David **Caleb** Robinson

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US Citizen

Education

- Georgia Institute of Technology, 2015-2020
  Ph.D. Computational Science and Engineering
  Large scale machine learning for geospatial problems in computational sustainability
- University of Mississippi, 2011-2015
  B.S. Computer and Information Science, Minor in Mathematics for Engineers
  Modeling global climate variables with cellular automata networks

Skills

- Familiar with Python; including Python data science, deep learning, visualization, and geospatial libraries
- Familiar with basic HTML/CSS/Javascript web application development
- Familiar working with geospatial datasets using QGIS
- Familiar working with remote sensing/satellite data
- Familiar with building/training/testing deep learning models
- Familiar with formulating/solving mathematical programs using CLPEX or Gurobi
- Familiar with Linux and Windows, use Ubuntu Linux as main OS
- Graduate classes: Algorithms, Machine Learning, Computational Sustainability, Modeling and Simulation, Numerical Linear Algebra, Deep Learning, Network Science, Development Economics, Numerical Linear Algebra, Econometrics

Service

Reviewer for: AAAI, NeurIPS,

Fellowships and Awards

- Microsoft AI for Earth Research grant (Fall 2019)
- UN Data for Climate Action Award (Fall 2017)
- Serve Learn Sustain Fellowship (Fall 2017)
- Microsoft Azure Research Award (Fall 2017)
- NSF Graduate Research Fellowship Program (GRFP) Honorable mention (Spring 2017)
- Georgia Tech President's Fellowship (2015)

Publications

Journal Articles

- **C. Robinson**, N. Malkin, N. Jojic, H. Chen, R. Qin, C. Xiao, M. Schmitt, P. Chamisi, R. Hansch, and N. Yokoya, "Global land cover mapping with weaksupervision: Outcome of the 2020 ieee grssdata fusion contest," 2020. **In submission.**
- **C. Robinson**, B. Dilkina, and J. Moreno-Cruz, "Modeling migration patterns in the usa under sea level rise," *PLOS ONE*, vol. 15, pp. 1–15, 2020
- W. Zhang, **C. Robinson**, S. Guhathakurta, V. M. Garikapati, B. Dilkina, M. A. Brown, and R. M. Pendyala, "Estimating residential energy consumption in metropolitan areas: A microsimulation approach," *Energy*, 2018
- **C. Robinson**, B. Dilkina, J. Hubbs, W. Zhang, S. Guhathakurta, M. A. Brown, and R. M. Pendyala, "Machine learning approaches for estimating commercial building energy consumption," *Applied Energy*, 2017

Conference Proceedings

- **C. Robinson**, N. Malkin, L. Hu, B. Dilkina, and N. Jojic, "Weakly supervised semantic segmentation in the 2020 ieee grss data fusion contest," in *IGARSS 2020 - 2020 IEEE International Geoscience and Remote Sensing Symposium*, 2020
- A. Ortiz, **C. Robinson**, D. Morris, O. Fuentes, C. Kiekintveld, M. M. Hassan, and N. Jojic, "Local context normalization: Revisiting local normalization," in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020
- **C. Robinson**, A. Ortiz, K. Malkin, B. Elias, A. Peng, D. Morris, B. Dilkina, and N. Jojic, "Human-machine collaboration for fast land cover mapping," in *AAAI Conference on Artificial Intelligence (AAAI)*, 2020
- F. Hohman, H. Park, **C. Robinson**, and D. H. Chau, "Summit: Scaling deep learning interpretability by visualizing activation and attribution summarizations," *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 2020
- **C. Robinson**, L. Hou, K. Malkin, R. Soobitsky, J. Czawlytko, B. Dilkina, and N. Jojic, "Large scale high-resolution land cover mapping with multi-resolution data," in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019
- **C. Robinson** and B. Dilkina, "A machine learning approach to modeling human migration," in *1st ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS)*, 2018
- K. Malkin, **C. Robinson**, L. Hou, R. Soobitsky, J. Czawlytko, D. Samaras, J. Saltz, L. Joppa, and N. Jojic, "Label super-resolution networks," in *International Conference on Learning Representations (ICLR)*, 2019
- **C. Robinson***, A. Gupta, , and B. Dilkina, "Infrastructure resilience for climate adaptation," in *1st ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS)*, 2018. ***Co-first author**
- **C. Robinson**, J. Crittenden, Z. Lu, and R. Fujimoto, "Toward a common object model for integrated transportation and land use models," in *51st Annual Simulation Symposium (ANSS)*, 2018
- **C. Robinson**, F. Hohman, and B. Dilkina, "A deep learning approaches for population estimation from satellite imagery," in *1st ACM SIGSPATIAL Workshop on Geospatial Humanities (GeoHumanities)*, 2017
- **C. Robinson**, A. Shirazi, M. Liu, and B. Dilkina, "Network optimization of food flows in the U.S.," in *2016 IEEE International Conference on Big Data (Big Data)*, 2016
- A. Jain, **C. Robinson**, B. Dilkina, and R. Fujimoto, "An approach to integrate inter-dependent simulations using HLA with applications to sustainable urban development," in *2016 Winter Simulation Conference (WSC)*, 2016
- **C. Robinson** and J. Xue, "Sparse local binary pattern histograms for face recognition with limited training samples," in *2014 ACM Southeast Regional Conference*, ACM, 2014

Other

- L. Hu, **C. Robinson**, and B. Dilkina, "Model generalization in deep learning applications for land cover mapping," *arXiv preprint arXiv:2008.10351*, 2020
- D. Morris, P. Flickinger, **C. Robinson**, J. Marsman, N. Jojic, and L. N. Joppa, "Distributed inference and api hosting for an image analysis service: A case study on land cover mapping," *American Geophysical Union Fall Meeting 2019*, 2019
- B. Karl, **C. Robinson**, D. B. Koch, and O. Omitaomu, "Knowledge to action – understanding natural hazards-induced power outage scenarios for actionable disaster responses," *American Geophysical Union Fall Meeting 2017*, 2017. Abstract/Poster
- **C. Robinson***, A. Gupta, and B. Dilkina, "Predicting and alleviating road flooding for climate mitigation," *UN Data for Climate Action Challenge*, 2017. Paper/Poster/Talk. ***Co-first author**
- **C. Robinson**, "Modeling global climate variables with cellular automata networks." May 2015 (Undergraduate Honors Thesis)

Jobs and Internships

Data Scientist 2, Microsoft AI for Good. June 2020 - ongoing

- Working with external partners on geospatial machine learning projects
- Submitted 2 papers to AAAI 2020 on machine learning with medical imaging

Research Internship, Microsoft Research. May 2019 - August 2019

- Worked on human-in-the-loop active learning methods for improving land cover mapping.

- Developed open source web based application for interactive training of land cover models - https://github.com/microsoft/landcover.
- Coordinated with several groups stakeholders for the land cover mapping effort including the World Bank.

Research Internship, Microsoft Research. April 2018 - July 2018

- Worked on high resolution land cover mapping from aerial imagery with deep neural networks.
- Improved US-wide model performance from geographically limited training samples.
- Developed web application for rapid model evaluation / data exploration.

Research Internship, Oak Ridge National Laboratory. May 2016 - Aug 2016

- Worked on modeling human migration in response to extreme weather events with artificial neural networks.
- Created a web based visualizer that shows active hurricane tracks, and the probable power outages associated with the hurricane.

Software Development Internship, FNC Inc. June 2015 - Aug 2015
Software Development Internship, CSpire Wireless June 2014 - Aug 2014
Software Development Internship, FNC Inc June 2013 - Aug 2013
Software Development Internship, Wallace Community College, Selma, AL Dec 2012 - Jan 2013
Assistant Network Administrator, University of Mississippi Computer Science Department Jan 2012 – Aug 2012