2024-03

LEI MA

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Education

- Ph.D., Geography, University of Maryland, 2016-2021
- M.E., Cartography and Geography Information Engineering, Beijing Normal University (BNU), 2013-2016
- B.S., Geography Information System, Sun Yat-Sen University (SYSU), 2009-2013

Experience

- 2023-present, Assistant, Research Professor, UMD
- 2021-2023, Postdoctoral Associate, UMD
- 2018-2020 and 2021, Research Assistant, UMD
- 2016-2018, Teaching Assistant, UMD

Research Grants * (*partial listing)

- UMD BSOS Dean's Research Initiative, "Mapping tree regrowth using high-res aerial imagery and deep learning", $8,000, 06/2023 – 06/2024, PI
- NASA GEDI Competed Science Team, "Leveraging GEDI observations and mechanistic ecosystem modeling to quantify forest regrowth under a changing climate", $324,403, 04/2024 – 04/2027, PI
- NASA Early Career Investigator Program in Earth Science, "Constraining Forest Net Ecosystem Production Using Lidar Remote Sensing Observations and Mechanistic Ecosystem Modeling", $284,753, 06/2024 – 06/2027, PI

Publications

Peer-reviewed papers

1. Friedlingstein et al. (2023) Global Carbon Budget 2023, Global Carbon Budget 2023, Earth Syst. Sci. Data, 15, 5301–5369, https://doi.org/10.5194/essd-15-5301-2023
2. Wang et al. (2023) High-Fidelity Deep Approximation of Ecosystem Simulation over Long-Term at Large Scale, Proceedings of the 31st ACM International Conference on Advances in Geographic Information Systems, https://doi.org/10.1145/3589132.3625577
3. Ma et al. (2023) Spatial heterogeneity of global forest aboveground carbon stocks and fluxes constrained by spaceborne lidar data and mechanistic modeling, Global Change Biology, https://doi.org/10.1111/gcb.16682.
4. Kennedy et al. (2023) Changing cropland in changing climates: quantifying two decades of global cropland changes, Environmental Research Letters, https://doi.org/10.1088/1748-9326/acca97.
5. Ma et al. (2022) Global Evaluation of the Ecosystem Demography Model (ED v3.0), Geoscientific Model Development, https://doi.org/10.5194/gmd-15-1971-2022
6. Ma et al. (2020) Global rules for translating land-use change (LUH2) to land-cover change for CMIP6 using GLM2, Geoscientific Model Development, https://doi.org/10.5194/gmd-13-3203-2020.
7. Ma et al. (2021) High-resolution forest carbon modeling for climate mitigation planning over the RGGI region, USA. Environmental Research Letters. https://doi.org/10.1088/1748-9326/abe4f4.

8. Tang et al. (2021) High-resolution forest carbon mapping for climate mitigation baselines over the RGGI region, USA. Environmental Research Letters. https://doi.org/10.1088/1748-9326/abd2ef.
9. Lamb et al. (2021) Geospatial assessment of the economic opportunity for reforestation in Maryland, USA, Environmental Research Letters. https://doi.org/10.1088/1748-9326/ac109a.
10. Zhang et al. (2019) Assessing the impact of endmember variability on linear Spectral Mixture Analysis (LSMA): A theoretical and simulation analysis. Remote Sensing of Environment. https://doi.org/10.1016/j.rse.2019.111471.
11. Chini et al. (2021) Land-Use Harmonization Datasets for Annual Global Carbon Budgets, Earth System Science Data. https://doi.org/10.5194/essd-2020-388.
12. Lamb et al. (2021) Context and future directions for integrating forest carbon into sub-national climate mitigation planning in the RGGI region of the U.S, USA, Environmental Research Letters. https://doi.org/10.1088/1748-9326/abe6c2.
13. Hurtt et al. (2020) Harmonization of global land use change and management for the period 850–2100 (LUH2) for CMIP6, Geoscientific Model Development, 13, 5425–5464, https://doi.org/10.5194/gmd-13-5425-2020.
14. Hurtt et al. (2019) Beyond MRV: high-resolution forest carbon modeling for climate mitigation planning over Maryland, USA. Environmental Research Letters. https://doi.org/10.1088/1748-9326/ab0bbe.
15. Chen et al. (2016) Research progress of spectral mixture analysis. Journal of Remote Sensing. https://doi.org/10.11834/jrs.20166169.
16. Chen et al. (2016) A simple method for detecting phenological change from time series of vegetation index. IEEE Transactions on Geoscience and Remote Sensing, https://doi.org/ 10.1109/TGRS.2016.2518167.
17. Ma et al (2015) Two-step Constrained Nonlinear Spectral Mixture Analysis Method for Mitigating the Collinearity Effect. *IEEE Transactions on Geoscience and Remote Sensing,* https://doi.org/10.1109/TGRS.2015.2506725.
18. Ma et al. (2014) Estimation of Fractional Vegetation Cover in Semiarid Areas by Integrating Endmember Reflectance Purification Into Nonlinear Spectral Mixture Analysis. IEEE Geoscience and Remote Sensing Letter, https://doi.org/10.1109/LGRS.2014.2385816.
19. Fan et al. (2014) Earlier vegetation green-up has reduced spring dust storms. *Scientific Reports,* https://doi.org/10.1038/srep06749.
20. Liu et al. (2014) Simulating Urban Growth by Integrating Landscape Expansion Index (LEI) and Cellular Automata. International Journal of Geographical Information Science, https://doi.org/10.1080/13658816.2013.831097.

Reports

1. Kennedy (2024), Harnessing the Land Sector to Achieve US Climate Goals: An all-of-society approach to meeting our climate goals and bolstering the carbon sink by 2035, Center for Global Sustainability, University of Maryland and America Is All In. 21 pp
2. Kennedy (2023) Maryland's Climate Pathway: An analysis of actions the State can take to achieve Maryland's nation-leading greenhouse gas emissions reduction goals." Center for Global Sustainability, University of Maryland. 118 pp.
3. MDE (2023) Maryland's Climate Pollution Reduction Plan: Forestry and Land Use Sector Modeling (draft), Evaluating Maryland's natural carbon sequestration potential
4. MDE (2023) Maryland Tree and Forest Carbon Flux: Data and Methodology Documentation, Prepared by: Hurtt, G, C. Silva, L. Ma, Q. Shen, R. Lamb, V. Amin,

M. Abdulrahman, E. Campbell, R. Marks, A. Rudee, Haley Leslie-Bole Maryland Department of the Environment and Maryland Department of Natural Resources.

5. Ibrahim (2023) The Effectiveness of the GST Process in Facilitating the Evaluation and Documentation of Concrete Adaptation Interventions (Support and Finance) in SIDS. Working Paper. College Park, MD: Center for Global Sustainability, School of Public Policy, University of Maryland. 23 pp

Conference Presentation*

1. Ma et al. (AGU 2023) Afforestation/reforestation envelopes of carbon sequestration. (Invited).
2. Ma et al. (AGU 2022) Projection of global forest carbon sequestration potential under changing climate, AGU 2022
3. Lamb et al. (AGU 2022) Leveraging High-Resolution Forest Carbon Science to Support Maryland's Net-Zero GHG Reduction Goal
4. Chini et al. (AGU 2022) Land-Use Harmonization: Past, Present, and Future
5. Hannun et al. (AGU 2022) Linking Forest Biomass and Carbon Flux: Toward a Landscape-Scale Evaluation of Bottom-Up Flux Estimates Using Airborne Eddy Covariance Observations
6. Ma et al. (ForestSAT 2022) Advancing global forest carbon modeling with spaceborne lidar observations: integrating data on forest structure with an advanced ecosystem model for improving carbon stock mapping
7. Ma et al. (AGU 2021) Prototype global forest aboveground carbon monitoring system with process-based model and spaceborne lidar and optical observations
8. Ma et al. (NACP 7th 2021) Beyond MRV: High-Resolution Forest Carbon Monitoring and Modeling for the 11 State RGGI+ Region and National Prototype
9. Ott et al. (NACP 7th 2021) From minutes to seasons: an overview of predictions of carbon flux and concentrations over North America
10. Ma et al. (AGU 2020) High-resolution forest carbon modeling for climate mitigation planning over the 11-state RGGI+ region, USA,
11. Hurtt et al. (AGU 2020) High-resolution Monitoring of Forest Carbon Sequestration to Meet Climate Goals
12. Tang et al. (AGU 2020) Integrating GEDI, ICESat-1 and -2 to Characterize Vegetation Structure Dynamics: DOs and DON'Ts. AGU Fall Meeting.
13. Ott et al. (AGU 2020) Toward integrated seasonal predictions of land and ocean carbon flux, Lessons learned from NASA's subseasonal-to-seasonal predictions (Invited).
14. Ma et al. (AGU 2019) Global Ecosystem Demography Model (ED-global v1. 0): Development, Calibration and Evaluation for NASA's Global Ecosystem Dynamics Investigation (GEDI).
15. Ma et al. (NASA TE2019) Global Ecosystem Demography Model (ED-global v1.0): Development, Calibration and Evaluation for NASA's Global Ecosystem Dynamics Investigation (GEDI),
16. Ma et al. (AGU 2018) Impact of Forest Structure on Net Ecosystem Productivity Using Airborne Eddy Covariance and LiDAR Canopy Height.

Datasets

1. Ma et al. (2023). Global Forest Aboveground Carbon Stocks and Fluxes from GEDI and ICESat-2, 2018-2021. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/2180.
2. Ma et al. (2023). Forest Aboveground Biomass 2000-2022 for Maryland, USA. Zenodo. https://doi.org/10.5281/zenodo.10569327

3. Ma et al. (2022) Forest Aboveground Biomass and Carbon Sequestration Potential, Northeastern USA. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/1922
4. Ma et al. (2022). Simulated Forest Aboveground Biomass Dynamics, Northeastern USA. Zenodo. https://doi.org/10.5281/zenodo.6506453
5. Ma et al (2022). Forest Aboveground Biomass 1984-2016 for Maryland, USA. Zenodo. https://doi.org/10.5281/zenodo.6506502
6. Tang et al. (2021). LiDAR Derived Biomass, Canopy Height, and Cover for New England Region, USA, 2015. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/1854.
7. Chini et al. (2021). LUH2-GCB2019: Land-Use Harmonization 2 Update for the Global Carbon Budget, 850-2019. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/1851.
8. Hurtt et al. (2019). CMS: Aboveground Biomass and Carbon Sequestration Potential for Maryland. ORNL DAAC, Oak Ridge, https://doi.org/10.3334/ORNLDAAC/1660.

Honors and Awards*

- 2023, Outstanding Post-Doctoral Associate, UMD, Maryland, US
- 2021, First Place in the Excellence in Graduate Research Award, UMD, Maryland, US.
- 2020, Ann G. Wylie Dissertation Fellowship, UMD, Maryland, US.
- 2020, Outstanding Graduate Research Assistant, UMD, Maryland, US.
- 2015, First Academic Scholarship, BNU, Beijing, China.
- 2013, Top Ten Outstanding Graduates, SYSU, Guangzhou, China.
- 2013, Colonel-level Excellent Graduation Thesis, SYSU, Guangzhou, China.
- 2012, Second Prize of SYSU Outstanding Student Merit Scholarship, SYSU, Guangzhou, China
- 2011, Third Prize of SYSU Outstanding Student Merit Scholarship, SYSU, Guangzhou, China
- 2010, Second Prize of SYSU Outstanding Student Merit Scholarship, SYSU, Guangzhou, China

Services*

- NASA GEDI Competed Science Team
- Guest editor, Special Issue “Remote Sensing and Ecosystem Modeling for Nature-Based Solutions”, Remote Sensing
- Member of Early Career Scholars for An Inclusive Stocktake Program, Center for Global Sustainability (CGS), UMD
- Referee for Outstanding Student Presentation Awards (OSPA), AGU 2022
- Reviewers for journals, including Environmental Research Letters, Earth System Science Data, Global Biogeochemical Cycles, Remote Sensing of Environment, Ecological Modelling and etc.