Jenna M. Kline

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Education

2021 - 2026 **PhD Computer Science & Engineering**, **The Ohio State University**
Major: Software Systems | Minors: Artificial Intelligence & Imageomics
Advisors: Dr. Christopher Stewart and Dr. Tanya Berger-Wolf
Thesis Committee: Dr. DK Panda and Dr. Tilo Burghardt
Dissertation: *Autonomous Drone Systems for In Situ Animal Ecology: Towards AI-Driven Multi-Modal Ecosystem Monitoring at the Far Edge*

2014 - 2018 **B.S. Industrial Engineering**, *cum laude*, **The Ohio State University**
Honors in Integrated Business and Engineering (IBE)

Research Interests

Intelligent Systems for Adaptive Ecosystem Observation at the Far Edge

I am a computer systems researcher who designs, builds, and deploys intelligent sensing systems for dynamic field environments. My work integrates edge AI and distributed computing, computer vision, adaptive autonomy, robotics and sensor hardware, and multimodal sensing. I develop systems foundations for coordinated, cross-modal sensing networks that adapt what, where, and when they observe at the far edge, with applications spanning wildlife monitoring and coastal resilience.

Research Experience and Appointments

Massachusetts Institute of Technology, Postdoctoral Associate Jun 2026 - present

Research on coastal resilience, using satellite imagery, drones and computer vision to monitor salt marsh habitats through the Climate Project at MIT, supervised by Dr. Heidi Nepf.

The Ohio State University, Graduate Research Assistant Aug 2021 - May 2026

Research supported by NSF Imageomics (Award 2118240) and ICICLE (Award 2112606).

Visiting PhD Candidate, WildDroneEU 2024-2026

Visiting researcher conducting autonomous-drone fieldwork in Kenya and participating in WildDrone summer schools at SDU and the Max Planck Institute of Animal Behavior.

Los Alamos National Laboratory, Supercomputer Institute Graduate Intern Summer 2023

Completed high performance computing bootcamp. Conducted research on scalable characterization of HPC filesystem trees using GUFI; developed tree-description methods, presented at the SC23 ACM Student Research Competition.

Research Outputs

Selected Publications

1. **J. Kline**, S. Stevens, D. I. Rubenstein, T. Berger-Wolf, and C. Stewart. "What the Sheep Can Teach the Shepherd: A Vision for Self-Organizing Drone Swarms Informed by Collective Animal Behavior." In: *2026 IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS)*. 2026. To appear. *[Vision paper]*
2. **J. Kline**. "A Maneuver-Indexed Testbed for Context-Aware Adaptive Wildlife Drones." In: *2026 IEEE International Conference on Autonomic Computing and Self-Organizing Systems Companion (ACSOS-C)*. 2026. To appear. *[Peer-reviewed artifact paper]*
3. **J. Kline**, A. Zhong, K. Irizarry, C. V. Stewart, C. Stewart, et al. "WildWing: An Open-Source, Autonomous and Affordable UAS for Animal Behaviour Video Monitoring." *Methods in Ecology and Evolution* 17.2 (2026), pp. 291–300. doi:10.1111/2041-210X.70018.
4. **J. Kline**, R. Katole, T. Berger-Wolf, and C. Stewart. "Edge-Native, Behavior-Adaptive Drone System for Wildlife Monitoring." In: *DroneSys: Workshop on Autonomous Drone Computing Systems and Applications at the ACM/IEEE Symposium on Edge Computing (SEC)*. 2025. Associated work received First Place in the SEC 2025 Student Research Competition. doi:10.1145/3769102.3774245.
5. **J. Kline**, S. Afridi, E. G. A. Rolland, G. Maalouf, L. Laporte-Devylder, et al. "Studying Collective Animal

Behaviour with Drones and Computer Vision." *Methods in Ecology and Evolution* 16.10 (2025), pp. 2229–2259. **2025 Robert May Prize**. doi:10.1111/2041-210X.70128.

6. **J. Kline**, A. O'Quinn, T. Berger-Wolf, and C. Stewart. "Characterizing and Modeling AI-Driven Animal Ecology Studies at the Edge." In: *2024 IEEE/ACM Symposium on Edge Computing (SEC)*. 2024, pp. 220–233. doi:10.1109/SEC62691.2024.00025.

Journal Articles

7. G. Maalouf et al., including **J. Kline**. "SORA 2.5-Guided BVLOS UAS for Wildlife Conservation in Kenya: Reducing Friction Between Safety and Field Operations." *Drones* 10.3 (2026). doi:10.3390/drones10030178
8. I. Duporge, M. Kholiavchenko, et al. including **J. Kline**. "BaboonLand Dataset: Tracking Primates in the Wild and Automating Behaviour Recognition from Drone Videos." *International Journal of Computer Vision* 133.9 (2025), pp. 6578–6589. doi:10.1007/s11263-025-02493-5.
9. M. Kholiavchenko, **J. Kline**, M. Kukushkin, O. Brookes, S. Stevens, et al. "Deep Dive into KABR: A Dataset for Understanding Ungulate Behavior from In-Situ Drone Video." *Multimedia Tools and Applications* 84.21 (2025), pp. 24563–24582. doi:10.1007/s11042-024-20512-4.
10. S. Afridi, L. Laporte-Devylder, G. Maalouf, **J. Kline**, S. G. Penny, et al. "Impact of Drone Disturbances on Wildlife: A Review." *Drones* 9.4 (2025), article 311. doi:10.3390/drones9040311.

Peer-Reviewed Conference and Workshop Publications

11. B. Pillai, V. Viswapriyan, C. Stewart, T. Berger-Wolf, and **J. Kline**. "Cross-Modal Corroboration for Annotation-Free Wildlife Monitoring." In: *CV4Animals Workshop at the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. 2026. arXiv:2606.21613
12. C. Sun, T. Berger-Wolf, and **J. Kline**. "Autonomous UAV Navigation for Individual Wildlife Re-Identification." In: *CV4Animals Workshop at the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. 2026. arXiv:2606.31772
13. A. O'Quinn, C. Snedeker, S. Zhang, and **J. Kline**. "Environment-Aware Dynamic Pruning for Pipelined Edge Inference." In: *2025 IEEE International Conference on Edge Computing and Communications (EDGE)*. 2025, pp. 83–89. doi:10.1109/EDGE67623.2025.00018
14. **J. Kline**, A. Potlapally, B. Pillai, T. Wani, R. Katole, et al. "SmartWilds: Multimodal Wildlife Monitoring Dataset." In: *Third Workshop on Imageomics at NeurIPS*. 2025. arXiv:2509.18894.
15. S. Stevens, S. M. Rayeed, and **J. Kline**. "Mind the (Data) Gap: Evaluating Vision Systems in Small Data Applications." In: *Third Workshop on Imageomics at NeurIPS*. 2025. arXiv:2504.06486.
16. **J. Kline**, S. Stevens, G. Maalouf, C. R. Saint-Jean, D. N. Ngoc, et al. "MMLA: Multi-Environment, Multi-Species, Low-Altitude Aerial Footage Dataset." In: *CV4Animals Workshop at the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. 2025. arXiv:2504.07744.
17. N. N. Dat, T. Richardson, M. Watson, K. Meier, **J. Kline**, et al. "WildLive: Near Real-Time Visual Wildlife Tracking Onboard UAVs." In: *CV4Animals Workshop at the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. 2025. arXiv:2504.10165.
18. **J. Kline**, R. Katole, and C. Stewart. "An Edge-Native Approach to Behavior-Adaptive Navigation in Drone Systems." In: *Proceedings of the Tenth ACM/IEEE Symposium on Edge Computing (SEC)*. 2025, pp. 1–3. **SEC 2025 Student Research Competition — First Place**. doi:10.1145/3769102.377437. *[Extended abstract; presented as poster]*
19. P. Covey, **J. Kline**, and C. Stewart. "An Edge-to-Cloud Framework for Vigilance-Adaptive Drones." In: *Proceedings of the Tenth ACM/IEEE Symposium on Edge Computing (SEC)*. 2025, pp. 1–3. doi:10.1145/3769102.3774384. *[Extended abstract; presented as poster]*
20. **J. Kline**. "An Adaptive Autonomous Aerial System for Dynamic Field Animal Ecology Studies." In: *2024 IEEE International Conference on Autonomic Computing and Self-Organizing Systems Companion (ACSOS-C)*. 2024, pp. 164–166. doi:10.1109/ACSOS-C63493.2024.00051 *[PhD Forum extended abstract]*
21. M. Kholiavchenko, **J. Kline**, M. Ramirez, S. Stevens, A. Sheets, et al. "KABR: In-Situ Dataset for Kenyan Animal Behavior Recognition from Drone Videos." In: *IEEE/CVF Winter Conference on Applications of Computer Vision Workshops (WACVW)*. 2024, pp. 31–40. doi:10.1109/WACVW60836.2024.00011.
22. **J. Kline**, M. Kholiavchenko, O. Brookes, T. Berger-Wolf, C. V. Stewart, et al. "Integrating Biological Data into Autonomous Remote Sensing Systems for In Situ Imageomics: A Case Study for Kenyan Animal Behavior Sensing with Unmanned Aerial Vehicles." In: *First Workshop on Imageomics at AAAI*. 2024. arXiv:2407.16864.
23. D. Grushchak, **J. Kline**, D. Pianini, N. Farabegoli, G. Aguzzi, et al. "Decentralized Multi-Drone Coordination for Wildlife Video Acquisition." In: *2024 IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS)*. 2024, pp. 31–40. doi:10.1109/ACSOS61780.2024.00021.
24. D. Grushchak, **J. Kline**, D. Pianini, and N. Farabegoli. "An Agent-Based Model of Directional Multi-Herds." In:

2024 IEEE International Conference on Autonomic Computing and Self-Organizing Systems Companion (ACSOS-C). 2024, pp. 15–20. doi:10.1109/ACSOS-C63493.2024.00023.

25. E. Rolland, K. A. R. Grøntved, L. Laporte-Devylder, **J. Kline**, U. P. S. Lundquist, et al. "Drone Swarms for Animal Monitoring: A Method for Collecting High-Quality Multi-Perspective Data." In: *15th International Micro Air Vehicle Conference (IMAV)*. 2024, pp. 316–323.
26. **J. M. Kline**, J. Lee, and R. Davis. "Seeing the Trees for the Forest: Describing HPC Filesystem Trees with the Grand Unified File-Index (GUFI)." In: *ACM Student Research Competition at the International Conference for High Performance Computing, Networking, Storage, and Analysis (SC23)*. Denver, CO, 2023. *[Extended abstract; presented as poster]*
27. **J. Kline**, C. Stewart, T. Berger-Wolf, M. Ramirez, S. Stevens, et al. "A Framework for Autonomic Computing for In Situ Imageomics." In: *2023 IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS)*. 2023, pp. 11–16. doi:10.1109/ACSOS58161.2023.00018.

Preprints and Articles Under Review

28. **J. Kline** et al. "Where to Trust Automation in Remote-Sensing-Based Animal Behavior Monitoring: An Empirical Evaluation Using Drone and Camera-Trap Video." 2026. Manuscript under review.
29. **J. Kline**, A. Potlapally, H. Subramoni, T. Berger-Wolf, and C. Stewart. "A Blueprint for Cross-Modal Coordination at the Far Edge." 2026. Manuscript under review.
30. **J. Kline**, K. Meier, V. Shukla, E. G. A. Rolland, E. Iannino, et al. "FAIR^2 Drones: An AI-Ready Standard for Cross-Domain Wildlife Drone Datasets." 2026. Manuscript under review. arXiv:2606.00355.
31. L. J. Pollock, P. H. P. Braga, C. R. Florian, K. Hébert, **J. Kline**, et al.. "Putting the 'Adaptive' in Adaptive Monitoring: From Fast Data to Meaningful Ecological Change." Manuscript under review, 2026. EcoEvoRxiv preprint. doi:10.32942/X2S94C.
32. K. Meier, E. G. A. Rolland, E. Iannino, M. Simpson, **J. Kline**, et al. "Simulated and Field-Based Error Characterization of Animal Geolocalisation and Relative Positioning via Commercial Drones." Manuscript under review, 2026.
33. V. Shukla, K. Meier, L. Laporte-Devylder, C. R. Saint-Jean, **J. Kline**, et al. "WildBox: A Dataset and Benchmark for Aerial Monocular 3D Detection of African Savanna Wildlife." Submitted, 2026. arXiv:2606.21309.
34. **J. Kline**, M. Kholiavchenko, S. Stevens, N. van Tiel, A. Zhong, et al. "kabr-tools: Automated Framework for Multi-Species Behavioral Monitoring." arXiv preprint, 2025. arXiv:2510.02030.

Invited Talks

35. **J. Kline**. "Lessons from FAIR^2 Drones: Toward AI-Ready Multimodal, Multispatial Sensor Data for Ecology." Invited symposium talk, "Building an AI-Ready Ecology and Biodiversity Data Infrastructure for Science and Action," Ecological Society of America (ESA) Annual Meeting, Salt Lake City, UT, July 2026. Scheduled.
36. **J. Kline**. Panelist, "AI for Ecology: Accelerating Discoveries, Reducing Uncertainties, and Scaling Solutions." Special Session SS23, Ecological Society of America (ESA) Annual Meeting, Salt Lake City, UT, July 2026. Scheduled.
37. **J. Kline**. "Autonomous Drones for Animal Studies with Edge AI." Global Conservation Tech & Drone Forum, Nairobi, Kenya, 2026.
38. **J. Kline**. "Drones and AI in Field Animal Ecology: Integrating Biology, Animal Science, and Technology." Fridays at Findlay, University of Findlay, 2025.
39. **J. Kline**. "From Ohio to Kenya: Autonomous Drones in Field Ecology and Conservation." Conservation Science Symposium, Muskingum University and The Wilds, 2025.
40. **J. Kline**. "Autonomous Drones for Collective Wildlife Behavior." WildDrone Seminar Series, 2025.
41. **J. Kline**. "Adaptive, Autonomous Aerial Systems for Dynamic Field Animal Ecology Studies." University of Bologna, Cesena, Italy, 2024.

Conference Presentations and Accepted Abstracts

42. **J. Kline** et al. "FAIR^2 Drones: An AI-Ready Standard for Cross-Domain Wildlife Drone Datasets." Accepted abstract, Biodiversity Information Standards Annual Conference (TDWG), Oslo, Norway, September 2026.
43. E. Sokol et al., including **J. Kline***. "A Metadata-First FAIR4AI Checklist and Automated Evaluation Agent for Biodiversity Datasets." Accepted abstract, TDWG, Oslo, Norway, September 2026. *Presenting author.
44. **J. Kline** et al. "Cross-Modal Coordination for Biodiversity Monitoring at Scale: Lessons from SmartWilds." Accepted abstract, TDWG, Oslo, Norway, September 2026.
45. **J. Kline** et al. "Digital Twins as System-Optimization Tools: Provisioning Edge and Cloud Infrastructure for Biodiversity Monitoring at Scale." Accepted abstract, TDWG, Oslo, Norway, September 2026.
46. **J. Kline** et al. "kabr-tools: A Modular Workflow for Automated Video-Based Behavioral Monitoring Across the

Autonomy Spectrum." Accepted abstract, TDWG, Oslo, Norway, September 2026.

47. **J. Kline** et al. "FAIR^2 Drones: An AI-Ready Standard for Cross-Domain Wildlife Drone Datasets." Poster, FARR Workshop: FAIR in ML, AI Readiness and Reproducibility, Washington, DC, 2026.
48. **J. Kline**. "Autonomous AI-Driven Environmental Sensing Systems." Poster, MIT and Boston University Rising Stars in EECS Workshop, 2025.
49. **J. Kline**. "How Do Drones Fit into Multimodal Sensing Networks?" Poster, WildDrone Summer School, Max Planck Institute of Animal Behavior, Konstanz, Germany, 2025.
50. **J. Kline**. "Autonomous, Adaptive Vision-Based Remote Sensing System for Dynamic Field Animal Ecology Studies." Oral presentation, Edward F. Hayes Advanced Research Forum, 2025. **First Place, Engineering Oral Presentation**.
51. **J. Kline**. "Individual Identification of Zebras with Autonomous UAV Swarms." Poster, TDAI Interdisciplinary Research Fall Forum, 2024. **Best Poster Award**.
52. **J. Kline**. "Intelligent Cyberinfrastructure for Remote Sensing with Autonomous Aerial Robotics." TDAI Interdisciplinary Research Fall Forum, 2023.
53. **J. Kline**. "Interdisciplinary Applications of Autonomous Unmanned Aerial Vehicles." STARS Celebration at Tapia and Ohio Celebration of Women in Computing, 2023.
54. **J. Kline**. "Autonomous UAV Missions for Studying Wildlife Behavior: A Case Study for the Individual Identification of Zebras." Poster, Midwest Machine Learning Symposium (MMLS), Chicago, IL, 2023.
55. **J. Kline**. "Individual Identification of Zebras with Autonomous UAV Swarms." Poster, CRA-WP Grad Cohort for Women, San Francisco, CA, 2023.
56. **J. Kline**. "PhD Forum: Edge Computing for Software-Defined Cartography." ACM/IEEE Symposium on Edge Computing (SEC), Seattle, WA, 2022.

Data and Model Collections

57. **KABR: In Situ Kenyan Animal Behavior Recognition Data and Model Collection.** Imageomics, Hugging Face, 2024–present. Drone videos, behavior annotations, synchronized telemetry, worked examples, and trained behavior-recognition models. *Role:* data collection, annotation, analysis, telemetry integration, and public release. [Collection].
58. **MMLA: Multi-Environment, Multi-Species, Low-Altitude Aerial Data and Model Collection.** Imageomics, Hugging Face, 2025–present. Multi-site detection datasets, pose annotations, deployment data, and trained detection and pose models. *Role:* data collection, annotation, analysis, curation, and public release. [Collection].
59. **SmartWilds: Multimodal Wildlife Monitoring Data Collection.** Imageomics, Hugging Face, 2025–present. Camera-trap, bioacoustic, and drone monitoring resources collected at The Wilds. *Role:* project lead; led study design, field data collection, annotation, analysis, multimodal coordination, and public release. [Collection].

Software and Interactive Research Artifacts

60. **J. Kline** et al. *kabr-tools: Automated Framework for Multi-Species Behavioral Monitoring.* Open-source software, 2025–present. [Code].
61. **J. Kline**. *A Maneuver-Indexed Evaluation Framework for Context-Aware Adaptive Wildlife Drones.* Interactive research demo, Hugging Face Spaces, 2026. Companion artifact for the ACSOS-C 2026 paper. [Demo].
62. **J. Kline** et al. *WildWing: Open-Source Autonomous UAS for Animal Behaviour Monitoring.* Open-source hardware and software system. [Code].

Teaching and Mentorship

Undergraduate Mentorship
Supervised five undergraduate researchers at Ohio State, including a team conducting fieldwork at The Wilds, and two undergraduate researchers at MIT. Student-led projects were published at SEC 2025 and CV4Animals at CVPR 2026.

Master's Thesis Co-supervisor
Co-supervised Denys Grushchak's master's thesis, *Herd Monitoring with Autonomous Drones: A Decentralized k-Coverage-Inspired Approach*, at the University of Bologna with Dr. Danilo Pianini. The thesis resulted in two ACSOS 2024 publications.

Lab Instructor, *CSE 2111: Modeling and Problem Solving with Spreadsheets and Databases*
Undergraduate required course. Led two 30-student lab sections twice weekly and supervised team of undergraduate graders. Topics: spreadsheet and database modeling, programming concepts, business applications.

Graduate Teaching Assistant, *CSE 3244: Data Management in the Cloud*
Senior-level elective. Sole graduate teaching assistant responsible for grading and supervising class lab assignments and final project. Topics: data organization on cloud computing architectures, B-tree and hash-based indexing, fundamentals of query optimization, data partitioning and distributed task scheduling.

Grants and Awards

Awards

Robert May Prize	British Ecological Society, 2025
SEC SRC — First Place	IEEE/ACM Symposium on Edge Computing Student Research Competition, 2025
Rising Stars in EECS	Selected for MIT & Boston University Rising Stars Workshop, 2025
WiscProf Workshop	Selected for Future Faculty in Engineering, 2025
CSE Graduate Research Award	Department of Computer Science & Engineering, The Ohio State University, 2025
Hayes Forum — First Place	First Place, Engineering Oral, Edward F. Hayes Advanced Research Forum, 2025
ACSOS Best Poster Award	IEEE International Conference on Autonomic Computing & Self-Organizing Systems, 2024
TDAI Best Poster Award	Ohio State TDAI Interdisciplinary Research Fall Forum, 2024
CRA-WP Grad Cohort	Selected for the Computing Research Association Widening Participation Grad Cohort for Women, 2023

Grants and Fellowships

Presidential Fellow	The Ohio State University Presidential Fellowship Recipient, 2025-2026
Research Grant	OSU Alumni Grant for Graduate Research and Scholarship Award, 2025
NSF NAIRR Pilot Allocation	Digital Twins for Ecological Research (NAIRR250091), 20,000 H100 GPU hours, 2025
Travel Grant	ACM/IEEE Symposium on Edge Computing, 2022 & 2024
Grace Hopper Scholar	The Ohio State University ACM-W, 2022

Service

Group Co-lead	WILDLABS Group Leader Programme for new Edge Computing for Conservation Group, 2025-2026
Community Building Committee Co-chair	Co-chair of the ACSOS 2026 Community Building Committee; organized and facilitated its community-building seminar series
Workshop Organizer & Lead Facilitator	Proposed, organized, and led the accepted full-day Edge AI for Conservation workshop at the International Conservation Technology Conference (ICTC), Lima, Peru, 2026
Workshop Organizer	Imageomics Institute Image Datapalooza 2023 Hackathon
Volunteer	Code I/O coding camp, 2023
Peer Mentor	GUIDE Program, 2022-2024
Journal Reviewer	Ecological Informatics, Scientific Reports, International Journal of Computer Vision (IJCV), Methods in Ecology and Evolution, Ecology and Evolution, IET Computer Vision, PLOS One

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