

DR. MATTHEW W. COOPER

Data Science Initiative Postdoctoral Fellow, T.H. Chan School of Public Health, Harvard University

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

PROFESSIONAL PREPARATION

Data Science Initiative Postdoctoral Fellow, Harvard University *May 2020 - April 2022*

Based at the T.H. Chan School of Public Health

Mentored by Sam Myers and Marcia Castro

PhD, Geographical Sciences, University of Maryland *August 2017 - January, 2020*

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 Beliyu, 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, with the results of the 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

Surgo Foundation *January, 2020 - March, 2020*
Research Scientist

- Modeled determinants of maternal and child health outcomes in India and Uganda.
- Created web application to periodically scrape data from Google Maps to measure social distancing.

Systems Science and Applications, Inc

November, 2019 - January, 2020

Senior Research Scientist

- Conduct topic modeling analysis of publications from NASA Carbon Monitoring System.
- Create an automated system for ingesting text data and outputting topic modeling results and visualizations.

World Data Lab

September, 2019 - November, 2019

Data Consultant

- Collate data at the subnational level on various metrics of hunger related to SDG 2.
- Model global levels of hunger over the next 20 years.

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 at BiodiversityEngagementIndicator.com
- 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.

Wayne National Forest

May, 2010 – November, 2011

Fire Effects Monitoring Intern

- Collected data on vegetation types and fuel levels in pre- and post-burn forest plots.
- Compiled a geospatial database of biodiversity levels and analyzed data using ArcGIS.
- Worked with the team in the field on trips last up to 10 days.
- Worked part-time doing wildlife fire fighting.
- Learned to identify every species of tree found in the mid-Appalachian ecoregion.

Pisco Sin Fronteras

July, 2009 – August, 2009

*Volunteer**Pisco, Peru*

- Did disaster-relief work involving clearing rubble and rebuilding new structures after a 8.0 earthquake.
- Conducted community needs-assessments in Spanish to assist in determining how the NGO's efforts could be best directed.

Inca Wasi Non-Profit

May, 2009 – June, 2009

*Volunteer**Cajamarca, Peru*

- Worked with Andean children to improve their educational and nutritional condition.
- Did all work activities in Spanish.

The Jesus Trail

May, 2008 – August, 2008

*Trail Mapping Specialist**Nazareth, Israel*

- Planned and mapped an eco-tourism and pilgrimage hiking trail using GPS and Google Earth.
- Promoted the trail by writing descriptions for the trails website and other website.
- Lead tours of the trail for visitors.

University of Florida Outdoor Program

December, 2007 – April, 2010

Trip Leader

- Planned, organized and executed outdoor adventure excursions in rock climbing, backpacking and canoeing.
- Taught students with no previous experience how to perform advanced outdoor activities.
- Had to maintain a positive demeanor through a variety of challenges and adverse weather conditions.

Hua Mei International School

June, 2007 – July, 2007

*English Teacher**Guangzhou, China*

- Organized and planned classes to teach children aged 5-15 the English language.

SOFTWARE SKILLS

Since	Skill	Packages, Libraries & Competencies	Used
2019	LaTeX		Frequently
2018	Machine Learning & AI	keras, sklearn, topic modeling	Frequently
2017	Javascript	node.js, d3.js	Occasionally
2017	NoSQL Databases	MongoDB, Elastic Search	Occasionally
2016	Cloud Computing	AWS - EC2, RDS, S3, IAM, Lambda Google Cloud - Storage, Compute Engine Microsoft Azure - Blob Storage, VMs, ML Studio	Frequently
2016	Google Earth Engine		Frequently
2016	Linux	bash scripting, package management, cron jobs, ssh	Frequently
2015	SQL	SQLite, Microsoft SQL Server, PostgreSQL, PostGIS	Occasionally
2015	Version Control	Git, Github, Bitbucket, Sourcetree	Frequently
2014	R	ggplot2, RShiny, tidyverse, geospatial packages	Daily
2014	Remote Sensing	ENVI, Erdas Imagine, PCI Geomatica	Occasionally
2013	Matlab		Rarely
2013	Python	pandas, numpy, boto3, arcpy	Frequently
2010	GIS	ArcGIS, QGIS	Occasionally

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

International Journal of Public Health

PLOS ONE

Open-Source Software

Maintainer of [gfcanalysis](#), an R package for downloading, manipulating and analyzing global forest cover data.

VOLUNTEERING

The Cornstalk Project

August, 2018 - January, 2020

- Serve on the board of a non-profit providing financial assistance to women and children in Magada, Western Kenya.

DC Detention Visitation Network

May, 2016 - May, 2017

- Provide social visits to immigrants and asylum seekers currently detained in federal prisons by the US Immigration and Customs Enforcement (ICE).

Yokefellows Prison Ministry

February, 2014 - November, 2015

- Provide weekly social visits to inmates in state prisons.
- Occasionally take 1-3 inmates out prison on supervised trips.