

Nathan Jacobs

Dept. of Computer Science & Engineering
McKelvey School of Engineering
Washington University in St. Louis
1 Brookings Drive, St. Louis, MO 63130-4899

jacobsn@wustl.edu
<https://jacobsn.github.io/>
<https://mvrl.cse.wustl.edu/>
0000-0002-4242-8967 (ORCID)

Areas of Expertise

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

Contents

1	Education	1
2	Appointments and Affiliations	1
3	Awards	2
4	Publications	3
5	Funding	17
6	Talks	21
7	Service	25
8	Teaching and Mentoring	29

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

Prior

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

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] C. Mosig, T. Kattenborn, D. Montero Loaiza, J. Vanja-Jehle, J. Brandt, N. Jacobs, S. Khanal, E. Xing, M. Schwartz, H. C. Muller-Landau, M. Beloiu, A. Bozzini, Y. Cheng, K. Ganz, B. Grüning, H. Hartmann, J. Hempel, S. Horion, S. Junttila, K. Korznikov, G. Kraemer, M. Mönks, D. Nardi, P. Neumeier, J. Schmid, S. Soltani, M. Therese-Schmehl, J. Veitch-Michaelis, and M. Mahecha, “Sub-pixel mapping of disturbance and tree mortality dynamics from sentinel-2 time series around the globe,” *Eartharxiv*, 2026. DOI: [10.31223/X5B18W](https://doi.org/10.31223/X5B18W) [Online]. Available: <https://eartharxiv.org/repository/view/11912/>
- [3] 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>
- [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. Dhakal, S. Khanal, S. Sastry, J. Arndt, P. A. Dias, D. Lunga, and N. Jacobs, “SimLBR: Learning to detect fake images by learning to detect real images,” in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2026. arXiv: [2602.20412](https://arxiv.org/abs/2602.20412) [cs.CV].
- [2] G. Muhawenayo, C. Robinson, S. Khanal, Z. Fang, I. Corley, A. Wollam, T. Gao, L. Strnad, R. Avery, L. Estes, A. M. Tárano, N. Jacobs, and H. Kerner, “PRUE: A practical recipe for field boundary segmentation at scale,” in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2026.

- [3] S. Sastry, S. Khanal, A. Dhakal, J. Lin, D. Cher, P. Jarosz, and N. Jacobs, “ProM3E: Probabilistic masked multimodal embedding model for ecology,” in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2026. arXiv: [2511.02946 \[cs.CV\]](#).
- [4] 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.
- [5] 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 \[cs.CV\]](#).
- [6] 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.
- [7] 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 \[cs.CV\]](#).
- [8] 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 \[cs.CV\]](#).
- [9] 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 \[cs.CV\]](#).
- [10] 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 \[cs.CV\]](#).
- [11] 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 \[cs.CV\]](#).
- [12] 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 \[cs.CV\]](#).
- [13] 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 \[cs.CV\]](#).
- [14] 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 \[cs.LG\]](#).
- [15] 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 \[cs.CV\]](#).
- [16] 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 \[cs.LG\]](#).
- [17] 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 \[cs.CV\]](#).

- [18] 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].
- [19] 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].
- [20] 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.
- [21] 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.
- [22] 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.
- [23] 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.
- [24] 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.
- [25] 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.
- [26] 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.
- [27] 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.
- [28] 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.
- [29] 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)
- [30] 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)
- [31] 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)
- [32] 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)
- [33] Y. Zhang, G. Liang, and N. Jacobs, “Dynamic feature alignment for semi-supervised domain adaptation,” in *British Machine Vision Conference (BMVC)*, Nov. 2021.
- [34] 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)

- [35] 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)
- [36] 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)
- [37] G. Liang, Y. Zhang, X. Wang, and N. Jacobs, “Improved trainable calibration method for neural networks,” in *British Machine Vision Conference (BMVC)*, Sep. 2020.
- [38] M. U. Rafique, H. Blanton, N. Snaveley, and N. Jacobs, “Generative Appearance Flow: A hybrid approach for outdoor view synthesis,” in *British Machine Vision Conference (BMVC)*, Sep. 2020.
- [39] 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)
- [40] 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)
- [41] 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)
- [42] 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)
- [43] 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)
- [44] 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)
- [45] 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)
- [46] 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)
- [47] 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)
- [48] D. Jones, J. Bopaiah, 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.
- [49] 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)
- [50] 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)

- [51] S. Schuster, 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)
- [52] 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)
- [53] 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.
- [54] 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)
- [55] 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)
- [56] 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)
- [57] 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)
- [58] 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)
- [59] 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)
- [60] 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)
- [61] 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)
- [62] 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)
- [63] 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)
- [64] S. Workman, M. Zhai, and N. Jacobs, "Horizon lines in the wild," in *British Machine Vision Conference (BMVC)*, Acceptance rate: 39.4%, 2016.
- [65] 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)
- [66] 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)
- [67] 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)

- [68] 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)
- [69] 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)
- [70] S. Workman, R. Souvenir, and N. Jacobs, “Wide-area image geolocalization 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)
- [71] 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)
- [72] 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)
- [73] 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)
- [74] 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)
- [75] 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)
- [76] 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)
- [77] 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)
- [78] 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)
- [79] 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)
- [80] 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)
- [81] 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)
- [82] 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)

- [83] 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)
- [84] 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)
- [85] 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)
- [86] 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)
- [87] 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)
- [88] 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)
- [89] 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)
- [90] 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](https://arxiv.org/abs/2409.08520) [cs.CV].
- [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](https://arxiv.org/abs/2407.09672) [cs.CV].
- [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](https://arxiv.org/abs/2410.12943) [astro-ph.CO].

- [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/acsestair.3c00054](https://doi.org/10.1021/acsestair.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. Abdulahad, “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. Körting, 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](https://arxiv.org/abs/2312.08334) [cs.CV].

- [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 \[cs.CV\]](#).
- [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 \[cs.CV\]](#).
- [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 \[cs.CV\]](#).
- [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 \[cs.CV\]](#).
- [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 \[cs.CV\]](#).
- [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 \[cs.CV\]](#).
- [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 \(cs.CV\)](#).
- [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](#)
- [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](#)
- [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](#)
- [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](#)

- [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](https://arxiv.org/abs/2002.11881) [cs.CV].
- [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: [10.1145/1178782.1178805](https://doi.org/10.1145/1178782.1178805)
- [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. Muhawenayo, 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. Muhawenayo, 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'Neel, 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 Kekenos-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, Mirosław Truszczyński, 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
 - * IACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR) [2026]
 - * 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](#) Degree: Ph.D., Computer Science
 Title: Probabilistic Cross-Domain Representation Learning Date: Jun 2022
 Employment: Senior R&D Engineer, Kitware Inc.
12. [Yu Zhang](#) Degree: Ph.D., Computer Science
 Title: Multimodal Domain Generalization Date: Mar 2023
 Employment: Assistant Professor, Computer Science, Boise State University
13. [Xin Xing](#) [*co-chair* with Ai-Ling Lin] Degree: Ph.D., Computer Science
 Title: Structured Attention for Image Analysis Date: Nov 2023
 Employment: Assistant Professor, University of Nebraska-Omaha
14. [Subash Khanal](#) Degree: Ph.D., Computer Science
 Title: Multimodal Representation Learning for Geospatial Soundscape Mapping Date: Jul 2025
15. Lydia Reader [*co-chair* with Ross Hammond] Degree: Ph.D., Computational & Data Sciences
 Title: Toward an Understanding of Heterogeneous Effects of Walkability on Children's Physical Activity Date: May 2026 (est)
16. Aayush Dhakal Degree: Ph.D., Computer Science
 Title: TBD Date: Dec 2026 (est)
17. Srikumar Sastry Degree: Ph.D., Imaging Science
 Title: Task-Aligned Multimodal Representation Learning Date: Dec 2026 (est)
18. Michael Lanier [*co-chair* with Yevgeniy Vorobeychik] Degree: Ph.D., Computer Science
 Title: TBD Date: May 2027 (est)
19. Zhexiao Xiong Degree: Ph.D., Computer Science
 Title: TBD Date: May 2027 (est)
20. Alex Wollam Degree: Ph.D., Computer Science
 Title: TBD Date: TBD
21. Nia Hodges Degree: Ph.D., Electrical and Systems Engineering
 Title: TBD Date: TBD

22. Tong Li [<i>co-chair</i> 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 [<i>co-chair</i> 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 Degree: MS, Computer Science
Title: Intensity Harmonization for Airborne LiDAR Date: May 2021
7. Jacob Birge Degree: MS, Computer Science
Title: A Cost-Sensitive Approach To Multimodal Fusion Date: Dec 2021
8. Alex Greene Degree: MS, Computer Science
Title: Using Aerial Imagery to Estimate Ground-level Object Distributions Date: May 2023
9. Alex Wollam Degree: MS, Computer Science
Title: Exploring Sequential Outdoor Panorama Synthesis with Diffusion Models Date: Jul 2023
10. Hongzhang Wang Degree: MS, Computer Science
Title: Monocular Depth Estimation Date: Dec 2023
11. Nia Hodges Degree: MS, Engineering Data Analytics & Statistics
Title: Wide-Area Image Localization Date: May 2024
12. Wanzhou Liu Degree: MS, Computer Science
Title: High Efficiency Generalizable Driving World Model 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
Title: User-Tools for Aerial Image Registration | Dates: 2011–2012 |
| 2. Kyle Kolpek
Title: Aerial Image Registration | Dates: 2012 |
| 3. Noora Aljabi
Title: Using Flickr to Map Phenological Trends | Dates: 2013 |
| 4. J. David Smith
Title: User-in-the-loop Camera Calibration | Dates: 2013–2015 |
| 5. Angelo Stekardis
Title: Understanding Facial Expressions | Dates: 2014–2015 |
| 6. Ryan Baltenberger
Title: Understanding Outdoor Scene Appearance | Dates: 2012–2015 |
| 7. Connor Greenwell
Title: Interactive Methods for Aerial Imagery Understanding | Dates: 2014–2016 |
| 8. Sam Davidson
Title: Applications of Generative Adversarial Networks to Social Media Imagery | Dates: 2016–2017 |
| 9. Aaron Mueller
Title: Deep Learning for Educational Data | Dates: 2018 |
| 10. Weilian Song
Title: Applications of Deep Convolutional Neural Networks to Geometric Computer Vision | Dates: 2016–2019 |
| 11. Yuhan Long
Title: Deep Learning for Medical Imaging | Dates: 2019 |
| 12. Thomas Barber
Title: Deep Learning for Remote Sensing | Dates: 2019 |
| 13. Sean Grate
Title: Deep Learning for Point Clouds | Dates: 2019–2020 |
| 14. Shashank Bhatt
Title: Multi-Object Tracking | Dates: 2020–2022 |
| 15. Evan Bolton
Title: Generating Synthetic Training Data using a Game Engine | Dates: 2021 |
| 16. Julia Stekardis
Title: Large-Scale Image Geo-Localization | Dates: 2021–2022 |
| 17. Gareth Walker
Title: Remote Sensing for Social Good | Dates: 2022 |
| 18. Matthew Mitchell
Title: Remote Sensing for Social Good | Dates: 2022 |
| 19. Cohen Archbold
Title: Automatic Real-Estate Price Estimation | Dates: 2020–2022 |

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

Graduate Committees (as regular member or external examiner)

- | | |
|---|---------------------------------------|
| 1. Edwin Prem Kumar Sathiyamoorthy | Degree: M.S., Electrical Engineering |
| Role: member | Date: Spring 2011 |
| Title: Global Change Reactive Background Subtraction | |
| 2. Ju Shen | Degree: Ph.D., Electrical Engineering |
| Role: member | Date: Spring 2014 |
| Title: Computational Multimedia for Video Self Modeling | |

3. Hasan Sajid Degree: M.S., Electrical Engineering
 Role: member Date: Summer 2014
 Title: A Universal Background Subtraction System
4. Chenxi Zhang Degree: Ph.D., Computer Science
 Role: member Date: Fall 2014
 Title: Depth-assisted Image Segmentation, Enhancement and Visualization
5. Mao Ye Degree: Ph.D., Computer Science
 Role: member Date: Fall 2014
 Title: 3D Reconstruction and Motion Analysis of Deformable Objects with Consumer Depth Cameras
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) Degree: Ph.D., Environmental Studies
 Role: member Date: Summer 2018
 Title: High-Precision Photogrammetry for Glaciology
21. Yannick Hold-Geoffroy (Laval University, Quebec, CA) Degree: Ph.D., Computer Science
 Role: member Date: Summer 2018
 Title: Learning Geometric and Lighting priors from Natural Images
22. Nkiruka Uzuegbunam Degree: Ph.D., Electrical Engineering
 Role: member Date: Oct 2018
 Title: Self-Image Multimedia Technologies for Feedforward Observational Learning
23. Nam Vo (Georgia Institute of Technology) Degree: Ph.D., Computer Science
 Role: member Date: Spring 2019
 Title: Image Geolocalization with Deep Learning
24. Jinping Zhuge Degree: Ph.D., Math
 Role: outside examiner Date: Spring 2019
 Title: Boundary layers in periodic homogenization
25. Ryan Zembrodt Degree: M.S., Computer Science
 Role: member Date: Spring 2019
 Title: Open-World Story Generation with Sequence-to-Sequence and Hierarchical Recurrent Encoder-Decoder Models
26. Jonathan Dingess Degree: M.S., Computer Science
 Role: member Date: Spring 2019
 Title: Epsilon-Superposition and Truncation Dimension in Average and Probabilistic Settings for Infinite-Variate Linear Problems
27. Genghis Goodman Degree: M.S., Computer Science
 Role: member Date: Summer 2019
 Title: A Machine Learning Approach to Artificial Floorplan Generation
28. Xinxin Zuo Degree: Ph.D., Computer Science
 Role: member Date: Oct 2019
 Title: Depth Enhancement and Surface Reconstruction with RGB-D sequence
29. Sifei Han Degree: Ph.D., Computer Science
 Role: member Date: Fall 2019
 Title: Text Mining Methods for Analyzing Online Health Information and Communication

30. Shivangi Srivastava (Wageningen University, Netherlands) Degree: Ph.D., Computer Science
 Role: member Date: Feb 2020
 Title: Mapping of urban landuse and landcover with multiple sensors: joining close and remote sensing with deep learning
31. Raian Maretto (National Institute for Space Research) Degree: Ph.D., Geoinformation Science
 Role: member Date: Feb 2020
 Title: Deep Learning techniques applied to classification of Remote Sensing Images
32. Kyle Helfrich Degree: Ph.D., Math
 Role: member Date: Spring 2020
 Title: Orthogonal Recurrent Neural Networks and Batch Normalization in Deep Neural Networks
33. Subash Khanal Degree: M.S., Electrical Engineering
 Role: member Date: Spring 2020
 Title: Mispronunciation Detection and Diagnosis in Mandarin Accented English Speech
34. Narjes Bozorg Degree: Ph.D., Electrical Engineering
 Role: member Date: Nov 2020
 Title: Articulatory-Wavenet: Deep Autoregressive Model for Acoustic-to-Articulatory Inversion
35. Céline Portenier (University of Bern) Degree: Ph.D., Computer Science
 Role: external referee Date: Spring 2021
 Title: High-resolution snow cover retrieval using public webcams
36. Ahmed Nassar (IRISA, Université Bretagne Sud, Vannes) Degree: Ph.D., Computer Science
 Role: external referee Date: Spring 2021
 Title: Learning to map street-side objects using multiple views
37. Alireza Shirvani Degree: Ph.D., Computer Science
 Role: member Date: Summer 2021
 Title: Personality and Emotion for Virtual Characters in Strong-story Narrative Planning
38. Sajad Javadinasab Hormozabad Degree: Ph.D., Civil Engineering
 Role: member Date: Nov 2021
 Title: Artificial Intelligence and Soft Computing in Smart Structural Systems
39. Chengxi Li Degree: Ph.D., Computer Science
 Role: member Date: Spring 2022
 Title: Supporting Stylized Language Models using Multi-Modality Features
40. Tarannum Shaila Zaman Degree: Ph.D., Computer Science
 Role: member Date: Spring 2022
 Title: An Automated Framework to Debug System-Level Concurrency Failures
41. David Adeniji Degree: Ph.D., Mechanical Engineering
 Role: member Date: Spring 2022
 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) Degree: Ph.D., Data Science in Earth Observation
 Role: reviewer Date: Oct 2022
 Title: Predicting Building Functions on Large Scale by Fusing Social Media and Remote Sensing Data

- | | |
|---|---------------------------------|
| 43. Arnab Sarkar | Degree: Ph.D., Physics |
| Role: member | Date: Summer 2022 |
| Title: Understanding the Physics of Galaxy Clusters Out to their Virial Radii and Beyond | |
| 44. Yuan Liu | Degree: M.S., Computer Science |
| Role: member | Date: Fall 2022 |
| Title: Skeleton-Based Analysis of Melt Networks | |
| 45. Aiden McIlraith | Degree: M.S., Computer Science |
| Role: member | Date: Fall 2022 |
| Title: Spatial Transcriptome Visualizer | |
| 46. Zhou Chu | Degree: M.S., Computer Science |
| Role: member | Date: Fall 2022 |
| Title: Adapting at time series machine learning models to a real informatics pipe | |
| 47. Zihao Zou | Degree: M.S., Computer Science |
| Role: member | Date: Fall 2022 |
| Title: Deep Model-Based Architectures using Explicit Regularizers for Computational Imaging | |
| 48. Ashutosh Timilsina | Degree: Ph.D., Computer Science |
| Role: member | Date: Spring 2023 |
| Title: Peer-to-peer Energy Trading in Smart Residential Environment with User Behavioral Modeling | |
| 49. Nan Huang | Degree: M.S., Computer Science |
| Role: member | Date: Spring 2023 |
| Title: Toward Continuous Regularizer for Imaging Inverse Problems | |
| 50. Md Selim | Degree: Ph.D., Computer Science |
| Role: member | Date: Spring 2023 |
| Title: Deep Learning Models for CT Image Standardization | |
| 51. Di Huang | Degree: M.S., Computer Science |
| Role: member | Date: Spring 2023 |
| Title: Deep Neural Networks for Infant Pose Estimation | |
| 52. Peizhen Tong | Degree: M.S., Computer Science |
| Role: member | Date: Spring 2023 |
| Title: Adversarial Patch Attacks on Deep Reinforcement Learning | |
| 53. David Sarpong | Degree: M.S., Computer Science |
| Role: member | Date: Spring 2023 |
| Title: Adversarial Defenses against Interpolation Attacks on Semi-Supervised Learning Systems | |
| 54. Yihang Xu | Degree: M.S., Computer Science |
| Role: member | Date: Spring 2023 |
| Title: Real-Time Action Segmentation in a Smart Kitchen System | |
| 55. Stephen Parsons | Degree: Ph.D., Computer Science |
| Role: member | Date: Summer 2023 |
| Title: Hard-Hearted Scrolls: A Noninvasive Method for Reading the Herculaneum Papyri | |
| 56. Brian Chao | Degree: M.S., Computer Science |
| Role: member | Date: Summer 2023 |
| Title: Adversarial Attacks on AI Systems in Medical Applications | |

- | | |
|---|---------------------------------|
| 57. Chang Ti | Degree: M.S., Computer Science |
| Role: member | Date: Fall 2023 |
| Title: Handwritten Digit Recognition Web Plugin | |
| 58. Emma McMillian | Degree: M.S., Computer Science |
| Role: member | Date: Fall 2023 |
| Title: Convolutional Neural Networks for Hyperspectral Image-to-Image Microscopy Translation | |
| 59. Fiona Xu | Degree: M.S., Computer Science |
| Role: member | Date: Fall 2023 |
| Title: Adversarial Attack on Graph Embeddings from Text Dataset | |
| 60. Kyle Montgomery | Degree: M.S., Computer Science |
| Role: member | Date: Spring 2024 |
| Title: Exploring the Reasoning Abilities of Large Language Models | |
| 61. Joshua Tang | Degree: M.S., Computer Science |
| Role: member | Date: Spring 2024 |
| Title: Autonomous Vehicle Object Classification with Uncertainty | |
| 62. Patrick Lynch | Degree: M.S., Computer Science |
| Role: member | Date: Spring 2024 |
| Title: An Automated System for Detecting Errors in Oatmeal-Making Research Task | |
| 63. Owen Ma | Degree: M.S., Computer Science |
| Role: member | Date: Fall 2024 |
| Title: Towards Verified Vision-Based Neural Network Controllers for Autonomous Lane-Following | |
| 64. Minoos Hosseinzadeh | Degree: Ph.D., Computer Science |
| Role: member | Date: Fall 2024 |
| Title: Smart QoS-Aware Resource Management For Edge Intelligence Systems | |
| 65. Junlin Wu | Degree: Ph.D., Computer Science |
| Role: member | Date: Spring 2025 |
| Title: Trustworthy Autonomy Through Robust Control and Alignment | |
| 66. Evin Jaff | Degree: M.S., Computer Science |
| Role: member | Date: Fall 2024 |
| Title: SwiftFake: Real-Time Defense Against Deepfake Calls | |
| 67. Yin Li | Degree: M.S., Computer Science |
| Role: member | Date: Fall 2024 |
| Title: 3D Analysis of Spatial Transcriptome | |
| 68. Sizhe Zhang | Degree: A.M., Statistics |
| Role: member | Date: Fall 2024 |
| Title: ProofTutor: LLM-based formal math proving model | |
| 69. Ye Htet | Degree: Ph.D., Computer Science |
| Role: member | Date: Fall 2024 |
| Title: System Design and Task Scheduling for Real-Time Scientific Sensing Applications in Space | |
| 70. Zifan Wang | Degree: M.S., Computer Science |
| Role: member | Date: Spring 2025 |
| Title: GCHP Workload Balancing | |

71. Yuxuan Yang Degree: M.S., Computer Science
 Role: member Date: Spring 2025
 Title: Training Safety Filters for Safe Control with Partial Observed and Un-labeled Data
72. Haris Naveed Degree: M.S., Computer Science
 Role: chair Date: Spring 2025
 Title: Deep Learning for Tree Canopy Height Estimation
73. Sheng-Chieh Lin (University of Kentucky) Degree: Ph.D., Physics
 Role: member Date: Spring 2025
 Title: Machine Learning for Mapping and Understanding Galaxy Clusters
74. Hao Liu Degree: Ph.D., Computer Science
 Role: member Date: Spring 2025
 Title: Toward Graph Foundation Models: Few-shot and Zero-shot Learning on Graphs
75. Yiwen Ju Degree: Ph.D., Computer Science
 Role: member Date: Fall 2025
 Title: Geometric Modeling through Multiple Implicit Functions
76. Morris Alper (Tel Aviv University) Degree: Ph.D., Computer Science
 Role: member Date: Fall 2025
 Title: Multimodal Learning for High-Level Semantic Understanding: From Interpretability to Real-World Applications
77. Gustavo Gratacós Degree: Ph.D., Computer Science
 Role: member Date: Spring 2024
 Title: Tree Recovery by Dynamic Programming
78. Weijie Gan Degree: Ph.D., Computer Science
 Role: member Date: Summer 2025
 Title: Computational Imaging under Incomplete Information
79. Weining Wang Degree: M.S., CSE
 Role: member Date: Spring 2026
 Title: Corrupted MRI Brain Image Restoration with Neural Networks
80. Sidrah Liaqat (University of Kentucky) Degree: Ph.D., Electrical Engineering
 Role: member Date: TBD
 Title: Model-based Deep Learning Techniques for Detecting Behaviors Related to Autism Spectrum Disorder from Video
81. Nischal Khanal Degree: Ph.D., Imaging Science
 Role: member Date: TBD
 Title: Cortical Motor Programs as Biomarkers for Functional Impairment and Recovery After Stroke
82. Christoph Gerhardt (Technische Universität Ilmenau) Degree: Ph.D., Computer Science
 Role: member Date: TBD
 Title: Outdoor Appearance Transfer
83. Anindya Sarkar Degree: Ph.D., Computer Science
 Role: member Date: TBD
 Title: TBD

- | | |
|--|------------------------------------|
| 84. Rachel Badzioch (Notre Dame University) | Degree: Ph.D., Biological Sciences |
| Role: member | Date: TBD |
| Title: Detecting Visual Features in Permafrost | |
| | |
| 85. Ruiqi Wang | Degree: Ph.D., Computer Science |
| Role: member | Date: TBD |
| Title: Real-time and Embedded Systems and Efficient Human Activity Recognition | |
| | |
| 86. Kyle Wolford | Degree: M.S., Computer Science |
| Role: member | Date: Spring 2025 |
| Title: Enhancing Plug-and-Play Image Registration via Diffusion | |
| | |
| 87. Tri Pham | Degree: Ph.D., Computer Science |
| Role: member | Date: TBD |
| Title: Adaptive Historical Context: Granular Activity Tracking for Interruption Recovery in Software Development | |
| | |
| 88. Lisa Liao | Degree: Ph.D., Computer Science |
| Role: member | Date: TBD |
| Title: Interpretable Deep Learning for Multi-Trait Analysis of Biological Pathways | |
| | |
| 89. Yu Yan | Degree: Ph.D., EECE |
| Role: member | Date: TBD |
| Title: Improvement and Analysis of Ambient Nitrogen Dioxide Estimation with Machine Learning, Satellite Remote Sensing, and Chemical Transport | |
| | |
| 90. Evelyn Yang | Degree: Ph.D., CSE |
| Role: member | Date: TBD |
| Title: TBD | |
| | |
| 91. Aadarsha Gopala Reddy | Degree: M.S., CSE |
| Role: member | Date: TBD |
| Title: TBD | |
| | |
| 92. Ben Warner | Degree: Ph.D., CSE |
| Role: member | Date: TBD |
| Title: TBD | |
| | |
| 93. Chengsong Huang | Degree: Ph.D., CSE |
| Role: member | Date: TBD |
| Title: 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