Hannah R. Kerner
Curriculum Vitae
January 3, 2022

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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 Research Professor   2019-Present
Department of Geographical Sciences   College Park, MD
University of Maryland, College Park

Machine Learning and US Co-Lead   2020-Present
NASA Harvest   College Park, MD

Onboard Software Engineer   2014-2015
Planet Labs (Planet, Inc.)   San Francisco, CA

HONORS AND AWARDS

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
2016	Interact Fellowship

GRANTS AND FELLOWSHIPS

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

Peer-Reviewed Journal Articles

1. Shirzaei, M., Khoshmanesh, M., Ojha, C., Werth, S., **Kerner, H.**, Carlson, G., Sherpa, S. F., Zhai, G., and Lee, J. 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`.

2. Gray, P. C., Chamorro, D. F., Ridge, J. T., **Kerner, H. R.**, Ury, E. A., and Johnston, D. W. 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`.

3. 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`.

4. Hosseini, M., **Kerner, H.**, Sahajpal, R., Puricelli, E., Lu, Y-H., Lawal, A., Humber, M. L., Mitkish, M., Meyer, S., Becker-Reshef, I. 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`.

5. **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`.

6. **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`.

7. **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`.

8. **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`.

9. 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`.

Peer-Reviewed Conference Proceedings

10. Tseng, G., **Kerner, H.**, Rolnick, D. (2021). TIML: Task-Informed Meta-Learning for crop type mapping. To appear in *Association for the Advancement of Artificial Intelligence (AAAI)*, AI for Agriculture and Food Systems (AIAFS) Workshop.

11. 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*, `https://openreview.net/forum?id=JtjzUXPEaCu`.

12. 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`.

13. 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`.

14. 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`.

15. 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`.

16. 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`.

17. 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`.

18. 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`.

19. **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`.

20. **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`.

21. **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`.

22. **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`.

Other Publications

23. 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`.

24. 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`.

25. **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

26. **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)

27. 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)

28. 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)

29. 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.

30. **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)

31. 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)

32. 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)

33. 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)

34. **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)

35. 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)

36. 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.

37. 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.

38. 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.

39. 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)

40. **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)

41. **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)

42. **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)

43. **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)

44. 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)

45. **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)

46. **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)

47. **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)

48. **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. (est. 2021). Machine Learning for Planetary Science. In preparation for *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

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

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

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
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

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)

Artificial Intelligence   Fall 2019+
School of Computing, Informatics, and Decision System Engineering, Arizona State University
        (Coursera)

RESEARCH EXPERIENCE

Appointments

Assistant Research Professor   2019-Present
Department of Geographical Sciences   College Park, MD
University of Maryland, College Park

Graduate Research Assistant   2015-2019
School of Earth and Space Exploration   Tempe, AZ
Arizona State University

Research Intern   2018, 2019
Machine Learning and Instrument Autonomy Group   Pasadena, CA
Jet Propulsion Laboratory, California Institute of Technology

Mission Experience

Science Team Member, Mars Science Laboratory   2016-2020
Payload Downlink Lead, Opportunity Mars Exploration Rover   2016-2019

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

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

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

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

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

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

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

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

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

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

SERVICE

Reviewing

2021	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-	Brooke Owens Fellowship
2019-	SpaceVision Conference Student Scholarships
2019	Women in Machine Learning Workshop, NeurIPS
2018	NASA Frontier Development Lab

Organizations and Committees

Internal (UMD Geographical Sciences)

2021	Unlearning Racism in the Geosciences (URGE) Pod
2020-	Diversity, Equity, Inclusion, and Anti-Racism Committee
2020-	Graduate Committee
2020-2021	Department Committee Voting Representative (Research Faculty)

External

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

2022-	Advisor for Maryann Vazhapilly, undergraduate student researcher (UMD CS)
2022-	Advisor for Arushi Patel, undergraduate student researcher (UMD CS)
2021-	Advisor for Saketh Sundar, high school student researcher (River Hill High School)
2021-	Advisor for Vinay Raman, high school student researcher (Montgomery Blair High School)
2021-	Advisor for Eva Utzschneider, undergraduate student researcher (UMD CS)
2021-	Advisor for Vinay Raman, high school student researcher (Montgomery Blair High School)
2020-	Doctoral Committee Member for Yiming Zhang (UMD Geog)
2020-	Advisor for Dhruv Pai, high school student researcher (Montgomery Blair High School)
2020-	Advisor for Madhava Paliyam, undergraduate student researcher (UMD CS)
2020-	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)