Hannah R. Kerner
Curriculum Vitae

School of Computing and Augmented Intelligence
Arizona State University, Tempe, AZ

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EDUCATION

Ph.D. School of Earth and Space Exploration, Arizona State University, 2019
B.S. Department of Computer Science, University of North Carolina at Chapel Hill, 2014

PROFESSIONAL APPOINTMENTS/EMPLOYMENT

Assistant Professor	2022-Present
School of Computing and Augmented Intelligence	Tempe, AZ
Affiliate Faculty, School of Earth and Space Exploration	
Center Faculty, Center for Global Conservation and Discovery Science	
Arizona State University	
Adjunct Assistant Professor	2022-Present
Department of Geographical Sciences	College Park, MD
University of Maryland, College Park	
Machine Learning/Artificial Intelligence Lead	2020-Present
NASA Harvest and NASA Acres Consortia	College Park, MD
Machine Learning Advisor	2020-Present
World Resources Institute	Washington, DC
Assistant Research Professor	2019-2022
Department of Geographical Sciences	College Park, MD
University of Maryland, College Park	
Onboard Software Engineer	2014-2015
Planet Labs (Planet, Inc.)	San Francisco, CA

HONORS AND AWARDS

2022	Selected participant for 1st US-Africa Frontiers of Science, Engineering, and Medicine Symposium by US National Academies (<10% accept rate)
2021	Top 10 of 100 projects solving problems related to the UN SDGs with AI, International Research Centre on Artificial Intelligence (IRCAI), for NASA Harvest
2021	Outstanding Research Faculty, Geographical Sciences (UMD)
2021	15 Leading Women in ML4EO, Radiant Earth Foundation
2021	Forbes 30 Under 30 in Science
2019	ASU College of Liberal Arts and Sciences Graduate Excellence Award
2018	Google Women Techmakers Scholarship
2018	ASU College of Liberal Arts and Sciences Student Leader
2018	ASU Graduate and Professional Student Association Outstanding Mentor Award
2017	ASU College of Liberal Arts and Sciences Doctoral Fellowship for First-Generation College Graduates

GRANTS AND FELLOWSHIPS

2023   "Coordinating Regional and Global Condition Assessments in Support of Food Security" (Co-I)
NASA Goddard Space Flight Center, $70,000

2023   "A Data-Centric Approach to Improve Geographic Equity in Geospatial ML" (PI)
Google Research (Google Award for Inclusion Research program), $60,000

2023   "Lowering the Barriers to Planetary Science Studies with a Large Mars Model" (Co-PI)
NASA Jet Proposal Laboratory Strategic University Research Partnership (SURP), $60,000

2023   "RAPID: Rapid computational modeling of wildfires and management with emphasis on
human activity" (Co-PI), NSF RAPID, $200,000

2023   "Machine Learning Datasets for Public Good with a Data-Centric AI Approach" (PI)
NASA Supplemental Open Source Software Awards, $149,892

2023   "Anomaly Visualization for Earth and Heliophysics GNSS Data using DORA" (Co-I)
NASA Multidomain Reusable Artificial Intelligence Tools, $202,922

2022   "NASA ACRES: A Climate Resilient Ecosystem Approach to Strengthening US Agriculture" (Co-I)
NASA Earth Science Applications: Agriculture, $15,000,000

2022   "NASA Harvest: NASA Food Security and Agriculture Consortium" (Co-I)
NASA, $15,000,000

2022   "EO-Enabled Regional and National Agricultural Monitoring in West Africa" (Co-I)
NASA SERVIR, $658,000

2022   "EO-Enabled Food Security Dashboard to Close Critical Data Gaps in Highly
Food Insecure Maui County" (PI)
NASA Equity and Environmental Justice (EEJ), $250,000

2022   "Optimizing Crop Yield Data Collection for Supply Chain Enhancement" (Co-I)
Bill and Melinda Gates Foundation, $200,000

2021   "Planted Area Change Estimation for East Africa Virtual Crop Tour" (PI)
NASA Goddard Space Flight Center, $122,225

2021   "Earth Observations for Field Level Agricultural Resource Mapping (EO-FARM):
Pilot in Rwanda in Support of NISR" (Co-I)
USDA Foreign Agricultural Service (FAS), $490,000

2021   "Strengthening Agri-Foods Data Systems to Inform Food Security Policies
and Trade in Sub-Saharan Africa" (Co-I)
Alliance for a Green Revolution in Africa (AGRA), $546,859

2021   "Domain-Agnostic Outlier Detection in Science Data Sets" (PI)
NASA SMD ML/AI Cross-Divisional Use Case Demonstration, $110,475

2020   "Quantifying volcanic activity from space with multiple sensors: The CEOS volcano
demonstrator project" (Co-I/Institutional PI)
NASA Earth Surface and Interior (ESI), $1,156,857

2020   "In-Season Crop Monitoring Using Earth Observation in Major Food-Producing
Countries to Mitigate Market Uncertainty Caused by COVID-19 Pandemic" (PI)
NASA Rapid Response and Novel Research in Earth Sciences, $100,000

2020   Microsoft AI for Earth Grant (PI), $10,000 Azure credits

2020   "Earth Observations for Field Level Agricultural Resource Mapping (EO-Farm):
Pilot in Kenya and Mexico in Support of Small Holders" (Co-I)
SwissRe Foundation, $750,000

2019   "Novelty-Driven Onboard Targeting for MSL and Mars 2020 Rovers" (Co-I)
NASA Center Innovation Fund Advanced Concepts, $200,000

PUBLICATIONS

Preprints Under Review

1. Rolnick, D., Aspuru-Guzik, A., Beery, S., Dilkina, B., Donti, P. L., Ghassemi, M., **Kerner, H.**, Monteleoni, C., Rolf, E., Tambe, M., White, A. (2024). Application-Driven Innovation in Machine Learning. arXiv preprint, `https://arxiv.org/abs/2403.17381`.

2. Rolf, E., Klemmer, K., Robinson, C., and **Kerner, H.** (2024). Mission Critical–Satellite Data is a Distinct Modality in Machine Learning, arXiv preprint, `https://arxiv.org/abs/2402.01444`.

3. **Kerner, H.**, Nakalembe, C., Yeh, B., Zvonkov, I., Skakun, S., Becker-Reshef, I., and McNally, A. (2023). Satellite Data Shows Resilience of Tigrayan Farmers in Crop Cultivation During Civil War. arXiv preprint, `https://arxiv.org/abs/2312.10819`.

4. **Kerner, H.**, Nakalembe, C., Yang, A., Zvonkov, I., McWeeny, R., Tseng, G., and Becker-Reshef, I. (2023). How accurate are existing land cover maps for agriculture in Sub-Saharan Africa? arXiv preprint, `https://arxiv.org/abs/2307.02575`.

5. Tseng, G., Zvonkov, I., Purohit, M., Rolnick, D., and **Kerner, H.** (2023). Lightweight, Pre-trained Transformers for Remote Sensing Timeseries. arXiv preprint, `https://arxiv.org/abs/2304.14065`.

6. Tseng, G., **Kerner, H.**, and Rolnick, D. (2022). TIML: Task-informed meta-learning for agriculture. arXiv preprint, `https://arxiv.org/abs/2202.02124`.

Peer-Reviewed Conference Proceedings

7. Purohit, M., Adler, J., and **Kerner, H.** (2024). ConeQuest: A Benchmark for Cone Detection on Mars. In *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, pp. 6026-6035, `https://openaccess.thecvf.com/content/WACV2024/html/Purohit_ConeQuest_A_Benchmark_for_Cone_Segmentation_on_Mars_WACV_2024_paper.html`.

8. Tseng, G., Zvonkov, I., Purohit, M., Rolnick, D., and **Kerner, H.** (2023). Lightweight, Pre-trained Transformers for Remote Sensing Timeseries. *Neural Information Processing Systems (NeurIPS)*, Climate Change AI Workshop, `https://www.climatechange.ai/papers/neurips2023/58`.

9. Malvi, S., Shah, H., Chandarana, N., Purohit, M., Adler, J., and **Kerner, H.** (2023). Automated Multi-class Crater Segmentation in Mars Orbital Images. In *Proceedings of the 31st International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL)*, pp. 110-120, `https://dl.acm.org/doi/abs/10.1145/3615886.3627748`.

10. Lacoste, A., Lehmann, N., Rodriguez, P., Sherwin, E. D., **Kerner, H.**, Lütjens, B., Irvin, J. A., Dao, D., Alemohammad, H., Drouin, A., Gunturkun, M., Huang, G., Vazquez, D., Newman, D., Bengio, Y., Ermon, S., Zhu, X. (2023). GEO-Bench: Toward Foundation Models for Earth Monitoring. In *Proceedings of the Neural Information Processing Systems (NeurIPS), Datasets and Benchmarks Track*, `https://arxiv.org/abs/2306.03831`.

11. Zvonkov, I., Tseng, G., Nakalembe, C., and **Kerner, H.** (2023). OpenMapFlow: A Library for Rapid Map Creation with Machine Learning and Remote Sensing Data. In *Proceedings of the AAAI Conference on Artificial Intelligence, 37(12)*, 14655-14663, `https://doi.org/10.1609/aaai.v37i12.26713`.

12. **Kerner, H.**, Sundar, S., and Satish, M. (2023). Multi-Region Transfer Learning for Segmentation of Crop Field Boundaries in Satellite Images with Limited Labels. In *Proceedings of the 2023 AAAI Conference on Artificial Intelligence Workshops*, `https://ai-2-ase.github.io/papers/14%5CSubmission%5CField_boundary_delineation___AAAI_2023_AI2SE-camera-ready.pdf`.

13. Manimurugan, S., Singaram, R., Nakalembe, C., and **Kerner, H.** (2022). Geo-referencing crop labels from street-level images using Structure from Motion. In *Proceedings of the 73rd International Astronautical Congress (IAC)*.

14. **Kerner, H. R.** and Adler, J. B. (2022). Guiding Field Exploration on Earth and Mars with Outlier Detection. In *Proceedings of the International Geoscience and Remote Sensing Symposium (IGARSS)*, `https://doi.org/10.1109/IGARSS46834.2022.9884366`.

15. Nakalembe, C. L. and **Kerner, H. R.** (2022). Applications and Considerations for AI-EO for Agriculture in Sub-Saharan Africa. In *Proceedings of the Thirty-Sixth AAAI Conference on Artificial Intelligence*, International Workshop on Social Impact of AI for Africa.

16. Tseng, G., **Kerner, H.**, Rolnick, D. (2022). TIML: Task-Informed Meta-Learning for crop type mapping. In *Proceedings of the Thirty-Sixth AAAI Conference on Artificial Intelligence*, AI for Agriculture and Food Systems (AIAFS) Workshop.

17. Tseng, G., Zvonkov, I., Nakalembe, C., **Kerner, H.** (2021). CropHarvest: a global satellite dataset for crop type classification. *Neural Information Processing Systems (NeurIPS), Datasets and Benchmarks Track*, `https://openreview.net/forum?id=JtjzUXPEaCu`.

18. Lacoste, A., Sherwin, E., **Kerner, H.**, Alemohammad, H., Lutjens, B., Irvin, J., Dao, D., Chang, A., Gunturkun, M., Drouin, A., Rodriguez, P., Vazquez, D. (2021). Toward Foundation Models for Earth Monitoring: Proposal for a Climate Change Benchmark. *Proceedings of the Neural Information Processing Systems (NeurIPS) Workshops*, Tackling Climate Change with AI, `https://www.climatechange.ai/papers/neurips2021/73/paper.pdf`.

19. Huppertz, R., Nakalembe, C., **Kerner, H.** (2021). Using transfer learning to study burned area dynamics: A case study of Refugee settlements in West Nile, Northern Uganda. *Proceedings of the ACM/SIGKIDD Conference on Knowledge Discover and Data Mining (KDD) Workshops*, Humanitarian Mapping, `https://arxiv.org/abs/2107.14372`.

20. Paliyam, M., Nakalembe, C., **Kerner, H.** (2021). Street2Sat: A Machine Learning Pipeline for Generating Ground-truth Geo-referenced Labeled Datasets from Street-Level Images. *Proceedings of the International Conference on Machine Learning (ICML) Workshops*, Tackling Climate Change with AI, `https://www.climatechange.ai/papers/icml2021/74.html`.

21. Tseng, G., **Kerner, H.**, Nakalembe, C., and Becker-Reshef, I. (2021). Learning to predict crop type from heterogeneous sparse labels using meta-learning. *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, EarthVision 2021, `https://openaccess.thecvf.com/content/CVPR2021W/EarthVision/papers/Tseng_Learning_To_Predict_Crop_Type_From_Heterogeneous_Sparse_Labels_Using_CVPRW_2021_paper.pdf`.

22. Horton, P., **Kerner, H.**, Jacobs, S., Cisneros, E., Wagstaff, K. L., and Bell III, J. F. (2021). Integrating Novelty Detection Capabilities with MSL Mastcam Operations to Enhance Data Analysis. IEEE Aerospace Conference, Big Sky, Montana, March 6-13, `https://arxiv.org/abs/2103.12815`.

23. Tseng, G., **Kerner, H.**, Nakalembe, C., and Becker-Reshef, I. (2020). Annual and in-season mapping of cropland at field scale with sparse labels. *Neural Information Processing Systems (NeurIPS) Workshops*, Tackling Climate Change with AI, `https://www.climatechange.ai/papers/neurips2020/29/paper.pdf`.

24. Wagstaff, K. L., Francis, R., **Kerner, H.**, Lu, S., Nerrise, F. (2020). Novelty-Driven Onboard Targeting for Mars Rovers. *International Symposium on Artificial Intelligence, Robotics and Automation in Space (i-SAIRAS)*, `https://www.hou.usra.edu/meetings/isairas2020fullpapers/pdf/5056.pdf`.

25. **Kerner, H. R.**, Sahajpal, R., Skakun, S., Becker-Reshef, I., Barker, B., Hosseini, M. (2020). Resilient In-Season Crop Type Classification in Multispectral Satellite Observations using Growth Stage Normalization. *ACM SIGKDD Conference on Knowledge Discovery and Data Mining Workshops*, `https://arxiv.org/abs/2009.10189`.

26. **Kerner, H. R.**, Tseng, G., Becker-Reshef, I., Barker, B., Munshell, B., Paliyam, M., Hosseini, M. (2020). Rapid Response Crop Maps in Data Sparse Regions. *ACM SIGKDD Conference on Knowledge Discovery and Data Mining Workshops*, `https://arxiv.org/abs/2006.16866`.

27. **Kerner, H. R.**, Nakalembe, C., Becker-Reshef, I. (2020). Field-Level Crop Type Classification with k-Nearest Neighbors: A Baseline for a New Kenya Smallholder Dataset. *Proceedings of the International Conference on Learning Representations (ICLR) Workshops*, `https://arxiv.org/abs/2004.03023`.

28. **Kerner, H. R.**, Wellington, D. F., Wagstaff, K. L., Bell III, J. F., Kwan, C., Ben Amor, H. (2019). Novelty Detection for Multispectral Images with Application to Planetary Exploration. *Proceedings of the AAAI Conference on Artificial Intelligence*, pp. 9484-9491, `https://doi.org/10.1609/aaai.v33i01.33019484`.

Peer-Reviewed Journal Articles

29. Kebede, E. A., Abou Ali, H., Clavelle, T., Froehlich, H. E., Gephart, J. A., Hartman, S., Herrero, M., **Kerner, H.**, Mehta, P., Nakalembe, C., Ray, D. K., Siebert, S., Thornton, P., Davis, K. F. (2024). *Nature Reviews Earth & Environment*, p. 1-17, `https://www.nature.com/articles/s43017-024-00516-2`.

30. Prieur, N. C., Amaro, B., Gonzalez, E., **Kerner, H.**, Medvedev, S., Rubanenko, L., Werner, S., Xiao, Z., Zastrozhnov, D., and Lapôtre, M. G. (2023). Automatic Characterization of Boulders on Planetary Surfaces From High-Resolution Satellite Images. *Journal of Geophysical Research: Planets, 128(11)*, e2023JE008013, `https://doi.org/10.1029/2023JE008013`.

31. Nakalembe, C. and **Kerner, H.** (2023). Considerations for AI-EO for agriculture in Sub-Saharan Africa. *Environmental Research Letters, 18(4)*, `https://iopscience.iop.org/article/10.1088/1748-9326/acc476`.

32. Rice, M.S., Seeger, C., Bell, J., Calef, F., St Clair, M., Eng, A., Fraeman, A.A., Hughes, C., Horgan, B., Jacob, S., Johnson, J., **Kerner, H.**, Kinch, K., Lemmon, M., Million, C., Starr, M., and Wellington, D. (2022). Spectral diversity of rocks and soils in Mastcam observations along the Curiosity rover's traverse in Gale crater, Mars. *Journal of Geophysical Research: Planets*, p.e2021JE007134, `https://doi.org/10.1029/2021JE007134`.

33. Manheim, M. R., Henriksen, M. R., Robinson, M. S., **Kerner, H. R.**, Karas, B. A., Becker, K. J., Chojnacki, M., Sutton, S. S., Blewett, D. T. (2022). High-Resolution Regional Digital

Elevation Models and Derived Products from MESSENGER MDIS Images. *Remote Sensing, 14*, 3564, `https://doi.org/10.3390/rs14153564`.

34. **Kerner, H. R.**, Sahajpal, R., Pai, D. B., Skakun, S., Puricelli, E., Hosseini, M., Meyer, S., and Becker-Reshef, I. (2022). Phenological normalization can improve in-season classification of maize and soybean: A case study in the central US Corn Belt. *Science of Remote Sensing, 6*, 100059, `https://doi.org/10.1016/j.srs.2022.100059`.

35. **Kerner, H. R.**, Rebbapragada, U., Wagstaff, K. L., Lu, S., Dubayah, B., Huff, E., Raman, V., and Kulshrestha, S. (2022). Domain-Agnostic Outlier Ranking Algorithms—A Configurable Pipeline for Facilitating Outlier Detection in Scientific Datasets. *Frontiers in Astronomy and Space Sciences, 9*, 867947, `https://doi.org/10.3389/fspas.2022.867947`.

36. Handwerger, A. L., Jones, S. Y., Amatya, P., **Kerner, H. R.**, Kirschbaum, D. B., and Huang, M. H. (2021). Strategies for landslide detection using open-access synthetic aperture radar backscatter change in Google Earth Engine. *Natural Hazards and Earth System Sciences Discussions*, 22, pp. 753-773, `https://doi.org/10.5194/nhess-22-753-2022`.

37. Shirzaei, M., Khoshmanesh, M., Ojha, C., Werth, S., **Kerner, H.**, Carlson, G., Sherpa, S. F., Zhai, G., and Lee, J. (2021). Persistent impact of spring floods on crop loss in U.S. Midwest. *Weather and Climate Extremes, 34*, 100392, `https://doi.org/10.1016/j.wace.2021.100392`.

38. Gray, P. C., Chamorro, D. F., Ridge, J. T., **Kerner, H. R.**, Ury, E. A., and Johnston, D. W. (2021). Temporally Generalizable Land Cover Classification: A Recurrent Convolutional Neural Network Unveils Major Coastal Change through Time. *Remote Sensing, 13(19)*, 3953, `https://doi.org/10.3390/rs13193953`.

39. Lawal, A., **Kerner, H.**, Becker-Reshef, I., Meyer, S. (2021). Mapping the Location and Extent of 2019 Prevent Planting Acres in South Dakota Using Remote Sensing Techniques. *Remote Sensing, 13(13)*, 2430, `https://www.mdpi.com/2072-4292/13/13/2430`.

40. Hosseini, M., **Kerner, H.**, Sahajpal, R., Puricelli, E., Lu, Y-H., Lawal, A., Humber, M. L., Mitkish, M., Meyer, S., Becker-Reshef, I. (2020). Evaluating the Impact of the 2020 Iowa Derecho on Corn and Soybean Fields Using Synthetic Aperture Radar. *Remote Sensing, 12(23)*, 3878, `https://www.mdpi.com/2072-4292/12/23/3878`.

41. **Kerner, H. R.**, Wagstaff, K. L., Bue, B. D., Wellington, D. F., Jacob, S., Horton, P., Bell, J. F., Kwan, C. Ben Amor, H. (2020). Comparison of Novelty Detection Methods for Multispectral Images in Rover-Based Planetary Exploration Missions. *Data Mining and Knowledge Discovery, 34,* pp. 1642–1675, `https://doi.org/10.1007/s10618-020-00697-6`.

42. **Kerner, H. R.**, Hardgrove, C., Czarnecki, S., Gabriel, T. S. J., Mitrofanov, I., Litvak, M., Sanin, A., Lisov, D. (2020). Analysis of Active Neutron Measurements from the Mars Science Laboratory Dynamic Albedo of Neutrons Instrument: Intrinsic Variability, Outliers, and Implications for Future Investigations. *Journal of Geophysical Research: Planets, 125(5)*, e2019JE006264, `https://doi.org/10.1029/2019JE006264`.

43. **Kerner, H. R.**, Wagstaff, K. L., Bue, B. D., Gray, P., Bell III, J. F., Ben Amor, H (2019). Deep Learning Methods Toward Generalized Change Detection on Planetary Surfaces. *Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 12(10), pp. 3900-3918, `https://doi.org/10.1109/JSTARS.2019.2936771`.

44. **Kerner, H. R.**, Ben Amor, H., Bell III, J. F. (2018). Context-Dependent Image Quality Assessment of JPEG-Compressed Mars Science Laboratory Mastcam Images using Convolutional Neural Networks. *Computers and Geosciences*, 118, pp. 109-121, `https://doi.org/10.1016/j.cageo.2018.06.001`.

45. Kwan, C., Chou, B., Kwan, L., Larkin, J., Ayhan, B., Bell III, J. F., **Kerner, H. R.** (2017). Demosaicing Enhancement using Pixel-Level Fusion. *Signal, Image and Video Processing*, 12(4), pp. 749-756, `https://doi.org/10.1007/s11760-017-1216-2`.

Books and Book Chapters

46. Becker-Reshef, I., Bandaru, V., Barker, B., Coutu, S., Deines, J. M., Doorn, B., Eilerts, G., Franch, B., Galvez, A. S., Hosseini, M., Humber, M., Husak, G., Guan, K., Justice, C., Keniston, J., **Kerner, H.**, Mitkish, M., Mobley, K., Munshell, B., Nakalembe, C., Puricelli, E., Sahajpal, R., Skakun, S., Vermote, E., Whitcraft, A., Hansen, M., Salas, B., and Justice, C. (2022). The NASA Harvest Program on Agriculture and Food Security. In: Vadrevu, K.P., Le Toan, T., Ray, S.S., Justice, C. (eds) *Remote Sensing of Agriculture and Land Cover/Land Use Changes in South and Southeast Asian Countries. Springer, Cham*. `https://doi.org/10.1007/978-3-030-92365-5_3`.

47. Aye, K. M., D'Amore, M., Helbert, J., **Kerner, H. R.** (2022). *Machine Learning for Planetary Science*. Elsevier Science and Technology Books, `https://doi.org/10.1016/C2018-0-04220-6`.

48. **Kerner, H.**, Campbell, J., and Strickland, M. (2022). Chapter 1 - Introduction to machine learning. In: Helbert, J., D'Amore, M., Aye, K. M., Kerner, H. R. (eds), *Machine Learning for Planetary Science*, pp. 1-24, `https://doi.org/10.1016/B978-0-12-818721-0.00007-0`.

Whitepapers and Other Publications

49. Xu, L., Rolf, E., Beery, S., Bennett, J. R., Berger-Wolf, T., Birch, T., Bondi-Kelly, E., Brashares, J., Chapman, M., Corso, A., Davies, A., Garg, N., Gaylard, A., Heilmayr, R., **Kerner, H.**, Klemmer, K., Kumar, V., Mackey, L., Monteleoni, C., Moorcroft, P., Palmer, J., Perrault, A., Thau, D., Tambe, M. (2023). Reflections from the Workshop on AI-Assisted Decision Making for Conservation, *arXiv preprint arXiv:2307.08774*, `https://arxiv.org/abs/2307.08774`.

50. Nakalembe, C., Justice, C., **Kerner, H.**, Justice, C., and Becker-Reshef, I. (2021). Sowing seeds of food security in Africa, *Eos, 102*, `https://doi.org/10.1029/2021EO153329`.

51. Azari, A. R., Biersteker, J. B., Dewey, R. M., Doran, G., Forsberg, E., Harris, C. D. K., **Kerner, H. R.**, Skinner, K. A., Smith, A. W. (2020). Integrating Machine Learning for Planetary Science: Perspectives for the Next Decade. *A White Paper to the NRC Planetary Science and Astrobiology Decadal Survey 2023-2032*, `https://arxiv.org/pdf/2007.15129.pdf`.

52. **Kerner, H. R.** (2019). Machine Learning on Mars: A New Lens on Data from Planetary Exploration Missions. Ph.D. Dissertation, Arizona State University.

Conference Abstracts

53. Adler, J. and **Kerner, H. R.** (2023). Planet-scale Machine Learning Requires Rethinking Community Practices. American Geophysical Union (AGU) Fall Meeting, San Francisco, Dec 11-15. (Oral presentation)

54. Ali, H., Khan, B., Nakalembe, C., **Kerner, H. R.**, et al. (2023). Machine Learning for Cassava/Maize Intercropping Mapping in Nigeria. American Geophysical Union (AGU) Fall Meeting, San Francisco, Dec 11-15. (Poster presentation)

55. Davis, K. **et al.** (2023). Assessing the global state of food production data scarcity. American Geophysical Union (AGU) Fall Meeting, San Francisco, Dec 11-15. (Oral)

56. **Kerner, H. R.**, Tseng, G., Zvonkov, I., Nakalembe, C., Whitcraft, A. (2023). The Maui County Food Security Data Visualization Project: Progress and Lessons Learned from Year 1. American Geophysical Union (AGU) Fall Meeting, San Francisco, Dec 11-15. (Oral)

57. **Kerner, H. R.**, Nakalembe, C., and Becker-Reshef, I. (2023). How well do existing land cover maps identify cropland in Sub-Saharan Africa? Not well. American Geophysical Union (AGU) Fall Meeting, San Francisco, Dec 11-15. (Oral presentation, invited)

58. Rolf, E. and **Kerner, H. R.** (2023). Building a Good Foundation: Assessing How the Spatial Distribution of Pre-training Data Affects Self-supervised Geospatial Models. American Geophysical Union (AGU) Fall Meeting, San Francisco, Dec 11-15. (Oral)

59. **Kerner, H. R.**, Sundar, S., and Sadeh, Y. (2022). Multi-region, Cross-Sensor Transfer Learning for Segmentation of Crop Field Boundaries in Satellite Images with Limited Labels. American Geophysical Union (AGU) Fall Meeting, Chicago, December 12-16. (Poster presentation)

60. **Kerner, H. R.**, Zvonkov, I., Tseng, G., Yang, A., Nakalembe, C., and Becker-Reshef, I. (2022). Scalable Cropland and Crop Type Mapping with Machine Learning and Earth Observations for Field-scale Agriculture and Food Security Monitoring. American Geophysical Union (AGU) Fall Meeting, Chicago, December 12-16. (Oral)

61. Zvonkov, I., Tseng, G., Nakalembe, C., **Kerner, H.**, and Becker-Reshef, I. (2022). CropHarvest: a global satellite dataset for crop type classification. ESA Living Planet Symposium, Bonn, Germany, May 23-27. (Oral presentation)

62. Nakalembe, C., Paliyam, M., Zvonkov, I., and **Kerner, H.** (2022). Helmets Labeling Crops-An innovative citizen-science enabled approach filling training data gaps leveraging AI to accelerate ML4EO Applications. ESA Living Planet Symposium, Bonn, Germany, May 23-27. (Oral presentation)

63. Becker-Reshef, I. **et al.** (2022). GEOGLAM the First Decade: Progress in Operational Agricultural Monitoring. ESA Living Planet Symposium, Bonn, Germany, May 23-27. (Oral presentation)

64. Tseng, G., **Kerner, H.**, Rolnick, D., and Becker-Reshef, I. (2022). Task-Informed Meta-Learning for global crop type mapping. ESA Living Planet Symposium, Bonn, Germany, May 23-27. (Oral presentation)

65. Wagner, J., Becker-Reshef, I., **Kerner, H.**, Barker, B., Sahajpal, R., Rehbinder, and J., Nerry, F. (2022). Wheat yield and phenological response under occurrence of extreme weather or climate events during growing season. ESA Living Planet Symposium, Bonn, Germany, May 23-27. (Poster presentation)

66. Zvonkov, I., Tseng, G., Utzschneider, E., Lopez, A., Nakalembe, C., McNally, A., and Becker-Reshef, I. (2022). Earth Observations and Machine Learning for Planted Area

Estimation in Inaccessible Regions for Remote Food Security Assessments. ESA Living Planet Symposium, Bonn, Germany, May 23-27. (Oral presentation)

67. Prieur, N.C., Rubanenko, L., Xiao, Z., **Kerner, H.**, Werner, S. C., Lapotre, M. G. A (2022). A large training dataset of boulder sizes and shapes as a first step towards the automated detection of rock fragments on planetary surfaces. 53rd Lunar and Planetary Science Conference, The Woodlands, TX, March 7-11, Abstract #1835.

68. **Kerner, H. R.**, Rebbapragada, U., Wagstaff, K., Lu, S., Huff, E., Dubayah, B., Raman, V., Kulshrestha, S. (2021). Domain-agnostic Outlier Ranking Algorithms (DORA): A Configurable Pipeline for Outlier Detection in Scientific Datasets. American Geophysical Union (AGU) Fall Meeting, New Orleans, December 13-17. (Oral presentation)

69. Hosseini, M., **Kerner, H. R.**, Sahajpal, R., Puricelli, E., Lu, Y-H., Humber, M., Mitkish, M., Meyer, S., Becker-Reshef, I. (2021). Evaluating the Impacts of 2020 Iowa Derecho Over Agricultural Fields Using Synthetic Aperture Radar. American Geophysical Union (AGU) Fall Meeting, New Orleans, December 13-17. (Oral presentation)

70. Handwerger, A., Huang, M.-H., Amatya, P. M., Jones, S. Y., **Kerner, H. R.**, Kirschbaum, D. (2021). Generating satellite SAR-based landslide density heatmaps for rapid landslide detection in Google Earth Engine. American Geophysical Union (AGU) Fall Meeting, New Orleans, December 13-17. (Oral presentation)

71. Hosseini, M., **Kerner, H. R.**, Sahajpal, R., Puricelli, E., Lu, Y-H., Lawal, A. F., Humber, M., Mitkish, M., Meyer, S., Becker-Reshef, I. (2021). Evaluating the Impacts of 2020 Iowa Derecho Over Agricultural Fields Using Synthetic Aperture Radar. International Society for Photogrammetry and Remote Sensing (ISPRS) Congress, July 5-9.

72. **Kerner, H. R.**, Wagstaff, K. L., Lu, S., Francis, R., Kulshrestha, S. (2021). Novelty-Driven Onboard Target Selection in Grayscale and Color Mars Rover Images. Lunar and Planetary Science Conference, Virtual, March 15-19. (Poster presentation)

73. Nakalembe, C., **Kerner, H. R.**, and Becker-Reshef, I. (2020). Urgent and critical need for developing countries to invest in Earth observation-based agricultural early warning and monitoring systems to achieve Zero Hunger (SDG-2). American Geophysical Union (AGU) Fall Meeting, Virtual Conference, December 1-17. (Poster presentation)

74. Horton, P., Ravichandar, S., Lee, J., **Kerner, H.**, Natha, A., Soliman, T. K., Grimes, K., Wagstaff, K., Verma, R., and McAuley, J. (2020). Novelty and Discovery Content Analysis Methods for the Planetary Data System Image Atlas. American Geophysical Union (AGU) Fall Meeting, Virtual Conference, December 1-17. (Poster presentation)

75. Nerrise, F., **Kerner, H.**, Wagstaff, K., Lu, S., Francis, R., Rebbapragada, U., Bell III, J. F. (2020). Evaluation of Machine Learning Methodologies for Novelty-based Target Selection in Planetary Imaging Data Sets: Examples from the Mars Science Laboratory Mission. American Geophysical Union (AGU) Fall Meeting, Virtual Conference, December 1-17. (Poster presentation)

76. **Kerner, H.**, Tseng, G., Becker-Reshef, I., and Nakalembe, C. (2020). Post-season and in-season crop type classification for smallholder farms: reducing reliance on labeled data by learning latent features in unlabeled data. American Geophysical Union (AGU) Fall Meeting, Virtual Conference, December 1-17. (Poster presentation)

77. Tseng, G., **Kerner, H.**, Becker-Reshef, I., and Nakalembe, C. (2020). Leveraging Global Crop-Land Datasets to Improve Model Performance for Crop Classification in Data-Sparse

Regions. American Geophysical Union (AGU) Fall Meeting, Virtual Conference, December 1-17. (Poster presentation)

78. Shirzaei, M., Khoshmanesh, M., Ojha, C., Werth, S., **Kerner, H.**, Carlson, G., Sherpa, S. F., Zhai, G., and Lee, J. (2020). Unprecedented Crop Loss in the U.S. Midwest Caused by 2019 Flooding. American Geophysical Union (AGU) Fall Meeting, Virtual Conference, December 1-17.

79. Gold, K., Galvan, F. R., **Kerner, H.**, Whitcraft, A., Cadle-Davidson, L., and Jiang, Y. (2020). Deep learning enabled detection of low incidence plant disease with integrated proximal and remote sensing. American Geophysical Union (AGU) Fall Meeting, Virtual Conference, December 1-17.

80. Nakalembe, C., Becker-Reshef, I., **Kerner, H.**, Sahajpal, R., and Skakun, S. (2020). Using Satellites and Machine Learning to Enhance and Protect Food Security in Africa. Geological Society of America (GSA) Annual Meeting, Virtual Conference, October 26-30.

81. Becker-Reshef, I., Whitcraft, A. K., Justice, C., Nakalembe, C., Barker, B., Justice, C., Sahajpal, R., Humber, M., **Kerner, H.**, Hansen, M., Husak, G., Skakun, S., Vermote, E., Franch, B., Deines, J., Doorn, B., Lobell, D., Guan, K., Torbick, N., Coutu, S., Puricelli, E., and Verdin, J. (2020). NASA Harvest: Earth Observations for Informed Agricultural Decisions. EO for Agriculture Under Pressure Workshop, Virtual, October 5-9. (Oral presentation)

82. **Kerner, H. R.**, Wagstaff, K. L., Bue, B. D., Gray, P. C., Bell III, J. F., Ben Amor, H. (2019). Toward Generalized Change Detection on Planetary Surfaces with Deep Learning. American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, December 9-14. (Poster presentation)

83. **Kerner, H. R.**, Wagstaff, K. L., Bue, B. D., Wellington, D. F., Jacob, S., Bell III, J. F., Ben Amor, H. (2019). Comparison of Novelty Detection Methods for Multispectral Images from the Mastcam Instrument Onboard Mars Science Laboratory. 3rd Planetary Data Workshop, Flagstaff, AZ, June 18-20. (Oral presentation)

84. **Kerner, H. R.**, Hardgrove, C., Czarnecki, S. (2019). Analysis of Intrinsic Variability and Outliers in Pulsed Neutron Data using the Mars Science Laboratory Dynamic Albedo of Neutrons Instrument. 50th Lunar and Planetary Science Conference, The Woodlands, TX, March 18-22. (Poster presentation)

85. **Kerner, H. R.**, Wagstaff, K. L., Bue, Ben Amor, H. (2018). Change Detection on Mars: A Deep Learning Approach. Women in Machine Learning Workshop, NeurIPS, Montreal, Quebec, December 3. (Poster presentation)

86. Wronkiewicz, M., **Kerner, H. R.**, Harrison, T. (2018). Autonomous Mapping of Surface Features on Mars. American Geophysical Union (AGU) Fall Meeting, Washington, DC, December 10-14. (Poster presentation)

87. **Kerner, H. R.**, Wagstaff, K. L., Bue, B. D., Wellington, D. F., Bell III, J. F., Ben Amor, H. (2018). Novelty Detection for Multispectral Planetary Images. American Geophysical Union (AGU) Fall Meeting, Washington, DC, December 10-14. (Oral Presentation)

88. **Kerner, H. R.**, Wagstaff, K. L., Bue, B. D., Wellington, D. F., Bell III, J. F., Ben Amor, H. (2018). Novelty Detection for Multispectral Images with Application to Planetary Exploration. IMA Workshop on Recent Advances in Machine Learning and Computational Methods for Geoscience, Minneapolis, MN, October 22-26. (Poster presentation)

89. **Kerner, H. R.**, Bell III, J. F., Ben Amor, H. (2017). Context-dependent image quality assessment of JPEG compressed Mars Science Laboratory Mastcam Curiosity images using convolutional neural networks. American Geophysical Union (AGU) Fall Meeting, New Orleans, LA, December 11-15. (Oral presentation)

90. **Kerner, H. R.**, Bell III, J. F., Ben Amor, H. (2017). Detecting and characterizing compression-related artifacts in Mars Science Laboratory Mastcam images. 48th Lunar and Planetary Science Conference, The Woodlands, TX, March 20-24. (Oral presentation)

Editing

- Aye, K. M., D'Amore, M., Helbert, J., Kerner, H. R. (2022). Machine Learning for Planetary Science. *Elsevier Science and Technology Books.*
- Guest editor, "Monitoring Climate Impacts on Agriculture Using Remote Sensing Techniques," special issue in *Remote Sensing* (2020-2021)
- Guest editor, "Recent Advances in Crop Mapping and Monitoring Using Remote Sensing Data," special issue in *Remote Sensing* (2020-2021)
- Guest editor, "Advances in AI applications for small-scale agricultural systems," special issue in *Frontiers in AI in Food, Agriculture, and Water* (2020-2021)

PUBLIC DATASETS AND OPEN-SOURCE SOFTWARE

2023   GEO-Bench: Toward Foundation Models for Earth Monitoring
      `https://github.com/ServiceNow/geo-bench`
2022   OpenMapFlow python package, `https://pypi.org/project/openmapflow/`
2022   CropHarvest python package, `https://pypi.org/project/cropharvest/`
2021   DORA python package, `https://github.com/nasaharvest/dora`
2021   CropHarvest: A global dataset for crop type mapping
      `https://zenodo.org/record/5567762`
2021   Kenya 10m Cropland Map and Labels (2019)
      `https://zenodo.org/record/4271144#.YIAzqpNKhFc`
2020   MSL Curiosity Rover Images with Science and Engineering Classes
      `https://doi.org/10.5281/zenodo.3892023`
2020   Togo 10m Cropland Map and Labels (2019)
      `https://doi.org/10.5281/zenodo.3836628`
2020   Mars Novelty Detection Mastcam Labeled Dataset
      `https://doi.org/10.5281/zenodo.1486195`
2019   Dynamic Albedo of Neutrons (DAN) Simulated and Observed Die-Away Data
      `https://doi.org/10.5281/zenodo.3592014`
2019   Planetary Surface Features Change Detection Dataset
      `https://doi.org/10.5281/zenodo.2373797`

SELECTED INVITED TALKS

2024   "Unlocking the Potential of Planetary-Scale Machine Learning for a Sustainable Future." Spotlight, Machine Learning and Data Management for Earth Observation Workshop, BIFOLD (Berlin Institute for the Foundations of Learning and Data), Berlin.
2023   "Unlocking the Potential of Planetary-Scale Machine Learning for a Sustainable Future." Keynote, NeurIPS 2023, Sustainable Computing Workshop, New Orleans.

2023   "Unlocking Geospatial Machine Learning for Global Agricultural Monitoring." Keynote, DA3 Symposium, Kansas State University, Manhattan.

2023   "Unlocking the Potential of Planetary-Scale Machine Learning for a Sustainable Future." Computer Science and Engineering Department Colloquium, Washington University St. Louis, St. Louis.

2023   "AI for the Digital Planet." NSF AI Planning Institute Seminar, Carnegie Mellon University, Pittsburgh.

2023   "AI for the Digital Planet(s)." School of Earth and Space Exploration Colloquium, Arizona State University, Tempe.

2022   "Supporting Food Security in Africa using Machine Learning and Earth Observations." Machine Learning and the Physical Sciences Workshop, Neural Information Processing Systems (NeurIPS) 2022, New Orleans/Virtual.

2022   "AI and Earth Observations for Global Agricultural Monitoring and Food Security." AI Helps Ukraine fundraiser conference, Virtual.

2022   "Supporting Food Security in Africa using Machine Learning and Earth Observations." Computer Vision for Ecology Summer School, Caltech/Virtual.

2022   "Street2Sat: turning roadside images into ground-truth labeled datasets for machine learning." AgricultureVision workshop, IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), New Orleans.

2022   "AI for Earth Observations and Food Security—going beyond test metrics." AI4FoodSecurity Awards Ceremony (keynote), Virtual.

2022   "Advancing Global Food Security and Sustainable Development with ML and Earth Observations." Remote Sensing Interdisciplinary Graduate Education Program (IGEP) Seminar, Virginia Tech, Blacksburg, VA.

2022   "Advancing Global Food Security and Sustainable Development with ML and Earth Observations." AI Seminar, Oregon State University, Virtual.

2021   "Advancing Global Food Security and SDGs with Machine Learning and Earth Observations." Computer Science Department Seminar, University of Maryland, College Park, MD.

2021   "Advancing Global Food Security and SDGs with Machine Learning and Earth Observations." Forward Summit, Puerto Rico Science Trust, Virtual.

2021   "Advancing Global Food Security and SDGs with Machine Learning and Earth Observations." iCube Institute Seminar, Strasbourg, France.

2021   "Advancing Global Food Security and SDGs with Machine Learning and Earth Observations." NASA Marshall Space Flight Center, IMPACT Tech Talk, Virtual.

2021   "Novelty-guided onboard targeting and tactical planning for Mars rovers." Applications of Statistical Methods and Machine Learning in the Space Sciences, Space Science Institute, Virtual.

2021   "Enhancing Global Food Security with Machine Learning and Planet Data." Planet Colloquium, Virtual.

2021   "Mars, Machine Learning, and the Search for Life beyond Earth: How the Mars Perseverance and Curiosity rovers can use machine learning to detect the unknown." Ubiquity Ventures Public Event, Virtual.

2021   "Enhancing Global Food Security with Machine Learning and Earth Observations." World Resources Institute AI for Impact Series, Virtual.

2021   "The Power of ML and EO to Enhance Global Food Security." ESIP Winter Meeting, Virtual.

2020   "Eyes in the sky without boots on the ground: Using satellites and machine learning to

monitor agriculture and food security during COVID-19." NeurIPS Workshop on AI for Earth Science, Virtual.

2020   "How to Shape Your Career." IEEE GRSS and IGARSS Webinar Series.

2020   "Using Machine Learning in Space." Ubiquity Extended Team Webinar, Virtual.

2020   "Monitoring Agriculture at the Field Scale using Satellite Data and Machine Learning." Measuring Development 2020: Data Integration and Data Fusion, Virtual.

2020   "Enhancing Planetary Exploration Mission Planning and Data Analysis using Machine Learning." Solar System Exploration Division Seminar, NASA Goddard Space Flight Center, Greenbelt, MD.

2020   "Machine Learning for Agricultural Monitoring." Advancing Application of Machine Learning Tools for NASA's Earth Observation Data, Washington, DC.

2019   "Actionable Insights from Remote Sensing Enabled by Machine Learning, from Earth to Mars." International Space University, Strasbourg, France.

2019   "Actionable Insights from Remote Sensing Enabled by Machine Learning, from Earth to Mars." Arizona State University, Tempe, AZ.

2019   "Actionable Insights from Remote Sensing Enabled by Machine Learning, from Earth to Mars." Women in Data Science at Stanford Earth, Palo Alto, CA.

2019   "Machine Learning for Remote Sensing." Committee on Seismology and Geodynamics (COSG) Fall Meeting, National Academies of Science, Engineering, and Medicine, Washington, DC.

2019   "AI and Machine Learning." Space4Earth Hackathon, 70th International Astronautical Congress, Washington, DC.

CONFERENCE SERVICE

2024   Co-organizer, 2nd Machine Learning for Remote Sensing Workshop at International Conference on Learning Representations (ICLR) 2024, Vienna, May.

2024   Co-organizer, EarthVision Workshop at Computer Vision and Pattern Recognition (CVPR) 2024, Seattle, June.

2023   Session Chair/Co-Convener, "Highlighting Solution-Based Science: Connecting with Local Partners for Action," American Geophysical Union (AGU) Fall Meeting, San Francisco, December 11-15.

2023   Session Chair/Co-Convener, "Beyond the Black Box: advancing geo-ML by incorporating context with specialized architectures, benchmark datasets, and tailored notions of interpretability," American Geophysical Union (AGU) Fall Meeting, San Francisco, December 11-15.

2023   Session Chair/Co-Convener, "Machine Learning and Data Science Methods for Planetary Science," American Geophysical Union (AGU) Fall Meeting, San Francisco, Dec 11-15.

2023   Session Chair/Co-Convener, "Applications of Earth Observations for United States Agriculture," American Geophysical Union (AGU) Fall Meeting, San Francisco, December 11-15.

2023   Co-organizer, EarthVision Workshop at Computer Vision and Pattern Recognition (CVPR) 2023, Vancouver, June 18.

2023   Lead Organizer, Machine Learning for Remote Sensing Workshop at International Conference on Learning Representations (ICLR) 2023, Kigali, May 1-5.

2022   Session Chair/Co-Convener, "Machine Learning for Planetary Science," American Geophysical Union (AGU) Fall Meeting, Chicago, December 12-16.

2022   Organizer/Speaker, Machine Learning for Remote Sensing and Applications in Agriculture

and Food Security tutorial (invited) at Computer Vision and Pattern Recognition (CVPR) 2022, New Orleans, June 19-24.

2022   Co-organizer, "3rd International Workshop and Prize Challenge on Agriculture-Vision: Challenges & Opportunities for Computer Vision in Agriculture," Computer Vision and Pattern Recognition (CVPR) 2022, New Orleans, June 19-24.

2021   Organizing Committee Member, "On the Pathway to a Digital Earth", Joint AI/ML Workshop between UMD and NASA Goddard Space Flight Center, College Park, September 22.

2021   Session Chair/Co-Convener, "Machine Learning for Planetary Science," American Geophysical Union (AGU) Fall Meeting, New Orleans and Online, December 13-17.

2021   Program Committee, Humanitarian Mapping Workshop, KDD, August 14-18.

2021   Organizer/Session Chair, The Trillion Pixel Challenge Workshop, Virtual (hosted by ORNL), April 21-22.

2020   Session Chair/Co-Convener, "Machine Learning for Planetary Science," American Geophysical Union (AGU) Fall Meeting, Virtual Conference, December 1-17.

2020   Co-Chair, "Robots in the Wild: Challenges in Deploying Robust Autonomy for Robotic Exploration," Workshop at Robotics: Science and Systems (RSS), Virtual Conference, July 12.

2019   Session Chair/Co-Convener, "Machine Learning for Planetary Science," American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, December 9-13.

2018   Session Co-Convener, "Machine Learning in Planetary Science: Introductions and Applications," American Geophysical Union (AGU) Fall Meeting, Washington, DC, December 10-14.

2017   Session Co-Convener, "Rise of Machine Learning: Salvation for Planetary Science in Times of Increasing Data Volume and Complexity," American Geophysical Union (AGU) Fall Meeting, New Orleans, LA, December 11-15.

2017   Co-Chair, NewSpace Europe Conference, Luxembourg City, November 16-17.

TEACHING EXPERIENCE

Courses Taught

Special Topics: Machine Learning for Remote Sensing (CSE 598)	Spring 2024
Foundations of Machine Learning (CSE 475)	Fall 2023
Data Mining (CSE 572)	Fall 2022, Spring 2023

School of Computing and Artificial Intelligence, Arizona State University
    (Professor of Impact Award received from 2 students)

Open Source GIS (GEOG 670)	Spring 2022

Department of Geographical Sciences, University of Maryland

CS for People Who Don't Know CS (Yet!)	Spring 2015

Department of Computer Science, University of North Carolina at Chapel Hill

Courses Assisted

Introduction to Programming	Spring 2014

Department of Computer Science, University of North Carolina at Chapel Hill

Introduction to Scientific Programming	Fall 2013

Department of Computer Science, University of North Carolina at Chapel Hill

Guest Lectures

Introduction to Machine Learning for Remote Sensing	Fall 2023

GEOG 272, University of Maryland (Instructor: Catherine Nakalembe)

Introduction to AI for Agriculture   Summer 2023
Climate Change AI Summer School

Machine Learning Challenges in the Real World   Spring 2023
AI 539, Oregon State University (Instructor: Kiri Wagstaff)

Computer Vision for Ecology (CV4E) Summer School   Summer 2022, 2023
California Institute of Technology

PRAIRIE AI Summer School (PAISS)   Summer 2021
PRAIRIE Institute

Remote Sensing for Sustainable Development   Spring 2021
University of Strasbourg (Instructor: Inbal Becker-Reshef)

Coding for Exploration   Fall 2019, 2020, 2021
School of Earth and Space Exploration, Arizona State University (Instructor: Jnaneshwar Das)

Remote Sensing   Spring 2020
Department of Geology, University of Maryland (Instructor: Mong-Han Huang)

Tutorials and Capacity Building

Machine Learning for Remote Sensing tutorial, hosted at Carnegie Mellon University (Africa campus, Kigali, Rwanda) and led by ASU, NASA Harvest, and CMU   May 2023

'Āina Data Stewards program kickoff, hosted at University of Hawaii Maui College and led by ASU, UMD, and NASA Harvest/ACRES consortium team members   Feb 2023

Argentina Multilateral training program led by NASA Harvest, UMD, the Buenos Aires Grain Exchange (Bolsa de Cereales), the Argentinian Ministry of Education, and the International Development Bank   Sep 2022

Scalable Cropland Mapping Workshop, hosted at University of Maryland for Regional Centre on Mapping Resources and Development (RCMRD)   Aug 2022

Machine Learning for Remote Sensing and Applications in Agriculture and Food Security tutorial (invited) at Computer Vision and Pattern Recognition (CVPR)   Jun 2022

AI and Earth Observations for Agriculture tutorials led by UMD and NASA Harvest team members at Regional Centre on Mapping Resources and Development (RCMRD) and Rwanda Space Agency (RSA)   Mar 2022

Crop Yield Modeling Workshop, Regional Center for Mapping of Resources for Development (RCMRD) (NASA Harvest and NASA SERVIR, PI: Nakalembe)   Sep 2021

Course on remote sensing and ML technologies for agriculture, Argentina Rural Schools Education program led by NASA Harvest and Bolsa de Cereales)   Aug-Dec 2021, 2022

MEDIA

Opinion Articles

1. Sowing Seeds of Food Security in Africa. *Eos*, 2021.

2. Too many AI researchers think real-world problems are not relevant. *MIT Technology Review*, 2020.

3. Our path to Mars needs to look beyond launch. *Houston Chronicle*, 2016.

4. Space technology can help sustain Earth. *Scientific American*, 2016.

5. What's The Point? The Real Reason Scientists Study Space. *Space.com*, 2015.

6. The Space Destination Debate Gets Us Nowhere... Literally. *Space.com*, 2015.

7. It's Not Them It's You: Why Top Tech Talent Isn't Going to the Satellite Industry. *Via Satellite*, 2015.

Featured Articles, Podcasts, and Other Media

8. ASU researcher combats food insecurity with AI, ASU News, 2023.

9. NASA Harvest Expands Food Security Work In Maui County, HI With Community-Based Partners, NASA Harvest Blog, 2022.

10. AskSME: Dr. Hannah Kerner - Artificial Intelligence Lead, Close-up with a NASA Subject Matter Expert, NASA eClips Video, 2021.

11. Real World: Food Security - Monitoring Crops from Space, NASA eClips Video, 2021.

12. Remote Sensing with ML and Starting Your Professorship, How to Do Grad School, 2021.

13. Cracking the Code for Healthy Crops with Hannah Kerner, NASA Applied Sciences Profile, 2021.

14. Hannah Kerner on Remote Sensing with Machine Learning, Time Horizons Podcast, 2021.

15. Space Scientists Naia Butler-Craig and Hannah Kerner Make Forbes' Under 30 List, Via Satellite, 2020.

16. How Farmers Can Help NASA Assess the Impacts of the Derecho in Iowa, AgriTalk Radio, 2020.

17. NASA Funds Eight New Projects Exploring Connections Between the Environment and COVID-19. *NASA Earth Sciences Division*, 2020.

18. Smart Machines: Enabling a New Era of Planetary Exploration. *CuttingEdge*, 2020.

19. Harvest Hub: Food Security from Space. *Via Satellite*, On Orbit podcast, 2020.

SERVICE

Reviewing

2023-	Computer Vision and Pattern Recognition (CVPR) conference
2023-	Neural Information Processing Systems (NeurIPS) conference
2023-	*Earth System Science Data (ESSD)*
2023-	*Nature Communications; Nature Food*
2023-	*Science Robotics*
2023	Workshop on Machine Vision for Earth Observation and Environment Monitoring (BMVC)
2021-2023	Climate Change AI Innovation Grants
2021	Humanitarian Mapping Workshop (KDD)
2021	Climate Change AI Workshop (ICML)
2021-	*Precision Agriculture*
2020-	External Reviewer, NASA ROSES
2020-	External Reviewer, Puerto Rico Science Trust
2020-	*Remote Sensing of Environment*
2020-	*Journal of Selected Topics in Applied Earth Observations and Remote Sensing*
2020-	*Frontiers in Sustainable Food Systems*
2020-	*Hydrology and Earth System Science*

2020-	*Agronomy*
2020-	*Agriculture*
2020-	*Remote Sensing*
2020	Europlanet 2024 Research Infrastructure (RI) Virtual Access Review Board (VARB)
2020	Women in Machine Learning Scholarships for ICLR 2020
2019-	*IEEE Transactions on Geoscience and Remote Sensing*
2019-2022	Brooke Owens Fellowship
2019-2021	SpaceVision Conference Student Scholarships
2019	Women in Machine Learning Workshop, NeurIPS
2018	NASA Frontier Development Lab

Organizations, Advisory Groups, and Committees
Internal

2022-2023	Graduate Admissions Committee (ASU School of Computing and Augmented Intelligence)
2021	Unlearning Racism in the Geosciences (URGE) Pod (University of Maryland)
2020-2022	Diversity, Equity, Inclusion, and Anti-Racism Committee (University of Maryland)
2020-2022	Graduate Committee (UMD Department of Geographical Sciences)
2020-2021	Department Committee Voting Representative (UMD Department of Geographical Sciences)

External

2024-2026	Data Archiving and Access Requirements Working Group (DAARWG) NOAA Science Advisory Board (SAB), Federal Advisory Committee
2020-2021	Technical Advisory Panel, The Lacuna Fund: Our Voice on Data Meridian Institute and Rockefeller Foundation
2020-	Co-organizer, Machine Learning for Remote Sensing Online Discussion Group, `https://bit.ly/2KoEX7K`
2020	Technical Committee, 2020 NSF CPS Challenge "SoilScope – Mars edition"
2019-2020	Volunteer, Board of Directors, Research & Policy Committee Women in Machine Learning (WiML)
2019-	Member (advising early-stage investments) Ubiquity Ventures Extended Team (UXT)
2015-	Member, Board of Advisors Students for the Exploration and Development of Space (SEDS) USA
2018-2019	Co-Chair, Women in Science Program School of Earth and Space Exploration, Arizona State University
2015-2019	Member, Colloquium Committee School of Earth and Space Exploration, Arizona State University

Advising and Mentoring
Thesis committees (chair)

2023-	Chenwei Cui (ASU Computer Science, PhD)
2023-	Gedeon Muhawenayo (ASU Computer Science, PhD)
2022-	Mirali Purohit (ASU Computer Science, PhD)
2022-	Rahul Nair (ASU Computer Science, PhD)
2022-	Bhanu Tokas (ASU Computer Science, Masters)
2023-	Nicholas Johnson (ASU Computer Science, Undergraduate Barrett Honors)
2023-	Anant Rastogi (ASU Computer Science, Undergraduate Barrett Honors)
2023-	Rini Jain (ASU Computer Science, Undergraduate Barrett Honors)
2023-	Sloan Cooney (ASU Computer Science, Undergraduate Barrett Honors)

Thesis committees (member)

2023-	Jianghai Peng (ASU Geological Sciences, PhD)
2023-	Zifan Yu (ASU Computer Science, PhD)
2023-	Madeline Schwarz (ASU Geological Sciences, PhD)
2022-	Paul Horton (ASU Exploration Systems Design, PhD)
2020-	Yiming Zhang (UMD Geographical Sciences, PhD)
2020-	Gabriel Tseng (McGill University/Mila Computer Science, PhD)
2023	Saisumana Konatam (ASU Computer Science, Undergraduate Honors Thesis)
2023	Matthew Watson (ASU Computer Science, Masters)
2022-2023	Ujjwala Anantheswaran (ASU Computer Science, Masters)
2021-2023	Ivan Zvonkov (UMD Computer Science, Masters)

Non-thesis research advising and mentorship

2023-	Advisor for Snehal Chaudhari, graduate student researcher (ASU CS, Masters)
2023-	Advisor for Aninda Ghosh, graduate student researcher (ASU Robotics, Masters)
2022-	Advisor for Manthan Satish (ASU Robotics, Masters)
2022-	Advisor for Aditya Mohan, graduate student researcher (ASU CS, Masters)
2023	Advisor for Kartik Jawanjal, graduate student researcher (ASU CS, Masters)
2023	Advisor for Vedant Janapaty, high school student researcher (Silver Creek High School)
2023	Advisor for Benjamin Yeh, NASA Harvest intern
2022-2023	Advisor for Keun Park, graduate student researcher (ASU CS, Masters)
2022-2023	Advisor for Adebowale Daniel Adebayo, NASA Harvest intern
2022-2023	Advisor for Abena Boatemaa Asare-Ansah, NASA Harvest intern
2022-2023	Advisor for Adam Yang, undergraduate student researcher (UMD CS)
2021-2023	Advisor for Saketh Sundar, high school student researcher (River Hill High School)
2022	Advisor for Aditya Shrivastava, graduate student researcher (ASU CS, Masters)
2022	Advisor for Ekenedilichukwu Ndu, undergraduate student researcher (UMD CS)
2022	Advisor for Maryann Vazhapilly, undergraduate student researcher (UMD CS)
2022	Advisor for Arushi Patel, undergraduate student researcher (UMD CS)
2022	Advisor for Sophia Owens, undergraduate student researcher (UMD GEOG)
2022	Advisor for Logan Daytner, undergraduate student researcher (UMD GEOG)
2022	Advisor for Chin-Yun Kuei, undergraduate student researcher (UMD GEOG)
2021-2022	Advisor for Vinay Raman, high school student researcher (Montgomery Blair High School)
2021-2022	Advisor for Eva Utzschneider, undergraduate student researcher (UMD CS)
2020-2022	Advisor for Dhruv Pai, high school student researcher (Montgomery Blair High School)
2020-2022	Advisor for Madhava Paliyam, undergraduate student researcher (UMD CS)
2020-2022	Faculty Advisor, Students for the Exploration and Development of Space (SEDS) at UMD)
2020-	Tutor for multiple scholars (anonymous), From Prison Cells to PhD (P2P)

2021	Advisor for Kevin Liu, undergraduate student researcher (UMD CS)
2021	Advisor for Bryce Dubayah, undergraduate student researcher (UMD CS)
2021	Advisor for Sakshum Kulshrestha, undergraduate student researcher (UMD CS)
2021	Advisor for Yao Poudima, undergraduate student researcher (UMD iSchool)
2020-2021	Advisor for William Cao, undergraduate student researcher (UMD CS)
2020-2021	Advisor for Bissaka Kenah, undergraduate student researcher (UMD CS)
2020-2021	Advisor for Avi Grant, undergraduate student researcher (UMD Geog)
2020-2021	Advisor for Favour Nerrise, undergraduate student researcher (UMD CS)
2020-2021	Advisor for Afolarin Lawal, graduate student researcher (UMD Geog)
2020	Advisor for Students for the Exploration and Development of Space (SEDS) Grad School Application Virtual Bootcamp
2020	Mentor & Judge, NASA COVID-19 Space Apps Challenge (SDGs category)
2017	Mentor for Julia Odden, high school summer intern (ASU)

Outreach

2018-2019	Curriculum Development, Prison Education Program School of Earth and Space Exploration, Arizona State University
2018	Algebra 1A and GED Math Instructor Adobe Mountain School, Arizona Department of Juvenile Corrections
2018-2019	President, Devil Divers (Scuba Club) Arizona State University
2016-2019	Instructor, Girls Who Code Maie Bartlett Heard K-8 School

Professional Membership

Member, Association for the Advancement of Artificial Intelligence (AAAI)

Member, American Geophysical Union (AGU)

Member, Women in Machine Learning (WiML)