Hannah J. Rubin

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Education

University of Tennessee, Knoxville, TN   **2020-2024**
PhD. in Environmental Engineering

Dartmouth College, Hanover, NH   **2016-2020**
B.A. in Earth Science and Geography

Research Experience

PhD Research   **2020-2022**
Dr. Joshua Fu, Department of Civil and Environmental Engineering, University
of Tennessee, Knoxville

- Developed a measurement-model fusion approach in ArcMap and R to combine multiple databases of ground-based air pollution measurements with an HTAP-II multi-model ensemble
- Developed an algorithm using R, Python, and HDFView to extract surface-level pollution from OMI and IASI remotely sensed total column density
- Predicted heat wave risk at the regional level using dynamically and statistically downscaled climate models with custom NCL and R scripts and NERSC computing resources
- Mapped impacts of sulfur deposition under a stratospheric aerosol injection future climate scenario using bash and CDO scripts, Jupyter Notebook, and OLCF computing resources
- Applied custom NCL and CDO algorithms to correct climate model estimates of wildfire risks using the MODIS FireCCI51 product and calculate future population exposure
- Rebuilt and maintained the research group website with HTML5 and CSS
- Mapped soil organic carbon stocks in the US using machine learning to incorporate point observations, Landsat pixels, a digital elevation model, and historical meteorology using Google Earth Engine

Undergraduate Honors Thesis   **2018-2020**
Dr. Jonathan Chipman, Geography and Dr. Dave Lutz, Environmental Studies,
Dartmouth College

- Trained a random forest algorithm in R to predict water clarity in thousands of northeastern US lakes from Landsat spectral bands and a database of lake properties
- Compared Landsat surface reflectance viewing errors due to bi-directional reflectance distribution function post-processing with 30 years of Landsat cloud-free pixels in Google Earth Engine
- Worked closely with a 15-person interdisciplinary team to publish a peer-reviewed paper on algae blooms and share our research at conferences

Independent Research   2017
Dr. Frank Magilligan, Geography, Dartmouth College
- Quantified the relationship between suspended sediment in rivers and Landsat spectral bands using ArcMap and R

Independent Research   2013-2016
Racing Surfaces Testing Laboratory, Orono, ME
Dr. Mick Peterson, Biosystems Engineering, University of Maine
- Developed a new ASTM testing procedure to quantify thoroughbred horse racetrack composition and performance
- Analyzed a horse injury database with Python
- Created a LabVIEW program to run a track tester biomechanical hoof

Work Experience

Graduate Teaching Assistant for Geomatics, Department of Civil   **2020-2022**
Engineering, University of Tennessee
- Taught 4 lab sections per week of 25 students each how to use surveying equipment (e.g., total stations, GPS units) and process data in Carlson Survey
- Instructed junior TAs on how to teach the material

Ledyard Rental Business deskwork, Dartmouth College   **2017-2020**

Student Field Work Supervisor, Rogers Farm, University of Maine   **2018-2019**

Nordic Skiing PE Instructor, Dartmouth College   **2016-2018**

Trip Leader, 4-H Camp and Learning Center at Bryant Pond   **2016-2017**

Publications

1. Rubin, H.J., Fu, J.S., Dentener, F., Rui, L., Huang, K., Fu, H. (In Press). Global Nitrogen and Sulfur Deposition Mapping Using a Measurement-Model Fusion Approach. *ACP*.
2. Rubin, H.J.; Lutz, D.A.; Steele, B.G.; Cottingham, K.L.; Weathers, K.C.; Ducey, M.J.; Palace, M.; Johnson, K.M.; Chipman, J.W. Remote Sensing of Lake Water Clarity: Performance and Transferability of Both Historical Algorithms and Machine Learning. *Remote Sensing*. 2021, *13*, 1434. https://doi.org/10.3390/rs13081434
3. Bridge, J. W., Rubin, H., Dempsey, K. M., Peterson, M. L. Determining the Water Holding Capacity of Synthetic Track Materials for Thoroughbred Horse Racing. *Materials Performance and Characterization*, 2018, *7,* 1: 202-216.

Conferences

1. Rubin, H.J.; Yang, C.-E.; Hoffman, F.; Fu, J.S. Impacts of Climate Intervention on Sulfur Deposition with CMIP6 Model Outputs. Presented at 2022 Fall Meeting, AGU, 12-16 Dec.
2. Zhang, L.; Rubin, H.J.; Fu. J.S.; Rastogi, D.; Kao, S.-C.; Ashfaq, M. Heat Wave Predictions with Dynamical and Statistical Downscaling Methods. Presented at 2022 Fall Meeting, AGU, 12-16 Dec.

3. Rubin, H.J.; Fu, J.S. Revisiting Global Nitrogen and Sulfur Budgets Using a Measurement-Model Fusion Approach. In Proceedings of the Proceedings; NADP, 2021.
4. Lutz, D.A.; Rubin, H.J.; Steele, B.; Ducey, M.J.; Cottingham, K.L.; Palace, M.W.; Weathers, K.C.; Chipman, J.W. Harnessing Machine Learning and Citizen Science Data to Improve Remotely Sensed Estimates of Lake Water Clarity and Document Regional Clarity Trends. Presented at 2019 Fall Meeting, AGU, 9-13 Dec.