MATTHEW W. COOPER

Department of Geographical Sciences, University of Maryland

mcooper.github.io ⋄ mattcoop@terpmail.umd.edu

EDUCATION

PhD, Geographical Sciences, University of Maryland *August 2017 - Present*
Coursework on spatial econometrics, data science, and machine learning.
Dissertation work combining geolocated household survey data with satellite-derived indicators of climate shocks and ecosystem services.

MA, Geography, University of North Carolina *August 2013 - December 2015*
Coursework in modeling environmental systems, GIS, remote sensing, public health, statistical analysis and R, applied ecology, ecosystem services, policy analysis, and biogeography.
Thesis work conducted in rural Mali.

BA, Geography and Anthropology, University of Florida *August 2006 - April 2010*
Minor in Philosophy

PEER REVIEWED PUBLICATIONS

1. **Cooper, M.**, Brown, M. E., Hochrainer-Stigler, S., Pflug, G., McCallum, I., Fritz, S., Silva, J., & Zvoleff, A. (2019). Mapping the effects of drought on child stunting. *Proceedings of the National Academy of Sciences*. doi.org/10.1073/pnas.1905228116

2. **Cooper, M.**, Brown, M. E., Azzarri, C., & Meinzen-Dick, R. (2019). Hunger, nutrition, and precipitation: evidence from Ghana and Bangladesh. *Population and Environment*, 1-58. doi.org/10.1007/s11111-019-00323-8

3. **Cooper, M.**, Di Minin, E., Haussman, A., Qin, S., Schwartz, A., Correia, R., (2019) Using Multiple Internet Data Streams Is Necessary To Measure Public Engagement With Biodiversity. *Biological Conservation*, 230, 29-36. doi.org/10.1016/j.biocon.2018.12.004

4. **Cooper, M.**, Zvoleff, A, Gonzalez-Roglich, M., Tusiime, F., Musumba, M., Noon, M., Alele, P., Nyiratuza, M., (2018) Geographic Factors Predict Wild Food and Nonfood NTFP Collection by Households Across Four African Countries. *Forest Policy and Economics*, 96, 38-53. doi.org/10.1016/j.forpol.2018.08.002

5. Hengle, T., Leenaars, J., Shepherd, K. D., Walsh, M. G., Mamo, T., Berkhout, E., Hellmann, F., **Cooper, M.**, Fegraus, E., Kwabena, N. (2017). Soil Nutrient Maps of Sub-Saharan Africa: Assessment of Soil Nutrient Content at 250 m Spatial Resolution Using Machine Learning. *Nutrient Cycling in Agroecosystems*, 109(1), 77-102. doi.org/10.1007/s10705-017-9870-x

6. **Cooper, M.**, & West, C. T. (2016). Unraveling the Sikasso Paradox: Agricultural Change and Malnutrition in Sikasso, Mali. *Ecology of Food and Nutrition*, 56(2), 101-123. doi.org/10.1080/03670244.2016.1263947

PAPERS IN PREPARATION, SUBMITTED, OR UNDER REVIEW

"What are we talking about when we discuss Food Security? Text mining the geographic and semantic scope of the Food Security literature" with Molly E. Brown and Meredith T. Niles

"Droughts Associated with Higher Probability of Intimate-Partner Violence Across 44 Developing Countries" with Carlos Azzari, Haile Beliyou, Austin Sandler, Yeyoung Lee and Sveva Vitellozzi

"Mapping Africa's Natural Safety Nets: Where Should Conservation Efforts Be Targeted to Sustain Ecosystem Services for Climate Change Resilience?"

GRANTS AND AWARDS

Excellence in Graduate Research Award   *May 2019*
Awarded by the Department of Geographical Sciences at the University of Maryland

SESYNC Graduate Pursuits Fellowship   *February 2019*
Funding to work with a team of graduate students on integrating environmental data on shocks with social media data on mental health and well-being

IIASA Peccei Award   *February 2019*
Selected from among 52 recipients of the IIASA YSSP award to return for another summer of research on environmental change and child malnutrition.

Microsoft AI for Earth Grant   *May 2018*
Grant to conduct PhD dissertation research using Microsoft Azure cloud resources

SEAL Leadership Award   *April 2018*
Award for Sustainability, Environmental Achievement and Leadership

IIASA Young Scientists Summer Program (YSSP) Fellow   *March 2018*
Award to spend the summer at the Institute for Applied Systems Analysis in Vienna, Austria conducting research on environmental change and child malnutrition.

IFPRI GCAN Student Challenge Award   *August 2017*
Award to analyze data from IFPRI (International Food Policy Research Institute) Feed the Future household surveys.
Results of study to be published as an IFPRI discussion paper.

Biodiversity Indicators Grant for Aichi Target 1   *May 2017*
Grant to develop a social media based indicator for monitoring public engagement with biodiversity and awareness of the value of biodiversity, in the form of a country-level aggregate statistics as well as a real-time interactive platform

Millennium Innovation Lab Project Grant   *September 2016*
Lead a project collecting hundreds of millions of tweets in English and Bahasa, to gauge public sentiment on various environmental themes and target hotspots of environmental stress.

West African Research Association Pre-Doctoral Fellowship   *April 2014*
Funding to do ten weeks of research on cotton, land use, and childhood malnutrition in southern Mali for MA thesis.

WORK EXPERIENCE

World Data Lab   September, 2019 - Present
Data Consultant

- Model global hunger over the next few decades.

Agrograph, Inc.   January, 2019 - May, 2019
Data Consultant

- Model crop yields in India using machine learning and remotely sensed observations of ground soil moisture.
- Model soil moisture in the US Midwest using google earth engine, combining a wide variety of datasets to account for evapotranspiration, soil types, drainage, and runoff.

Conservation International   August, 2017 - May, 2018
Assistant Scientist

- Developed an indicator of public engagement with biodiversity by synthesizing data from multiple social media APIs.
- Created an interactive online dashboard for displaying social media data related to biodiversity and conservation using node.js and D3.js.
- Maintained cloud infrastructure for Vital Signs data monitoring project and published results of analyses.

JRS Biodiversity Foundation   July, 2017 - September, 2017
Data Consultant

- Assessed baseline biodiversity data for 8 JRS projects by using web scraping and API calls to Global Biodiversity Information Facility (GBIF) and other biodiversity datasets, assembling baseline data into intuitive graphical reports.
- Assessed ease of access of data published by 15 previous JRS grantees.

Conservation International   January, 2016 - July, 2017
Data Manager

- Managed data collection, storage and analysis for a multi-million dollar project on human outcomes of agro-ecological change across five African countries.
- Improved applications in a complex data flow involving field data collection tools, cloud-based web applications and databases, data QA/QC procedures and user-facing data products.
- Worked with teams in the field to collect a wide variety of biophysical and socioeconomic data.
- Analyzed data to develop indicators on Nutrition, Food Security, Biomass, Woodfuel Use, Water Quality, and Land Use Change, and presented indicator results to scientists, policymakers and stakeholders.
- Collected hundreds of millions of tweets in English and Bahasa to gauge public sentiment on various environmental themes and target hotspots of environmental stress.
- Developed a social media based indicator for monitoring public engagement with biodiversity and awareness of the value of biodiversity in the form of a country-level aggregate statistics as well as a real-time interactive platform.

aWhere, Inc   January, 2015 – December, 2015
Data Analyst

- Estimated growing areas of over 100 commodity crops by integrating land cover data and crop output data from FAO using spatial disaggregation techniques in R.
- Created several webmaps using ArcGIS online and R-Shiny to visualize spatial data.
- Used statistical modeling (Vector Autoregression) in R and SQL Server to estimate futures prices of commodities based on historical price and weather data.
- Automated cartographic outputs.
- Led French-language training in for World Food Program in Burkina Faso on data management.

E-Sciences, Inc.   May, 2014 - August, 2014
GIS and Tree Survey Intern

- Worked on GIS tasks such as hydrological modeling, cartography, database management and interpolation.
- Conducted urban tree surveys in Miami, rapidly learning the major tree species
- Used ArcGIS and AutoCAD, and introduced the company to open-source GIS tools available in R and Python.

Peace Corps Response Philippines   January, 2013 – July, 2013
Forest Land Use Advisor

- Use field surveys, GIS and Remote Sensing to advise the province of Camarines Sur in creating a new forest management plan that identifies and maximizes ecosystem services.
- Compiled a GIS database for the Caramoan National Forest and surrounding areas, deriving land cover data from LANDSAT imagery and using hydrologic modeling of a DEM to derive rivers and watersheds.
- Worked with rural communities to conduct Participatory Resource Assessments, using community resource mapping and free listing to determine the quantity and resilience of local natural resource systems.
- Engaged in capacity building activities, instructing local environmental workers in the use of GIS and GPS.

Juneau Forestry Sciences Lab   July, 2012 – November, 2012
Research Assistant Intern

- Managed all of the data for several research projects in the Tongass National Forest using computer programs like ArcGIS, SAS, Excel, Access, Photoshop, HemiView and VisualCE
- Occasionally collect data in the field, camping and living in primitive and remote conditions.

Peace Corps Mali   February, 2011 – April, 2012
Environmental Extension Agent

- Lived in a rural village without water or electricity, successfully integrating myself into the local Bambara-speaking community.
- Planted over 200 trees for food security, animal fodder, soil fertility, forest preservation, erosion control and fuelwood production.
- Hosted a radio show and led trainings in Bambara and French on food processing, nutrition, adult literacy, computer skills, human waste disposal, and hand washing.
- Acquired funds from USAID to increase the village's water availability and ability to garden.
- Learned to identify every major tree species in the Sudanian Savanna eco-region, including scientific name, and common names in French, Bambara and Dioula.
- Service interrupted due to a military Coup d'état.

LANGUAGES

Language	Score	Scored by	Date
German	Basic Conversational		2019
Swahili	Basic Conversational		2016
French	Advanced-Mid	University of North Carolina	September, 2015
Tagalog	Advanced-High	Peace Corps	July, 2013
Bambara	Advanced-Mid	Peace Corps	May, 2012
Spanish	68 (Equivalent of 4 College Semesters)	CLEP	May, 2010
Arabic	3.5 GPA over 4 College Semesters	University of Florida	August, 2006

PROFESSIONAL SERVICE

Journals Reviewed For
Forest Policy and Economics

Nutrition and Food Science
Food Security
Environmental Research

Open-Source Software
Maintainer of `gfcanalysis`, an R package for downloading, manipulating and analyzing global forest cover data.