

# Nathan Jacobs

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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

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## 1 Education

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

## 2 Appointments and Affiliations

### Active

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

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

## Prior

<b>Professor (with Tenure)</b> 2021–2022	Dept. of Computer Science, University of Kentucky <i>Lexington, KY</i>
<b>Director of Graduate Studies (Data Science)</b> 2020–2022	Dept. of Computer Science, University of Kentucky <i>Lexington, KY</i>
<b>Member</b> 2017–2022	Institute for Biomedical Informatics, University of Kentucky <i>Lexington, KY</i>
<b>Associate Professor (with Tenure)</b> 2016–2021	Dept. of Computer Science, University of Kentucky <i>Lexington, KY</i>
<b>Co-Department Chair (interim)</b> 2019–2020	Dept. of Computer Science, University of Kentucky <i>Lexington, KY</i>
<b>Affiliated Faculty</b> 2010–2019	Center for Visualization and Virtual Environments, University of Kentucky <i>Lexington, KY</i>
<b>Visiting Research Scientist (sabbatical)</b> 2017–2018	Orbital Insight, Inc. <i>Mountain View, CA</i>
<b>Assistant Professor</b> 2010–2016	Dept. of Computer Science, University of Kentucky <i>Lexington, KY</i>
<b>Computer Vision Research Intern</b> 2008	ObjectVideo, Inc. <i>Reston, VA</i>
<b>Graduate Research Assistant</b> 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] K. Klemmer, E. Rolf, M. Russwurm, G. Camps-Valls, M. Czerkawski, S. Ermon, A. Francis, N. Jacobs, H. R. Kerner, L. Mackey, G. Mai, O. M. Aodha, M. Reichstein, C. Robinson, D. Rolnick, E. Shelhamer, V. Sitzmann, D. Tuia, and X. Zhu, *Earth Embeddings: Towards AI-centric representations of our planet*, Dec. 2025. DOI: <https://doi.org/10.31223/X5HX9S>
- [3] S. Sastry, S. Khanal, A. Dhakal, J. Lin, D. Cher, P. Jarosz, and N. Jacobs, *ProM3E: Probabilistic masked multimodal embedding model for ecology*, Nov. 2025. arXiv: [2511.02946](https://arxiv.org/abs/2511.02946) [[cs.CV](#)].
- [4] S. Khanal, S. Sastry, A. Dhakal, A. Ahmad, and N. Jacobs, *Sat2Sound: A unified framework for zero-shot soundscape mapping*, May 2025. arXiv: [2505.13777](https://arxiv.org/abs/2505.13777) [[cs.CV](#)].
- [5] Z. Xiong, W. Xiong, J. Shi, H. Zhang, Y. Song, and N. Jacobs, *GroundingBooth: Grounding text-to-image customization*, Sep. 2024. arXiv: [2409.08520](https://arxiv.org/abs/2409.08520) [[cs.CV](#)].
- [6] F. Qiao, Z. Xiong, X. Zhu, Y. Ma, Q. He, and N. Jacobs, *MCPDepth: omnidirectional depth estimation via stereo matching from multi-cylindrical panoramas*, Aug. 2024. arXiv: [2408.01653](https://arxiv.org/abs/2408.01653) [[cs.CV](#)].

### Refereed Conference Papers

- [1] A. Sarkar, S. Sastry, A. Pirinen, N. Jacobs, and Y. Vorobeychik, “DiffVAS: Diffusion-guided visual active search in partially observable environments,” in *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, May 2026.
- [2] D. Cher, B. Wei, S. Sastry, and N. Jacobs, “VectorSynth: Fine-grained satellite image synthesis with structured semantics,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Mar. 2026. arXiv: [2511.07744](https://arxiv.org/abs/2511.07744) [[cs.CV](#)].

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

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

- [36] G. Liang, X. Wang, Y. Zhang, and N. Jacobs, “Weakly-supervised self-training for breast cancer localization,” in *International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, (oral), 2020. DOI: [10.1109/EMBC44109.2020.9176617](https://doi.org/10.1109/EMBC44109.2020.9176617)
- [37] T. Salem, S. Workman, and N. Jacobs, “Learning a dynamic map of visual appearance,” in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 25%, 2020. DOI: [10.1109/CVPR42600.2020.01245](https://doi.org/10.1109/CVPR42600.2020.01245)
- [38] S. Workman and N. Jacobs, “Dynamic traffic modeling from overhead imagery,” in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 5.7% (oral), 2020. DOI: [10.1109/CVPR42600.2020.01233](https://doi.org/10.1109/CVPR42600.2020.01233)
- [39] Z. Bessinger and N. Jacobs, “A generative model of worldwide facial appearance,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, (oral), 2019. DOI: [10.1109/WACV.2019.00172](https://doi.org/10.1109/WACV.2019.00172)
- [40] G. Liang, S. Fouladvand, J. Zhang, M. A. Brooks, N. Jacobs, and J. Chen, “GANai: Standardizing CT images using generative adversarial network with alternative improvement,” in *IEEE International Conference on Healthcare Informatics (ICHI)*, 2019. DOI: [10.1109/ICHI.2019.8904763](https://doi.org/10.1109/ICHI.2019.8904763)
- [41] G. Liang, X. Wang, Y. Zhang, X. Xing, H. Blanton, T. Salem, and N. Jacobs, “Joint 2d-3d breast cancer classification,” in *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, Acceptance rate: 18% (oral), 2019. DOI: [10.1109/BIBM47256.2019.8983048](https://doi.org/10.1109/BIBM47256.2019.8983048)
- [42] Y. Zhang, X. Wang, H. Blanton, G. Liang, X. Xing, and N. Jacobs, “2d convolutional neural networks for 3d digital breast tomosynthesis classification,” in *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, Acceptance rate: 18% (oral), 2019. DOI: [10.1109/BIBM47256.2019.8983097](https://doi.org/10.1109/BIBM47256.2019.8983097)
- [43] C. Greenwell, S. Workman, and N. Jacobs, “What goes where: Predicting object distributions from above,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2018. DOI: [10.1109/IGARSS.2018.8519251](https://doi.org/10.1109/IGARSS.2018.8519251)
- [44] N. Jacobs, A. Kraft, M. U. Rafique, and R. D. Sharma, “A weakly supervised approach for estimating spatial density functions from high-resolution satellite imagery,” in *ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL)*, Acceptance rate: 22.5% (oral), 2018. DOI: [10.1145/3274895.3274934](https://doi.org/10.1145/3274895.3274934)
- [45] D. Jones, J. Bopiah, F. Alghamedy, N. Jacobs, H. Weiss, W. A. D. Jong, and S. Ellingson, “Polypharmacology within the full kinase: A machine learning approach,” in *AMIA Informatics Summit*, 2018.
- [46] R. P. Mihail and N. Jacobs, “Automatic hand skeletal shape estimation from radiographs,” in *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, Acceptance rate: 19.6%, 2018. DOI: [10.1109/BIBM.2018.8621196](https://doi.org/10.1109/BIBM.2018.8621196)
- [47] T. Salem, M. Zhai, S. Workman, and N. Jacobs, “A multimodal approach to mapping soundscapes,” in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2018. DOI: [10.1109/IGARSS.2018.8517977](https://doi.org/10.1109/IGARSS.2018.8517977)
- [48] S. Schulter, M. Zhai, N. Jacobs, and M. Chandraker, “Learning to look around objects for top-view representations of outdoor scenes,” in *European Conference on Computer Vision (ECCV)*, Acceptance rate: 31.8%, 2018. DOI: [10.1007/978-3-030-01267-0\\_48](https://doi.org/10.1007/978-3-030-01267-0_48)
- [49] W. Song, S. Workman, A. Hadzic, R. Souleyrette, E. Green, M. Chen, X. Zhang, and N. Jacobs, “FARSA: Fully automated roadway safety assessment,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2018. DOI: [10.1109/WACV.2018.00063](https://doi.org/10.1109/WACV.2018.00063)
- [50] M. Zhai, T. Salem, C. Greenwell, S. Workman, R. Pless, and N. Jacobs, “Learning geo-temporal image features,” in *British Machine Vision Conference (BMVC)*, Acceptance rate: 29.5%, 2018.
- [51] N. Vo, N. Jacobs, and J. Hays, “Revisiting IM2GPS in the deep learning era,” in *IEEE International Conference on Computer Vision (ICCV)*, Acceptance rate: 28.9%, 2017. DOI: [10.1109/ICCV.2017.286](https://doi.org/10.1109/ICCV.2017.286)

- [52] S. Workman, R. Souvenir, and N. Jacobs, “Understanding and mapping natural beauty,” in *IEEE International Conference on Computer Vision (ICCV)*, Acceptance rate: 28.9%, 2017. DOI: [10.1109/ICCV.2017.596](https://doi.org/10.1109/ICCV.2017.596)
- [53] S. Workman, M. Zhai, D. Crandall, and N. Jacobs, “A unified model for near and remote sensing,” in *IEEE International Conference on Computer Vision (ICCV)*, Acceptance rate: 28.9%, 2017. DOI: [10.1109/ICCV.2017.293](https://doi.org/10.1109/ICCV.2017.293)
- [54] M. Zhai, Z. Bessinger, S. Workman, and N. Jacobs, “Predicting ground-level scene layout from aerial imagery,” in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 29.2%, 2017. DOI: [10.1109/CVPR.2017.440](https://doi.org/10.1109/CVPR.2017.440)
- [55] X. Zhang, Y. Zhang, E. Han, N. Jacobs, Q. Han, X. Wang, and J. Liu, “Whole mammogram image classification with convolutional neural networks,” in *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, Acceptance rate: 19%, 2017. DOI: [10.1109/BIBM.2017.8217738](https://doi.org/10.1109/BIBM.2017.8217738)
- [56] R. Baltenberger, M. Zhai, C. Greenwell, S. Workman, and N. Jacobs, “A fast method for estimating transient scene properties,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Acceptance rate: 42.3%, 2016, pp. 1–8. DOI: [10.1109/WACV.2016.7477713](https://doi.org/10.1109/WACV.2016.7477713)
- [57] Z. Bessinger and N. Jacobs, “Quantifying curb appeal,” in *IEEE International Conference on Image Processing (ICIP)*, Acceptance rate: 45%, 2016. DOI: [10.1109/ICIP.2016.7533189](https://doi.org/10.1109/ICIP.2016.7533189)
- [58] Z. Bessinger, C. Stauffer, and N. Jacobs, “Who goes there? Approaches to mapping facial appearance diversity,” in *ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL)*, 2016. DOI: [10.1145/2996913.2996997](https://doi.org/10.1145/2996913.2996997)
- [59] R. P. Mihail, S. Workman, Z. Bessinger, and N. Jacobs, “Sky segmentation in the wild: An empirical study,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Acceptance rate: 42.3%, 2016, pp. 1–6. DOI: [10.1109/WACV.2016.7477637](https://doi.org/10.1109/WACV.2016.7477637)
- [60] T. Salem, S. Workman, M. Zhai, and N. Jacobs, “Analyzing human appearance as a cue for dating images,” in *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Acceptance rate: 42.3%, 2016, pp. 1–8. DOI: [10.1109/WACV.2016.7477678](https://doi.org/10.1109/WACV.2016.7477678)
- [61] S. Workman, M. Zhai, and N. Jacobs, “Horizon lines in the wild,” in *British Machine Vision Conference (BMVC)*, Acceptance rate: 39.4%, 2016.
- [62] M. Zhai, S. Workman, and N. Jacobs, “Camera geo-calibration using an MCMC approach,” in *IEEE International Conference on Image Processing (ICIP)*, Acceptance rate: 45%, 2016. DOI: [10.1109/ICIP.2016.7532905](https://doi.org/10.1109/ICIP.2016.7532905)
- [63] M. Zhai, S. Workman, and N. Jacobs, “Detecting vanishing points using global image context in a non-Manhattan world,” in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Acceptance rate: 29.9%, 2016. DOI: [10.1109/CVPR.2016.610](https://doi.org/10.1109/CVPR.2016.610)
- [64] M. T. Islam, S. Workman, and N. Jacobs, “Face2GPS: Estimating geographic location from facial features,” in *IEEE International Conference on Image Processing (ICIP)*, Acceptance rate: 45% (overall), 2015. DOI: [10.1109/ICIP.2015.7351072](https://doi.org/10.1109/ICIP.2015.7351072)
- [65] C. Murdock, N. Jacobs, and R. Pless, “Building dynamic cloud maps from the ground up,” in *IEEE International Conference on Computer Vision (ICCV)*, Acceptance rate: 30.3%, 2015, pp. 1–9. DOI: [10.1109/ICCV.2015.85](https://doi.org/10.1109/ICCV.2015.85)
- [66] S. Workman, C. Greenwell, M. Zhai, R. Baltenberger, and N. Jacobs, “DeepFocal: A method for direct focal length estimation,” in *IEEE International Conference on Image Processing (ICIP)*, Acceptance rate: 45% (overall), 2015. DOI: [10.1109/ICIP.2015.7351024](https://doi.org/10.1109/ICIP.2015.7351024)
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- [2] R. O. Balogun, T. Chakraborty, G. Muhawenayo, H. R. Kerner, A. M. Tarano, 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. 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. 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.
- [5] M. Mohr, M. Roby, I. Bosloper, H. 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.
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- [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).
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## Technical Reports

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## Datasets

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- [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>.
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- [6] T. Salem, S. Workman, M. Zhai, and N. Jacobs, *Cross-View Time (CVT)*, <https://mvrl.github.io/CVT>.
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- [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

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## 5 Funding

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

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

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

## Grants (awarded/active)

1. *Learning-Based Visual Event Demarcation*  
PI: **Nathan Jacobs**  
Co-PI(s)/Co-I(s): Anderson Rocha (UNICAMP)  
Sponsor: Global Incubator Seed Grant (WashU Internal Funding)  
Total Award: \$25,000  
Duration: 2022–2023
2. *WATCH: Wide Area Terrestrial Change Hypercube*  
PI: **Nathan Jacobs**  
Sponsor: Kitware / Intelligence Advanced Research Projects Activity (IARPA)  
Total Award: \$305,941.48 (Phase 1); \$851,489 (Phase 1–3)  
Duration: 2020–2022 (Phase 1); 2020–2024 (Phase 1–3)
3. *Measures of Information via Representation Learning*  
PI: Luis Sanchez-Giraldo  
Co-PI(s)/Co-I(s): **Nathan Jacobs**  
Sponsor: Department of Defense (DEPSCoR)  
Total Award: \$582,376  
Duration: 2021–2024
4. *GeoSearch: Image-based Geolocation using Rank Aggregated Hash Index (Phase 2, direct)*  
PI: **Nathan Jacobs**  
Sponsor: Blue Halo / National Geospatial-Intelligence Agency (NGA)  
Total Award: \$250,000  
Duration: 2021–2023
5. *Spatio-Temporal Association and Curve Kernel Networks (STACKNet)*  
PI: **Nathan Jacobs**  
Sponsor: Blue Halo / MDA  
Total Award: \$483,000 (Phase 1 and 2)  
Duration: 2020–2023
6. *Geolocalization Pipeline for Ground Level Images*  
PI: **Nathan Jacobs**  
Sponsor: Blue Halo / National Geospatial-Intelligence Agency (NGA)  
Total Award: \$19,944 (Phase 1), \$249,988 (Phase 2), \$153,261 (Phase 3, Year 1)  
Duration: 2018–2022

## Grants (completed)

1. *NURI: Semantic Representations for Multi-Viewpoint Multimodal Geolocation*  
PI: **Nathan Jacobs**  
Sponsor: Johns Hopkins University, Applied Physics Laboratory / National Geospatial-Intelligence Agency (NGA)  
Total Award: \$196,000 (base)  
Duration: 2020–2022
2. *R01: Ex vivo single molecule tools to analyze membrane receptor dynamics*  
PI: Christopher Richards  
Co-PI(s)/Co-I(s): Jim Pauly, Ahmed Abdel-Latif, David Heidary, **Nathan Jacobs**  
Sponsor: National Institutes of Health (NIH)

Total Award: \$1,510,803  
Duration: 2021–2022 (my role ended when I left the University of Kentucky)

3. *UL1: Kentucky Center for Clinical and Translational Science*

PI: Philip A. Kern  
Co-PI(s)/Co-I(s): **Nathan Jacobs** and many others  
Sponsor: National Institutes of Health (NIH)  
Total Award: \$28,893,663

Duration: 2021–2022 (my role ended when I left the University of Kentucky)

4. *CCT: Context and Colorization for Tracking (Phase 2)*

PI: **Nathan Jacobs**  
Sponsor: Intelligent Automation Inc. / Defense Advanced Research Projects Agency (DARPA)  
Total Award: \$200,000  
Duration: 2020–2021

5. *Video to Feature Data Association and Geolocation*

PI: **Nathan Jacobs**  
Sponsor: Novateur Research Solutions / National Geospatial-Intelligence Agency (NGA)  
Total Award: \$29,503 (Phase 1), \$149,883 (Phase 2)  
Duration: 2018–2021

6. *CAREER: Learning and Using Models of Geo-Temporal Appearance*

PI: **Nathan Jacobs**  
Sponsor: National Science Foundation (NSF)  
Total Award: \$499,426  
Duration: 2016–2021

7. *R01: Monomeric G-proteins and Cardioprotection from Heart Failure*

PI: John Satin  
Co-PI(s)/Co-I(s): Douglas Andres, Ahmed Abdel-Latif, **Nathan Jacobs**, Peter Kekenes-Huskey  
Sponsor: National Institutes of Health (NIH)  
Total Award: \$1,575,279  
Duration: 2016–2020

8. *Group Travel Grant for the Doctoral Consortium to be Held in Conjunction with IEEE Conference on Computer Vision and Pattern Recognition*

PI: **Nathan Jacobs**  
Sponsor: National Science Foundation (NSF)  
Total Award: \$22,500  
Duration: 2019–2020

9. *DLALA: Deep Learning for Airborne LiDAR Analysis*

PI: **Nathan Jacobs**  
Sponsor: Orbital Insight  
Total Award: \$104,927  
Duration: 2019–2020

10. *Listening to Markets: A Temporal Convolutional Net (TCN) Analysis of Conservatism in Company Reporting*

PI: Dan Stone  
Co-PI(s)/Co-I(s): **Nathan Jacobs**, Mark Lauersdorf, Hong Xie  
Sponsor: University of Kentucky  
Total Award: \$33,315  
Duration: 2018–2019

11. *Calibrated Pose Regression Networks*  
PI: **Nathan Jacobs**  
Sponsor: The Design Knowledge Company / Air Force Research Lab (Wright-Patterson AFB)  
Total Award: \$155,700 (Phase 3)  
Duration: 2018–2019
12. *Group Travel Grant for the PhD Forum to be Held in Conjunction with IEEE Winter Conference on Applications of Computer Vision*  
PI: **Nathan Jacobs**  
Sponsor: National Science Foundation (NSF)  
Total Award: \$13,625  
Duration: 2018–2019
13. *ASER Multi Center Review of Blunt Splenic Trauma: Optimal CT Diagnosis, Characterization*  
PI: James Lee (Radiology)  
Co-PI(s)/Co-I(s): David Nickels, **Nathan Jacobs**, Emily Slade  
Sponsor: American Society of Emergency Radiology  
Total Award: \$5,000  
Duration: 2018–2019
14. *Mechanism of a Novel Stable Compensatory Cardiac Hypertrophy Model*  
PI: Jonathan Satin  
Co-PI(s)/Co-I(s): Douglas Andres, **Nathan Jacobs**, Moriel Vandsburger  
Sponsor: American Heart Association  
Total Award: \$154,000  
Duration: 2016–2018
15. *NIP: GeoLookbook: Modeling Worldwide Human Visual Appearance*  
PI: **Nathan Jacobs**  
Sponsor: National Geospatial-Intelligence Agency (NGA)  
Total Award: \$299,204  
Duration: 2014–2018
16. *Crossview ConvNets for Near/Remote Sensing*  
PI: **Nathan Jacobs**  
Sponsor: Google  
Total Award: \$46,209  
Duration: 2016–2017
17. *WALDO: Wide Area Localization of Depicted Objects*  
PI: **Nathan Jacobs**  
Sponsor: Object Video / Intelligence Advanced Research Projects Activity (IARPA)  
Total Award: \$373,395  
Duration: 2012–2016
18. *CSSG: ContextualEyes: A Context-Aware Surveillance System*  
PI: **Nathan Jacobs**  
Sponsor: Defense Advanced Research Projects Agency (DARPA)  
Total Award: \$743,131  
Duration: 2011–2015
19. *Image-Net: Discriminatory Imaging and Network Advancement for Missiles, Aviation, and Space*  
PI: Brent Seales  
Co-PI(s)/Co-I(s): Ken Calvert, James Griffioen, Jane Hayes, **Nathan Jacobs**, Victor Marek, Thomas Seigler,

Suzanne Smith, Miroslaw Truszcynski, Ruigang Yang  
Sponsor: United States Army Space and Missile Defense Command / United States Army Forces Strategic Command  
Total Award: \$2,092,905  
Duration: 2011–2012

## Donations

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

## 6 Talks

1. “(Almost) Two Decades of Vision Across Allitudes” (keynote), Oct 2025, Workshop on 3D-VAST From street to space: 3D Vision Across Allitudes (ICCV 2025 Workshop), Honolulu, Hawaii
2. “Learning to Map Anything, Anywhere, Anytime” (keynote), Nov 2023, The International Conference on Digital Image Computing: Techniques and Applications (DICTA), Port Macquarie, Australia
3. “Learning to Map Anything, Anywhere, Anytime” (keynote), Oct 2023, ACM Multimedia Workshop (UAVs in Multimedia: Capturing the World from a New Perspective), Ottawa, Canada
4. “A Cost-Sensitive Approach To Dimensionality Reduction for Multispectral Imagery”, Jul 2023, International Geoscience and Remote Sensing Symposium, Pasadena, CA
5. “Explorations in Self-Supervised Learning for Change Detection”, Jul 2023, International Geoscience and Remote Sensing Symposium, Pasadena, CA
6. “Toward Dynamic Multimodal Remote Sensing: From Buildings and Populations to Soundscapes and Aesthetics”, Apr 2023, Living Earth Collaborative, Washington University, St. Louis, MO
7. “Domain-Inspired Deep Learning for Computer Vision, Remote Sensing, and Medical Imaging”, Oct 2022, Imaging Science Seminar, Washington University, St. Louis, MO
8. “Computer Vision for Multimodal Remote Sensing”, Aug 2022, WashU Geospatial Working Group Research Workshop, Washington University, St. Louis, MO
9. “A Structure-Aware Method for Direct Pose Estimation”, Jan 2022, IEEE Winter Conference on Applications of Computer Vision (WACV), Waikoloa Village, HI
10. Panelist for “Non-Traditional Careers in Computer Science” Nov 2021, ACM-W, University of Kentucky, Lexington, KY
11. “Mapping the Visual World Using Webcams, Cell Phones, and Satellites”, Oct 2021, Washington University in St. Louis, MO

12. "Learning Geo-Temporal Scene Models from Webcams, Cell Phones, and Satellites" (Keynote), Oct 2021, International Workshop on Distributed Smart Cameras, an ICCV Workshop (virtual)
13. "Mapping the Visual World Using Webcams, Cell Phones, and Satellites", Dec 2020, University of Campinas, Unicamp, Brazil (virtual)
14. "Exploring the Intersection of Localization, Mapping, and Image Understanding" (Keynote), Aug 2020, ECCV Workshop on Long-Term Visual Localization (virtual)
15. "Deep Convolutional Neural Networks: Foundations to Frontiers (a 2-day short course)", Mar 2020, Brazilian Space Agency (INPE), Sao Jose dos Campos, Brazil
16. "What, Where, and When: Mapping the World Using Webcams, Cell Phones, and Satellites", Mar 2020, Brazilian Space Agency (INPE), Sao Jose dos Campos, Brazil
17. "Learning to Map Visual Appearance", Feb 2020, Keeping Current Seminar, University of Kentucky (Computer Science), Lexington, KY
18. "Learning to Map Visual Appearance", Jan 2020, Wageningen University, Netherlands
19. "What, Where, and When: Mapping the World Using Webcams, Cell Phones, and Satellites", Nov 2019, University of Kentucky (Forestry), Lexington, KY
20. "Learning to Map the Visual World", Jul 2019, Wright State University, Dayton, OH
21. "Understanding Places Using Ground-Level and Overhead Views" (Keynote), May 2019, Kentucky Geological Society (Annual Symposium), Lexington, KY
22. "Understanding Places Using Ground-Level and Overhead Views", Feb 2019, Notre Dame University, South Bend, IN
23. "A Generative Model of Worldwide Facial Appearance" (Keynote), Jan 2019, Workshop on Demographic Variations in Performance of Biometric Algorithms, Waikoloa Village, HI
24. "A Generative Model of Worldwide Facial Appearance", Jan 2019, IEEE Winter Conference on Applications of Computer Vision, Waikoloa Village, HI
25. "A Weakly Supervised Approach for Estimating Spatial Density Functions from High-Resolution Satellite Imagery", Nov 2018, ACM SIGSPATIAL, Seattle, WA
26. "Understanding Places Using Ground-Level and Overhead Views", Oct 2018, Commonwealth Computational Summit, Lexington, KY
27. "GeoLookbook: Modeling Worldwide Human Visual Appearance (Year 4)", Sep 2018, National Academy of Sciences (IC Academic Research Symposium), Washington, DC
28. "Understanding Places Using Ground-Level and Overhead Views", Aug 2018, Oak Ridge National Lab, Oak Ridge, TN
29. "WhatGoesWhere: Predicting Object Distributions from Above", Jul 2018, IGARSS, Valencia, Spain
30. "Building World Models for Situated Training and Planning", May 2018, Air Force Science and Technology 2030 Workshop, Bloomington, IN
31. "Recent Advances in Image Understanding", May 2018, DASC, Lexington, KY
32. "(Tutorial) Recent Advances in Deep Learning: Fusing Overhead and Ground-Level Views for Remote Sensing", April 2018, USGIF Annual Symposium, Tampa, FL

33. "Understanding Places Using Ground-Level and Overhead Views", Feb 2018, CVPR Area Chair Meeting, Toronto, Canada
34. "GeoLookbook: Modeling Worldwide Human Visual Appearance (Year 3)", Sep 2017, National Academy of Sciences (IC Academic Research Symposium), Washington, DC
35. "GPU Accelerated Computer Vision, Remote Sensing, and Machine Learning", Aug 2017, Kentucky Geological Service, Lexington, KY
36. "Fusing Overhead and Ground-Level Imagery to Improve Scene Understanding", Jul 2017, Planet, San Francisco, CA
37. "Learning about When and Where from Imagery", Jun 2017, Orbital Insight, Mountain View, CA
38. "(Tutorial) Recent Advances in Deep Learning: Fusing Overhead and Ground-Level Views for Remote Sensing", Jun 2017, USGIF Annual Symposium, San Antonio, TX
39. "How Computers See People (extended)", May 2017, CCTS Biomedical Informatics Seminar Series, Lexington, KY
40. "Understanding Places Using Ground-Level and Overhead Views", May 2017, Midwest Vision Meeting, Chicago, IL
41. "How Computers See People", Feb 2017, Suds'n'Science Speaker Series, West Sixth Brewing, Lexington, KY
42. "Learning about When and Where from Imagery", Feb 2017, University of Missouri, Department of Computer Science
43. "Localization, Mapping, and Image Understanding", Feb 2017, USGIF Machine Learning Symposium
44. "Deep Convolutional Neural Networks: Concepts and Examples (in Computer Vision)", Nov 2016, University of Kentucky, Society of Industrial and Applied Mathematics
45. "Crossview Convolutional Networks", Oct 2016, Applied Imagery and Pattern Recognition, Washington, D.C.
46. "GeoLookbook: Modeling Worldwide Human Visual Appearance (Year 2)", Sep 2016, National Academy of Sciences (IC Academic Research Symposium), Washington, DC
47. "Deep Convolutional Neural Networks: Concepts and Examples", Jul 2016, University of Kentucky: Systems Biology and Omics Integration Seminar
48. "Crossview Methods for Localization and Mapping", Jun 2016, IEEE CVPR Workshop on "Vision from Satellite to Street" (invited talk)
49. "A Fast Method for Estimating Transient Scene Properties", Mar 2016, Winter Conference on Applications of Computer Vision, Lake Placid, NY
50. "Novel Cues for Geocalibration", Feb 2016, Indiana University, Bloomington, IN
51. "Novel Cues for Camera Geocalibration", Jan 2016, Uber Advanced Technology Center, Pittsburgh, PA
52. "Novel Cues for Geocalibration: Cloudy Days, Rainbows, and More", Oct 2015, Carnegie Mellon University, Pittsburgh, PA
53. "Using Geotagged Internet Imagery to Understand the World", Sep 2015, Université Laval, Quebec City, Canada
54. "face2gps: Estimating Geographic Location from Facial Features", Sep 2015, International Conference on Image Processing, Quebec City, Canada

55. "GeoLookbook: Modeling Worldwide Human Visual Appearance", Sep 2015, National Academy of Sciences (IC Academic Research Symposium), Washington, DC
56. "Exploring the Geo-Dependence of Human Face Appearance", Mar 2014, Winter Conference on Applications of Computer Vision, Steamboat Springs, CO
57. "Estimating Cloudmaps from Outdoor Image Sequences", Mar 2014, Winter Conference on Applications of Computer Vision, Steamboat Springs, CO
58. "Scene Geometry from Several Partly Cloudy Days", Oct 2013, International Conference on Distributed Smart Cameras, Palm Springs, CA
59. "Unlocking the Potential of the Global Network of Outdoor Webcams", Apr 2013, Rochester Institute of Technology
60. "Geo-temporal Computer Vision: Applications to the NGA", Nov 2011, National Geospatial-Intelligence Agency
61. "Geo-temporal Computer Vision: Applications to the Army", Oct 2011, Army Research Lab
62. "Localizing, Calibrating, and Using Thousands of Outdoor Webcams", Feb 2011, University of North Carolina–Charlotte
63. "Using Clouds Shadows to Infer Scene Structure and Camera Calibration", Jun 2010, CVPR, San Francisco, CA
64. "Passive Vision and The Power of Collective Imaging", Apr 2010, Object Video Inc., Reston, VA
65. "Localizing, Calibrating, and Using Thousands of Outdoor Webcams", Apr 2010, University of Kentucky
66. "Time-Lapse Vision: Localizing, Calibrating, and Using Thousands Outdoor Webcams", Apr 2010, Google, Mountain View, CA
67. "Passive Vision and The Power of Collective Imaging", Jan 2010, Google, Mountain View, CA
68. "Incorporating Domain Constraints in Urban Vehicle Tracking", Nov 2010, University of Missouri, Columbia, MO
69. "Compressive Sensing and Differential Image-Motion Estimation", Mar 2010, ICASSP, Dallas, TX
70. "The Global Network of Outdoor Webcams: Properties and Applications ", Nov 2009, ACM GIS, Seattle, WA
71. "Passive Vision: The Global Webcam Imaging Network", Oct 2009, AIPR, Washington, DC
72. "Calibrating and Using the Global Network of Outdoor Webcams", Aug 2009, ICDSC, Italy
73. "Adventures in Archiving and Using Three Years of Webcam Images", Jun 2009, CVPR Workshop on Internet Vision, Miami, FL
74. "Recent Work: Webcams and Grooves", Aug 2009, Object Video, Reston, VA
75. "Location-Specific Models for Tracking", Jan 2008, WMVC, Copper Mountain, CO
76. "Using natural cues to geo-locate and geo-orient distributed cameras", Jan 2008, VISN, Copper Mountain, CO
77. "Foreground Modeling: The Shape of Things That Came", Feb 2007, WMVC, Austin, Texas

## 7 Service

### University Service

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

### Professional Service

- Area Chair:
  - IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2018, 2019, 2021, 2023, 2024 (senior), 2025 (lead), 2026 (senior)]
  - European Conference on Computer Vision (ECCV) [2022, 2024 (lead)]
  - IEEE/CVF International Conference on Computer Vision (ICCV) [2023, 2025 (lead)]
  - Conference on Neural Information Processing Systems (NeurIPS) [2024]

- IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [2014, 2022, 2023]
- Organizing Committees:
  - IEEE/ISPRS Workshop on Large Scale Computer Vision for Remote Sensing Imagery (EARTHVISION) [2019–2023, 2025–2026]
  - Foundational Models Beyond the Visual Spectrum (workshop at IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) ) [2026]
  - Doctoral Consortium Co-Chair: IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2017, 2019, 2024, 2025]
  - Industrial/Government Relations Chair: IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [2024]
  - Doctoral Consortium Chair: IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [2018, 2022]
  - Video Proceedings Chair: IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2015]
  - IEEE Workshop on Motion and Video Computing (WMVC) [2011]
- Guest Editor:
  - ISPRS Journal of Photogrammetry and Remote Sensing [2024], Special Issue “Vision Language Models for Remote Sensing Analysis and Interpretation”
  - IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (J-STARS) [2021], Special Issue “Integrating User Generated Contents for Remote Sensing Applications”
  - Elsevier Computer Vision and Image Understanding (CVIU) [2019], Special Issue “Computer Vision for Remote Sensing”
- Panelist:
  - Roundtable Discussion at 1st Workshop on Computer Vision for Earth Observation (CV4EO) Applications 2024 (Hosted as part of IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) 2024)
- Session Chair:
  - IEEE International Geoscience and Remote Sensing Symposium (IGARSS) [2020,2023]
  - IEEE/ISPRS Workshop on Large Scale Computer Vision for Remote Sensing Imagery (EARTHVISION) [2019]
  - IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [2016, 2019, 2022, 2024]
  - IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) [2018, 2024, 2025]
  - IEEE/ACM International Conference on Distributed Smart Cameras [2013]
- Reviewing for Journals:
  - Proceedings of the National Academy of Sciences [2024]
  - IEEE Transactions on Geoscience and Remote Sensing [2020]
  - ISPRS Journal of Photogrammetry and Remote Sensing [2020]
  - IEEE Transactions on Pattern Analysis and Machine Intelligence [2011×2, 2012, 2018, 2019]
  - ISPRS Journal of Photogrammetry and Remote Sensing [2019]
  - IEEE Transactions on Geoscience and Remote Sensing [2017]

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

- Panelist for NSF Information and Intelligent Systems Division [2019]
- Panelist for NSF Information and Intelligent Systems Division [2018]
- Panelist for NSF Information and Intelligent Systems Division [2017]
- Panelist for NSF Division of Industrial Innovation and Partnerships [2016]
- Panelist for NSF Information and Intelligent Systems Division [2016]
- Panelist for NSF Information and Intelligent Systems Division [2015]
- External reviewer for NSF Information and Intelligent Systems Division [2015]
- External reviewer for Fonds de recherche du Quebec [2014]
- Advisory Committee for:
  - 1st Workshop on Computer Vision for Earth Observation (CV4EO) Applications 2024 (Hosted as part of IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) 2024)

## Memberships

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

## 8 Teaching and Mentoring

### Courses Taught

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

- *Advances in Computer Vision*, CSE 659a, [F2024], Washington University in St. Louis
- *Computer Vision*, CSE 559a, [S2023, S2024, S2025], 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. Adeel Ahmad (Ph.D. Geomatics, University of Punjab–Lahore) Dates: 2023–2024  
Research Focus: Remote Sensing, Deep Learning, Land-Use Modeling
2. Benjamin Brodie (Ph.D. Mathematics, University of Kentucky) Dates: 2020–2022  
Research Focus: Change Detection, Object Tracking, Re-Identification, Metric Learning  
Employment: Research Scientist, Blue Halo

## 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 [ <i>co-chair</i> 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: May 2026 (est)
17. Srikumar Sastry	Degree: Ph.D., Imaging Science Title: Task-Aligned Multimodal Representation Learning Date: Dec 2026
18. Michael Lanier [ <i>co-chair</i> 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. Tong Li [ <i>co-chair</i> with Joshua Oltmanns]	Degree: Ph.D., Computational & Data Sciences Title: TBD Date: TBD
22. Nia Hodges	Degree: Ph.D., Electrical and Systems Engineering Title: TBD Date: TBD
23. Eric Xing	Degree: Ph.D., Computer Science Title: TBD Date: TBD
24. Daniel Cher	Degree: Ph.D., Computational & Data Sciences Title: TBD Date: TBD
25. Feng Qiao	Degree: Ph.D., Computer Science Title: TBD Date: TBD
26. Danni Beaulieu	Degree: Ph.D., Computer Science Title: TBD 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

## Masters Students

1. Feiyu Shi  
Title: Principal Component Analysis For Multi-size Images  
Degree: MS, Computer Science  
Date: Dec 2013
2. Ryan Baltenberger  
Title: Estimating Transient Scene Attributes Using Deep Convolutional Neural Networks  
Degree: MS, Computer Science  
Date: May 2016
3. William “Derek” Jones [*co-chair* w/ Sally Ellingson]  
Title: Scalable Feature Selection and Extraction with Applications in Kinase Polypharmacology  
Degree: MS, Computer Science  
Date: May 2018
4. [Weilian “William” Song](#)  
Title: Image-Based Roadway Assessment using Convolutional Neural Networks  
Degree: MS, Computer Science  
Date: May 2019
5. [Armin Hadzic](#)  
Title: Estimating Free-Flow Speed with LiDAR and Overhead Imagery  
Degree: MS, Computer Science  
Date: May 2020
6. David Jones  
Title: Intensity Harmonization for Airborne LiDAR  
Degree: MS, Computer Science  
Date: May 2021
7. Jacob Birge  
Title: A Cost-Sensitive Approach To Multimodal Fusion  
Degree: MS, Computer Science  
Date: Dec 2021
8. Alex Greene  
Title: Using Aerial Imagery to Estimate Ground-level Object Distributions  
Degree: MS, Computer Science  
Date: May 2023
9. Alex Wollam  
Title: Exploring Sequential Outdoor Panorama Synthesis with Diffusion Models  
Degree: MS, Computer Science  
Date: Jul 2023
10. Hongzhang Wang  
Title: Monocular Depth Estimation  
Degree: MS, Computer Science  
Date: Dec 2023
11. Nia Hodges  
Title: Wide-Area Image Localization  
Degree: MS, Engineering Data Analytics & Statistics  
Date: May 2024
12. Wanzhou Liu  
Title: High Efficiency Generalizable Driving Driving World Model  
Degree: MS, Computer Science  
Date: Fall 2024
13. Lunchi Guo  
Title: Deep Learning-Based Coordinate Prediction from Medical Fluoroscopic Images for Improved Radiation  
Date: Fall 2024  
Degree: MS, Computer Engineering
14. Lunchi Guo  
Title: MedVid-Align: Intelligent Analysis of Medical Procedure Videos  
Degree: MS, Computer Engineering  
Date: Spring 2025
15. Myan Sudharsanan  
Title: VisionLLMs in the Automotive Domain: Finegrained Details of Traffic Signs and Passenger Vehicles  
Date: Spring 2025  
Degree: MS, Computer Engineering
16. Ethan Weilheimer  
Title: Partially Supervised Reinforcement Learning for GPS-Denied Navigation  
Degree: MS (thesis), Computer Science  
Date: Spring 2025
17. Vinh Pham  
Title: Automated Satellite Imagery Analysis for Global Agricultural Field Boundary Detection  
Degree: MS, Engineering Data Analytics and Statistics  
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. Mohammad Rouie Miab	Degree: MS, Computer Science
Title: Enhancing Semantic Precision in Text-to-Image Generation	Date: Spring 2026

## Undergraduate Research Students

1. Jim Knochelmann	Dates: 2011–2012
Title: User-Tools for Aerial Image Registration	
2. Kyle Kolpek	Dates: 2012
Title: Aerial Image Registration	
3. Noora Aljabi	Dates: 2013
Title: Using Flickr to Map Phenological Trends	
4. J. David Smith	Dates: 2013–2015
Title: User-in-the-loop Camera Calibration	
5. Angelo Stekardis	Dates: 2014–2015
Title: Understanding Facial Expressions	
6. Ryan Baltenberger	Dates: 2012–2015
Title: Understanding Outdoor Scene Appearance	
7. Connor Greenwell	Dates: 2014–2016
Title: Interactive Methods for Aerial Imagery Understanding	
8. Sam Davidson	Dates: 2016–2017
Title: Applications of Generative Adversarial Networks to Social Media Imagery	
9. Aaron Mueller	Dates: 2018
Title: Deep Learning for Educational Data	
10. Weilian Song	Dates: 2016–2019
Title: Applications of Deep Convolutional Neural Networks to Geometric Computer Vision	
11. Yuhan Long	Dates: 2019
Title: Deep Learning for Medical Imaging	
12. Thomas Barber	Dates: 2019
Title: Deep Learning for Remote Sensing	
13. Sean Grate	Dates: 2019–2020
Title: Deep Learning for Point Clouds	

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| 14. Shashank Bhatt   | Dates: 2020–2022 |
| Title: Multi-Object Tracking   |                  |
| 15. Evan Bolton  | Dates: 2021      |
| Title: Generating Synthetic Training Data using a Game Engine  |                  |
| 16. Julia Stekardis  | Dates: 2021–2022 |
| Title: Large-Scale Image Geo-Localization  |                  |
| 17. Gareth Walker  | Dates: 2022      |
| Title: Remote Sensing for Social Good  |                  |
| 18. Matthew Mitchell   | Dates: 2022      |
| Title: Remote Sensing for Social Good  |                  |
| 19. Cohen Archbold   | Dates: 2020–2022 |
| Title: Automatic Real-Estate Price Estimation  |                  |
| 20. Brian Wei  | Dates: Fall 2025 |
| Title: Stereo Video Analysis   |                  |
| 21. Dev Gupta  | Dates: Fall 2025 |
| Title: Temporally-Consistent Stereo Video Generation   |                  |
| 22. Ice Cui  | Dates: Fall 2025 |
| Title: Leveraging Diffusion Transformers to Improve GeoSynth Scalability and Cross-Scale Consistency |                  |

## **High School Research Students**

- |   |                  |
|---|------------------|
| 1. Ryan Baltenberger  | 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  
 Role: member  
 Title: Analyzing Sybil Attacks and Similar Phenomena in Twitter Data
14. Wesley Hough  
 Role: outside examiner  
 Title: On Independence, Matching, and Homomorphism Complexes
15. Qingguo Xu  
 Role: member  
 Title: 3D Body Tracking using Deep Learning
16. Xiaofei Zhang  
 Role: member  
 Title: Mammogram and Tomosynthesis Classification Using Convolutional Neural Networks
17. Yajie Zhao  
 Role: member  
 Title: 3D Human Face Reconstruction and 2D Appearance Synthesis
18. Po-Chang Su  
 Role: member  
 Title: Real-time Capture and Rendering of Physical Scene with an Efficiently Calibrated RGB-D Camera Network
19. Anthony Rios  
 Role: member  
 Title: Deep Neural Networks for Multi-Label Text Classification: Application to Coding Electronic Medical Records
20. Ethan Welty (University of Colorado–Boulder)  
 Role: member  
 Title: High-Precision Photogrammetry for Glaciology
21. Yannick Hold-Geoffroy (Laval University, Quebec, CA)  
 Role: member  
 Title: Learning Geometric and Lighting priors from Natural Images
22. Nkiruka Uzuegbunam  
 Role: member  
 Title: Self-Image Multimedia Technologies for Feedforward Observational Learning
23. Nam Vo (Georgia Institute of Technology)  
 Role: member  
 Title: Image Geolocalization with Deep Learning
24. Jinping Zhuge  
 Role: outside examiner  
 Title: Boundary layers in periodic homogenization
25. Ryan Zembrodrt  
 Role: member  
 Title: Open-World Story Generation with Sequence-to-Sequence and Hierarchical Recurrent Encoder-Decoder Models
- Degree: M.S., Computer Science  
 Date: Spring 2017
- Degree: Ph.D., Computer Science  
 Date: Spring 2017
- Degree: M.S., Computer Science  
 Date: Spring 2017
- Degree: M.S., Computer Science  
 Date: Summer 2017
- Degree: Ph.D., Computer Science  
 Date: Fall 2017
- Degree: Ph.D., Electrical Engineering  
 Date: Fall 2017
- Degree: Ph.D., Computer Science  
 Date: Summer 2018
- Degree: Ph.D., Environmental Studies  
 Date: Summer 2018
- Degree: Ph.D., Computer Science  
 Date: Summer 2018
- Degree: Ph.D., Electrical Engineering  
 Date: Oct 2018
- Degree: Ph.D., Computer Science  
 Date: Spring 2019
- Degree: Ph.D., Math  
 Date: Spring 2019
- Degree: M.S., Computer Science  
 Date: Spring 2019

26. Jonathan Dingess  
Role: member  
Title: Epsilon-Superposition and Truncation Dimension in Average and Probabilistic Settings for Infinite-Variate Linear Problems  
Degree: M.S., Computer Science  
Date: Spring 2019

27. Genghis Goodman  
Role: member  
Title: A Machine Learning Approach to Artificial Floorplan Generation  
Degree: M.S., Computer Science  
Date: Summer 2019

28. Xinxin Zuo  
Role: member  
Title: Depth Enhancement and Surface Reconstruction with RGB-D sequence  
Degree: Ph.D., Computer Science  
Date: Oct 2019

29. Sifei Han  
Role: member  
Title: Text Mining Methods for Analyzing Online Health Information and Communication  
Degree: Ph.D., Computer Science  
Date: Fall 2019

30. Shivangi Srivastava (Wageningen University, Netherlands)  
Role: member  
Title: Mapping of urban landuse and landcover with multiple sensors: joining close and remote sensing with deep learning  
Degree: Ph.D., Computer Science  
Date: Feb 2020

31. Raian Maretto (National Institute for Space Research)  
Role: member  
Title: Deep Learning techniques applied to classification of Remote Sensing Images  
Degree: Ph.D., Geoinformation Science  
Date: Feb 2020

32. Kyle Helfrich  
Role: member  
Title: Orthogonal Recurrent Neural Networks and Batch Normalization in Deep Neural Networks  
Degree: Ph.D., Math  
Date: Spring 2020

33. Subash Khanal  
Role: member  
Title: Mispronunciation Detection and Diagnosis in Mandarin Accented English Speech  
Degree: M.S., Electrical Engineering  
Date: Spring 2020

34. Narjes Bozorg  
Role: member  
Title: Articulatory-Wavenet: Deep Autoregressive Model for Acoustic-to-Articulatory Inversion  
Degree: Ph.D., Electrical Engineering  
Date: Nov 2020

35. Céline Portenier (University of Bern)  
Role: external referee  
Title: High-resolution snow cover retrieval using public webcams  
Degree: Ph.D., Computer Science  
Date: Spring 2021

36. Ahmed Nassar (IRISA, Université Bretagne Sud, Vannes)  
Role: external referee  
Title: Learning to map street-side objects using multiple views  
Degree: Ph.D., Computer Science  
Date: Spring 2021

37. Alireza Shirvani  
Role: member  
Title: Personality and Emotion for Virtual Characters in Strong-story Narrative Planning  
Degree: Ph.D., Computer Science  
Date: Summer 2021

38. Sajad Javadinasab Hormozbad  
Role: member  
Title: Artificial Intelligence and Soft Computing in Smart Structural Systems  
Degree: Ph.D., Civil Engineering  
Date: Nov 2021

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

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| 53. | David Sarpong   | Degree: M.S., Computer Science<br>Date: Spring 2023  |
|     | Role: member  |  |
|     | Title: Adversarial Defenses against Interpolation Attacks on Semi-Supervised Learning Systems |  |
| 54. | Yihang Xu   | Degree: M.S., Computer Science<br>Date: Spring 2023  |
|     | Role: member  |  |
|     | Title: Real-Time Action Segmentation in a Smart Kitchen System                                |  |
| 55. | Stephen Parsons   | Degree: Ph.D., Computer Science<br>Date: Summer 2023 |
|     | Role: member  |  |
|     | Title: Hard-Hearted Scrolls: A Noninvasive Method for Reading the Herculaneum Papyri          |  |
| 56. | Brian Chao  | Degree: M.S., Computer Science<br>Date: Summer 2023  |
|     | Role: member  |  |
|     | Title: Adversarial Attacks on AI Systems in Medical Applications                              |  |
| 57. | Chang Ti  | Degree: M.S., Computer Science<br>Date: Fall 2023    |
|     | Role: member  |  |
|     | Title: Handwritten Digit Recognition Web Plugin   |  |
| 58. | Emma McMillian  | Degree: M.S., Computer Science<br>Date: Fall 2023    |
|     | Role: member  |  |
|     | Title: Convolutional Neural Networks for Hyperspectral Image-to-Image Microscopy Translation  |  |
| 59. | Fiona Xu  | Degree: M.S., Computer Science<br>Date: Fall 2023    |
|     | Role: member  |  |
|     | Title: Adversarial Attack on Graph Embeddings from Text Dataset                               |  |
| 60. | Kyle Montgomery   | Degree: M.S., Computer Science<br>Date: Spring 2024  |
|     | Role: member  |  |
|     | Title: Exploring the Reasoning Abilities of Large Language Models                             |  |
| 61. | Joshua Tang   | Degree: M.S., Computer Science<br>Date: Spring 2024  |
|     | Role: member  |  |
|     | Title: Autonomous Vehicle Object Classification with Uncertainty                              |  |
| 62. | Patrick Lynch   | Degree: M.S., Computer Science<br>Date: Spring 2024  |
|     | Role: member  |  |
|     | Title: An Automated System for Detecting Errors in Oatmeal-Making Research Task               |  |
| 63. | Owen Ma   | Degree: M.S., Computer Science<br>Date: Fall 2024    |
|     | Role: member  |  |
|     | Title: Towards Verified Vision-Based Neural Network Controllers for Autonomous Lane-Following |  |
| 64. | Minoo Hosseinzadeh  | Degree: Ph.D., Computer Science<br>Date: Fall 2024   |
|     | Role: member  |  |
|     | Title: Smart QoS-Aware Resource Management For Edge Intelligence Systems                      |  |
| 65. | Junlin Wu   | Degree: Ph.D., Computer Science<br>Date: Spring 2025 |
|     | Role: member  |  |
|     | Title: Trustworthy Autonomy Through Robust Control and Alignment                              |  |
| 66. | Evin Jaff   | Degree: M.S., Computer Science<br>Date: Fall 2024    |
|     | Role: member  |  |
|     | Title: SwiftFake: Real-Time Defense Against Deepfake Calls                                    |  |

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| 67. | Yin Li<br>Role: member<br>Title: 3D Analysis of Spatial Transcriptome  | Degree: M.S., Computer Science<br>Date: Fall 2024    |
| 68. | Sizhe Zhang<br>Role: member<br>Title: ProofTutor: LLM-based formal math proving model  | Degree: A.M., Statistics<br>Date: Fall 2024          |
| 69. | Ye Htet<br>Role: member<br>Title: System Design and Task Scheduling for Real-Time Scientific Sensing Applications in Space   | Degree: Ph.D., Computer Science<br>Date: Fall 2024   |
| 70. | Zifan Wang<br>Role: member<br>Title: GCHP Workload Balancing   | Degree: M.S., Computer Science<br>Date: Spring 2025  |
| 71. | Yuxuan Yang<br>Role: member<br>Title: Training Safety Filters for Safe Control with Partial Observed and Un-labeled Data   | Degree: M.S., Computer Science<br>Date: Spring 2025  |
| 72. | Haris Naveed<br>Role: chair<br>Title: Deep Leraning for Tree Canopy Height Estimation  | Degree: M.S., Computer Science<br>Date: Spring 2025  |
| 73. | Sheng-Chieh Lin (University of Kentucky)<br>Role: member<br>Title: Machine Learning for Mapping and Understanding Galaxy Clusters  | Degree: Ph.D., Physics<br>Date: Spring 2025          |
| 74. | Hao Liu<br>Role: member<br>Title: Toward Graph Foundation Models: Few-shot and Zero-shot Learning on Graphs  | Degree: Ph.D., Computer Science<br>Date: Spring 2025 |
| 75. | Yiwen Ju<br>Role: member<br>Title: Geometric Modeling through Multiple Implicit Functions  | Degree: Ph.D., Computer Science<br>Date: Fall 2025   |
| 76. | Morris Alper (Tel Aviv University)<br>Role: member<br>Title: Multimodal Learning for High-Level Semantic Understanding: From Interpretability to Real-World Applications     | Degree: Ph.D., Computer Science<br>Date: Fall 2025   |
| 77. | Gustavo Gratacós<br>Role: member<br>Title: Tree Recovery by Dynamic Programming  | Degree: Ph.D., Computer Science<br>Date: Spring 2024 |
| 78. | Weijie Gan<br>Role: member<br>Title: Computational Imaging under Incomplete Information  | Degree: Ph.D., Computer Science<br>Date: Summer 2025 |
| 79. | Weining Wang<br>Role: member<br>Title: Corrupted MRI Brain Image Restoration with Neural Networks  | Degree: M.S., CSE<br>Date: Spring 2026               |
| 80. | Sidrah Liaqat (University of Kentucky)<br>Role: member<br>Title: Model-based Deep Learning Techniques for Detecting Behaviors Related to Autism Spectrum Disorder from Video | Degree: Ph.D., Electrical Engineering<br>Date: TBD   |

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| 81. | Nischal Khanal<br>Role: member<br>Title: Cortical Motor Programs as Biomarkers for Functional Impairment and Recovery After Stroke                                       | Degree: Ph.D., Imaging Science<br>Date: TBD               |
| 82. | Christoph Gerhardt (Technische Universität Ilmenau)<br>Role: member<br>Title: Outdoor Appearance Transfer  | Degree: Ph.D., Computer Science<br>Date: TBD              |
| 83. | Anindya Sarkar<br>Role: member<br>Title: TBD   | Degree: Ph.D., Computer Science<br>Date: TBD              |
| 84. | Rachel Badzioch (Notre Dame University)<br>Role: member<br>Title: Detecting Visual Features in Permafrost  | Degree: Ph.D., Biological Sciences<br>Date: TBD           |
| 85. | Ruiqi Wang<br>Role: member<br>Title: Real-time and Embedded Systems and Efficient Human Activity Recognition   | Degree: Ph.D., Computer Science<br>Date: TBD              |
| 86. | Kyle Wolford<br>Role: member<br>Title: Enhancing Plug-and-Play Image Registration via Diffusion  | Degree: M.S., Computer Science<br>Date: Spring 2025       |
| 87. | Je-Hoon Michael Oh<br>Role: member<br>Title: TBD   | Degree: Ph.D., Computational Systems Biology<br>Date: TBD |
| 88. | Tri Pham<br>Role: member<br>Title: Adaptive Historical Context: Granular Activity Tracking for Interruption Recovery in Software Development                             | Degree: Ph.D., Computer Science<br>Date: TBD              |
| 89. | Lisa Liao<br>Role: member<br>Title: Interpretable Deep Learning for Multi-Trait Analysis of Biological Pathways  | Degree: Ph.D., Computer Science<br>Date: TBD              |
| 90. | Yu Yan<br>Role: member<br>Title: Improvement and Analysis of Ambient Nitrogen Dioxide Estimation with Machine Learning, Satellite Remote Sensing, and Chemical Transport | Degree: Ph.D., EECE<br>Date: TBD                          |
| 91. | Evelyn Yang<br>Role: member<br>Title: TBD  | Degree: Ph.D., CSE<br>Date: TBD                           |
| 92. | Aadarsha Gopala Reddy<br>Role: member<br>Title: TBD  | Degree: M.S., CSE<br>Date: TBD                            |

## Oral Qualifying Exam Committees

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