ph.D., Computer Science Date: Summer 2023
Role: member	
Title: Hard-Hearted Scrolls: A Noninvasive Method for Reading the Herculaneum Papyri	
56. Brian Chao	Degree: M.S., Computer Science Date: Summer 2023
Role: member	
Title: Adversarial Attacks on AI Systems in Medical Applications	
57. Chang Ti	Degree: M.S., Computer Science Date: Fall 2023
Role: member	
Title: Handwritten Digit Recognition Web Plugin	
58. Emma McMillian	Degree: M.S., Computer Science Date: Fall 2023
Role: member	
Title: Convolutional Neural Networks for Hyperspectral Image-to-Image Microscopy Translation	
59. Fiona Xu	Degree: M.S., Computer Science Date: Fall 2023
Role: member	
Title: Adversarial Attack on Graph Embeddings from Text Dataset	
60. Kyle Montgomery	Degree: M.S., Computer Science Date: Spring 2024
Role: member	
Title: Exploring the Reasoning Abilities of Large Language Models	

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| 61. | Joshua Tang
Role: member
Title: Autonomous Vehicle Object Classification with Uncertainty | Degree: M.S., Computer Science
Date: Spring 2024 |
| 62. | Patrick Lynch
Role: member
Title: An Automated System for Detecting Errors in Oatmeal-Making Research Task | Degree: M.S., Computer Science
Date: Spring 2024 |
| 63. | Owen Ma
Role: member
Title: Towards Verified Vision-Based Neural Network Controllers for Autonomous Lane-Following | Degree: M.S., Computer Science
Date: Fall 2024 |
| 64. | Minoo Hosseinzadeh
Role: member
Title: Smart QoS-Aware Resource Management For Edge Intelligence Systems | Degree: Ph.D., Computer Science
Date: Fall 2024 |
| 65. | Junlin Wu
Role: member
Title: Trustworthy Autonomy Through Robust Control and Alignment | Degree: Ph.D., Computer Science
Date: Spring 2025 |
| 66. | Evin Jaff
Role: member
Title: SwiftFake: Real-Time Defense Against Deepfake Calls | Degree: M.S., Computer Science
Date: Fall 2024 |
| 67. | Yin Li
Role: member
Title: 3D Analysis of Spatial Transcriptome | Degree: M.S., Computer Science
Date: Fall 2024 |
| 68. | Sizhe Zhang
Role: member
Title: ProofTutor: LLM-based formal math proving model | Degree: A.M., Statistics
Date: Fall 2024 |
| 69. | Ye Htet
Role: member
Title: System Design and Task Scheduling for Real-Time Scientific Sensing Applications in Space | Degree: Ph.D., Computer Science
Date: Fall 2024 |
| 70. | Zifan Wang
Role: member
Title: GCHP Workload Balancing | Degree: M.S., Computer Science
Date: Spring 2025 |
| 71. | Yuxuan Yang
Role: member
Title: Training Safety Filters for Safe Control with Partial Observed and Un-labeled Data | Degree: M.S., Computer Science
Date: Spring 2025 |
| 72. | Haris Naveed
Role: chair
Title: Deep Leraning for Tree Canopy Height Estimation | Degree: M.S., Computer Science
Date: Spring 2025 |
| 73. | Sheng-Chieh Lin (University of Kentucky)
Role: member
Title: Machine Learning for Mapping and Understanding Galaxy Clusters | Degree: Ph.D., Physics
Date: Spring 2025 |
| 74. | Hao Liu
Role: member
Title: Toward Graph Foundation Models: Few-shot and Zero-shot Learning on Graphs | Degree: Ph.D., Computer Science
Date: Spring 2025 |

75. Yiwen Ju
Role: member
Title: Geometric Modeling through Multiple Implicit Functions
Degree: Ph.D., Computer Science
Date: Fall 2025
76. Morris Alper (Tel Aviv University)
Role: member
Title: Multimodal Learning for High-Level Semantic Understanding: From Interpretability to Real-World Applications
Degree: Ph.D., Computer Science
Date: Fall 2025
77. Gustavo Gratacós
Role: member
Title: Tree Recovery by Dynamic Programming
Degree: Ph.D., Computer Science
Date: Spring 2024
78. Weijie Gan
Role: member
Title: Computational Imaging under Incomplete Information
Degree: Ph.D., Computer Science
Date: Summer 2025
79. Weining Wang
Role: member
Title: Corrupted MRI Brain Image Restoration with Neural Networks
Degree: M.S., CSE
Date: Spring 2026
80. Sidrah Liaqat (University of Kentucky)
Role: member
Title: Model-based Deep Learning Techniques for Detecting Behaviors Related to Autism Spectrum Disorder from Video
Degree: Ph.D., Electrical Engineering
Date: TBD
81. Nischal Khanal
Role: member
Title: Cortical Motor Programs as Biomarkers for Functional Impairment and Recovery After Stroke
Degree: Ph.D., Imaging Science
Date: TBD
82. Christoph Gerhardt (Technische Universität Ilmenau)
Role: member
Title: Outdoor Appearance Transfer
Degree: Ph.D., Computer Science
Date: TBD
83. Anindya Sarkar
Role: member
Title: TBD
Degree: Ph.D., Computer Science
Date: TBD
84. Rachel Badzioch (Notre Dame University)
Role: member
Title: Detecting Visual Features in Permafrost
Degree: Ph.D., Biological Sciences
Date: TBD
85. Ruiqi Wang
Role: member
Title: Real-time and Embedded Systems and Efficient Human Activity Recognition
Degree: Ph.D., Computer Science
Date: TBD
86. Kyle Wolford
Role: member
Title: Enhancing Plug-and-Play Image Registration via Diffusion
Degree: M.S., Computer Science
Date: Spring 2025
87. Tri Pham
Role: member
Title: Adaptive Historical Context: Granular Activity Tracking for Interruption Recovery in Software Development
Degree: Ph.D., Computer Science
Date: TBD

Oral Qualifying Exam Committees

Student	Date	Advisor
Junlin Wu	Fall 2022	Eugene Vorobeychik
Ye Htet	Spring 2023	Jeremy Buhler
Han Liu	Spring 2023	Ning Zhang
Yiwen Ju	Spring 2023	Tao Ju
Jiarui Feng	Summer 2023	Yixin Chen
Lydia Reader	Spring 2023	Ross Hammond
Tri Pham	Fall 2023	Caitlin Kelleher
Jingxuan Zhu	Summer 2024	
Aaron Adkins	Summer 2024	Chou Zhou
Ben Warner	Spring 2025	Chenyang Lu
Chengsong Huang	Spring 2025	Jiaxin Huang
Peter Rong	Spring 2025	Tao Ju
Peiqi Gao	Spring 2026	Chenyang Lu