

Fangni Lei | Curriculum Vitae

Assistant Research Professor
Eversource Energy Center
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Education

- **Ph.D.**, Cartography and Geographical Information Engineering, School of Resource and Environmental Sciences, Wuhan University, China (September 2013–December 2016).
 - **Advisor:** Professor Huanfeng Shen
- **Visiting Student**, Hydrology and Remote Sensing Laboratory, Agricultural Research Service, USDA, USA (December 2014–June 2016).
 - **Advisor:** Dr. Wade T. Crow
- **M.S.**, Cartography and Geography Information System, School of Resource and Environmental Sciences, Wuhan University, China (September 2011–July 2013).
 - **Advisor:** Professor Huanfeng Shen
- **Visiting Student**, Laboratory of Remote Sensing and Geospatial Science, Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, China (February 2012–September 2012).
 - **Advisor:** Dr. Chunlin Huang
- **B.S.**, Geographic Information System, School of Resource and Environmental Sciences, Wuhan University, China (September 2007–July 2011).

Work Experience

- **Assistant Research Professor**, Eversource Energy Center, University of Connecticut (May 2022–present).
 - **Advisor:** Dr. Emmanouil Anagnostou
- **Assistant Research Professor**, Geosystems Research Institute, Mississippi State University (August 2020–April 2022).
 - **Advisor:** Dr. Robert J. Moorhead
- **Postdoctoral Research Associate**, Geosystems Research Institute, Mississippi State University (August 2019–August 2020).
 - **Advisor:** Dr. Robert J. Moorhead
- **Postdoctoral Research Associate**, Hydrology and Remote Sensing Laboratory, Agricultural Research Service, USDA (April 2017–August 2019).
 - **Advisor:** Dr. Wade T. Crow

Funding Experience

- **Co-I:** "Applying radar and thermal remote sensing for irrigation decision support in vineyards and almond orchards", National Aeronautics and Space Administration, \$ 300,000 (my share), 11/2022-10/2025.
- **Co-I:** "High-resolution soil moisture monitoring for improved vineyard water resource management", National Aeronautics and Space Administration, \$ 96,440 (my share), 07/2019-06/2021.
- **Participated Projects**
 - MSU-USDA NACA Collaborative Program: "Closing the yield gap of cotton, corn, and soybean in the humid southeast with more sustainable cropping systems".
 - NASA Terrestrial Hydrology Program: "Robust estimates of soil moisture/evapotranspiration coupling strength derived from integrated thermal and microwave remote sensing".
 - NASA Applied Science Collaborative Project: "GRAPEX: Grape Remote sensing Atmospheric Profiling & Evapotranspiration eXperiment".

Professional Activities

- Panel reviewer, NASA Earth Science Programs, 2018-now
- Member, American Geophysical Union (AGU)
- Active Journal Reviewer for
Remote Sensing of Environment, Journal of Hydrology, Journal of Hydrometeorology, Science of the Total Environment, Agricultural and Forest Meteorology, Scientific Reports, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, Hydrological Processes, Remote Sensing, Water, Climate, Frontiers in Water, etc.

Research Interests

- Watershed-scale hydrologic modeling and hydrological data assimilation;
- Microwave remote sensing of soil moisture;
- Land surface water and energy balance modeling;
- Agricultural water management with remote sensing applications.

Journal Papers

1. **F. Lei**, V. Senyurek, M. Kurum, A. Gurbuz, D. Boyd, W. T. Crow, and R. Moorhead, "Quasi-Global Machine Learning-based Soil Moisture Estimates at High Spatio-Temporal Scales using CYGNSS and SMAP Observations," *Remote Sensing of Environment*, 276, 113041, 2022.
2. **F. Lei**, W. T. Crow, W. P. Kustas, J. Dong, Y. Yang, K. R. Knipper, M. C. Anderson, F. Gao, C. Nortarnicola, F. Gerifeneder, L. M. McKee, J. G. Alfieri, C. Hain, and N. Dokoozlian, "Data assimilation of high-resolution thermal and radar remote sensing retrievals for soil moisture monitoring in a drip-irrigated vineyard," *Remote Sensing of Environment*, 239, 111622, 2020.
3. **F. Lei**, W. T. Crow, T. R. H. Holmes, C. Hain, and M. C. Anderson, "Global investigation of soil moisture and latent heat flux coupling strength," *Water Resources Research*, 54(10): 8196-8215, 2018.
4. **F. Lei**, W. T. Crow, H. Shen, C.-H. Su, T. R. H. Holmes, R. M. Parinussa, and G. Wang,

- "Assessment of the impact of spatial heterogeneity on microwave satellite soil moisture periodic error," *Remote Sensing of Environment*, 205: 85-99, 2018.
5. F. Lei, W. T. Crow, H. Shen, R. M. Parinussa, and T. R. H. Holmes, "The impact of local acquisition time on the accuracy of microwave surface soil moisture retrievals over the contiguous United States," *Remote Sensing*, 7(10): 13448-13465, 2015.
 6. F. Lei, C. Huang, H. Shen, and X. Li, "Improving the estimation of hydrological states in SWAT model via the ensemble Kalman smoother: synthetic experiments for the Heihe Basin in northwest China," *Advances in Water Resources*, 67: 32-45, 2014.
 7. J. Dong, F. Lei, and W. T. Crow, "Land transpiration-evaporation partitioning errors responsible for modeled summertime warm bias in the central United States," *Nature Communications*, 13(1): 1-8, 2022.
 8. F. Chen, F. Lei, K. Knipper, and et al., "Application of the vineyard data assimilation (VIDA) system to vineyard root-zone soil moisture monitoring in the California Central Valley," *Irrigation Science*, 1-21, 2022.
 9. V. Senyurek, F. Lei, D. Boyd, A. C. Gurbuz, M. Kurum, R. Moorhead, "Evaluations of a Machine Learning-Based CYGNSS Soil Moisture Estimates against SMAP Observations," *Remote Sensing*, 12(21), 3503, 2020.
 10. V. Senyurek, F. Lei, D. Boyd, M. Kurum, A. C. Gurbuz, R. Moorhead, "Machine learning-based CYGNSS soil moisture estimates over ISMN sites in CONUS," *Remote Sensing*, 12(7), 1168, 2020.
 11. J. Dong, P. A. Dirmeyer, F. Lei, M. C. Anderson, T. R. Holmes, C. Hain, and W. T. Crow, "Soil Evaporation Stress Determines Soil Moisture-Evapotranspiration Coupling Strength in Land Surface Modeling," *Geophysical Research Letters*, 47(21), 2020.
 12. W. T. Crow, C. A. Gomez, J. M. Sabater, T. Holmes, C. R. Hain, F. Lei, J. Dong, J. G. Alfieri, and M. C. Anderson, "Soil Moisture-Evapotranspiration Overcoupling and L-Band Brightness Temperature Assimilation: Sources and Forecast Implications," *Journal of Hydrometeorology*, 21(10), 2359-2374, 2020.
 13. J. Dong, F. Lei, and L. Wei, "Triple collocation based multi-source precipitation merging," *Frontiers in Water*, 2(1), 2020.
 14. J. Dong, W. Crow, R. Reichle, Q. Liu, F. Lei, and M. Cosh, "A global assessment of added value in the SMAP Level 4 soil moisture product relative to its baseline land surface model," *Geophysical Research Letters*, 46, 6604-6613, 2019.
 15. H. Jiang, H. Shen, X. Li, C. Zeng, H. Liu, and F. Lei, "Extending the SMAP 9-km soil moisture product using a spatio-temporal fusion model," *Remote Sensing of Environment*, 231, pp.111224, 2019.
 16. W. P. Kustas, M. C. Anderson, et al. and F. Lei, "The grape remote sensing atmospheric profile and evapotranspiration eXperiment (GRAPEX)," *Bulletin of the American Meteorological Society*, 99, 1791-1812, 2018.
 17. H. Jiang, H. Shen, H. Li, F. Lei, W. Gan, and L. Zhang, "Evaluation of multiple downscaled microwave soil moisture products over the Central Tibetan Plateau," *Remote Sensing*, 9(5): 402, 2017.
 18. R. M. Parinussa, R. A. M. de Jeu, R. van der Schalie, W. T. Crow, F. Lei, and T. R. H. Holmes, "A quasi-global approach to improve day-time satellite surface soil moisture anomalies through the land surface temperature input," *Climate*, 4(4): 50, 2016.
 19. W. T. Crow, F. Lei, C. Hain, M. C. Anderson, R. L. Scott, D. Billesbach, and T. Arkebauer, "Robust estimates of soil moisture and latent heat flux coupling strength obtained from triple

collocation," *Geophysical Research Letters*, 42(20): 8415-8423, 2015.

Conference Proceedings and Presentations

1. Y. Yang, M. Anderson, F. Gao, **F. Lei**, J. Dong, C. Hain, K. Knipper, J. Alfieri, et. al., "Evaluation of OpenET DisALEXI and Ensemble ET over the State of California", AGU Fall Meeting, 2021.
2. K. Knipper, W. Kustas, M. Anderson, W. Crow, A. McElrone, N. Bambach, F. Chen, and **F. Lei**, "A remote sensing-based evapotranspiration toolkit for water management applications in California", AGU Fall Meeting, 2021.
3. W. Crow, F. Chen, **F. Lei**, K. Knipper, W. Kustas, L. McKee, N. Bambach, S. C. Bustamante, N. Dokoozlian, "High-resolution Tracking of Root-zone Soil Moisture Availability for High-value Irrigated Crops", AGU Fall Meeting, 2021.
4. **F. Lei**, V. Senyurek, M. Kurum, A. Gurbuz, D. Boyd, and R. Moorhead, and D. Boyd, "Quasi-global GNSS-R soil moisture retrievals at high spatio-temporal resolution from CYGNSS and SMAP data," IGARSS 2021.
5. **F. Lei**, V. Senyurek, M. Kurum, A. Gurbuz, and R. Moorhead, and D. Boyd, "Machine Learning based Retrieval of Soil Moisture at High Spatio-temporal Scales using CYGNSS and SMAP observations," IGARSS 2020 (oral presentation).
6. **F. Lei**, V. Senyurek, M. Kurum, A. Gurbuz, D. Boyd, and R. Moorhead, and D. Boyd, "A quasi-global machine learning-based CYGNSS soil moisture product at high spatio-temporal resolution," NASA CYGNSS Virtual Science Team Meeting 2020 (oral presentation).
7. W. T. Crow, F. Chen, **F. Lei**, W. P. Kustas, K. Knipper, M. M. Alsina, and N. Dokoozlian, "High-resolution monitoring of root-zone soil moisture for vineyard irrigation scheduling," AGU Fall Meeting, December 2020.
8. J. Dong, P. Dirmeyer, **F. Lei**, M.B. Anderson, T. Holmes, C. Hain, and W. Crow, "Bare soil evaporation stress determines soil moisture-evapotranspiration coupling strength bias in land surface modeling," AGU Fall Meeting December 2020.
9. **F. Lei**, W. T. Crow, J. Dong, M. C. Anderson, T. Holmes, C. Hain, "Investigating Land-Atmosphere Coupling Strength Biases in CMIP5 Climate Models Using Remote Sensing Data," San Francisco, CA, USA, December 2019 (oral presentation).
10. J. Dong, W. T. Crow, **F. Lei**, M. C. Anderson, T. Holmes, C. Hain, "Applying a remotely sensed land-atmosphere coupling diagnostic to improve land surface evapotranspiration estimation," San Francisco, CA, USA, December 2019 (poster presentation).
11. **F. Lei**, W. T. Crow, T. R. H. Holmes, C. Hain, and M. C. Anderson, "Integrating multi-source remote sensing data for global mapping of soil moisture and latent heat flux coupling," Washington DC, USA, December 2018 (poster presentation).
12. **F. Lei**, W. T. Crow, W. Kustas, M. Anderson, Y. Yang, "Assimilation of Remotely Sensed Evaporative Fraction for Improved Agricultural Irrigation Water Management," New Orleans, LA, USA, December 2017 (oral presentation).
13. W. T. Crow and **F. Lei**, "Accurately constraining surface soil moisture/evapotranspiration coupling using ground observations and satellite remote sensing," San Francisco, CA, USA, December 2015 (oral presentation).
14. **F. Lei**, H. Shen, C. Huang, "Enhancing the operational hydrologic forecast by simultaneous assimilation of satellite-based soil moisture and in-situ streamflow," in *Proc. of the 34th Asian Conference on Remote Sensing*, Bali, Indonesia, October 2013 (oral presentation).
15. **F. Lei**, C. Huang, H. Shen, "Improving the estimation of hydrological states in SWAT model

via the ensemble Kalman smoother," Hydrologic Ensemble Prediction EXperiment, Beijing, China, April 2012 (poster).

Honors and Awards

- Wangzhizhuo Award, Wuhan University, 2016
- Outstanding Ph.D Student Award, 2014
- Chinese Scholarship for supporting distinguish students to study abroad, 2014-2016
- Outstanding Graduate Student Award, 2013
- National Scholarship, 2013
- Outstanding Master Student Award, Wuhan University, 2012
- Outstanding Undergraduate Student Award, Wuhan University, 2008-2011