Travis M. Williams

Longmont, Colorado twillico@proton.me (850) 510-3048 williamstravis.github.io
TravisMWilliams WilliamsTravis twillico

Education

M.A. **University of Colorado**, Geography — Boulder, CO — Aug 2018
- Focus: Climate Risk Management, Drought, Research, Geospatial Modeling.
- Advisors: William R. Travis, Stefan Leyk, Barabara P. Buttenfield
- Thesis: *Drought Index-Based Insurance for the US Cattle Ranching Industry*
- Cumulative GPA: 3.90

B.S. **Florida State University**, Geography — Tallahassee, FL — Aug 2009
- Focus: GIS, Ecology, French
- Minors: Biology, French
- Cumulative GPA: 3.39

Experience

National Renenwable Energy Laboratory, Researcher III - Geospatial Data Science — Golden, CO — Nov 2019 – Present

My primary role at NREL is centered on the Renewable Energy Potential Model (reV). I have been the technical lead on this model since 2020 (shortly after it was open-sourced). Secondary roles at NREL include the development of other research models, data management, analysis, research, writing, and visualization for energy systems research projects.

- Designing analysis projects, collecting or building input data, and running models on NREL HPC systems
- Manage the reV model's maintenance budget
- Manage the reV models input data collection, filesystem, and compute environment on the HPC
- Train employees on reV and HPC
- Support and help existing users
- Interface with clients who want to use it with their own infrastructure
- Interface with the software developers (and periodically contribute to the software)

University of Colorado - Geography Dept., Research Assistant/Visiting Researcher — Boulder, CO — Jan 2017 – Nov 2019

Worked with a group called Earth Lab studying drought, fire, and agriculture.

- Co-authored literature review publication on adaptive ranching practices and drought information.
- Applied econometric methods to discover climate signals in a large market data set.
- Redesigned an existing rainfall insurance system to better manage drought-related agricultural risks.
- Developed and deployed interactive online risk management and decision-making tools.
- Generated descriptive charts, maps, and other graphical products.
- Built the Python package implementing the FIRED event delineation algorithm (firedpy)

University of Colorado - Geography Dept., Teaching Assistant — Boulder, CO — Aug 2016 – Dec 2017

Taught recitations for groups of 25-30 students.

- Geography of the Environment and Society & World Geography

- Topics included Human-Earth system interactions, theories of resource management, and natural hazard mitigation.
- Combination of content review, group activity, and grading.
- Focused on connecting course content with current events and engaging students in discussion.
- Features of 5 major world regions with a particular focus on culture and social injustice.

Southern Illinois University - Plant, Soil, & Ag. Systems Dept., Research Assistant — Carbondale, IL
Soil sampling, laboratory tests, GIS analysis, research, & writing. — Apr 2014 – May 2016

- Collected plant tissue and soil samples with Truck Mounted Soil Probe, SPAD and other devices.
- Performed KCL extractions and other laboratory tests for agricultural chemicals content.
- Collected and interpreted climate data and site information for a large meta-analysis of high-yield fertilizer studies across the Midwest using various GIS programs.
- Used ArcGIS and SAS to perform spatial analysis into the performance of a no-till and cover crop study concurrent with extensive research into the practices

Various, Various — FL, NC, & IL
Various jobs in retail, environmental protection, landscaping, a rock masonry company, a boarding school, etc. — Aug 2003 – Apr 2014

- Lived and worked for a year off-grid in near Blackforest, NC
- Lived and worked for a few years on a family ranch near Vienna, IL
- etc

Projects

Drought Index Portal (DrIP) — Jan 2017 – Nov 2019
An interactive data portal for comparing drought indices and exploring historical drought in the United States.

- https://droughtindexportal.colorado.edu
- Interactive map and timeseries compares 42 different indicators of drought.
- Flexible enough to compare any two drought indices at any point, across any time period since 1900 or one index at mutliple points and time periods.
- Allows allows user to easily identify the severity and geographic extent worse historical droughts in the US to compare with current conditions.
- Was built with less than two years of experience in programming.

reView — Jan 2021 – Present
Another interactive data portal, this time to review outputs from the Renewable Energy Potential Model (reV).

- Renders spatial, statistical, and temporal outputs from reV model runs.
- Links location and graph visualization

Skills

GIS Interfaces: QGIS, ArcMap, GRASS, & DIVA GIS

Programming Languages: Python, R, SQL, Bash, C, C++, HTML

Geospatial Data Tools: Geospatial Abstraction Library (GDAL), Rasdaman, PostGIS

Research & Data Analysis: Geospatial Analysis, Renewable Energy Technical Potential Modeling, Natural Hazards and Insurance (particularly drought), Soil Science, Econometrics

Etc.: Blender, OBS-Studio, Linux, SLURM, General Cartography

Publications

Managing climate risks on the ranch with limited drought information 02/22/2018
Trisha Shrum, William Travis, Travis Williams, and Evan Lih
Climate Risk Management 20, 11-26
www.sciencedirect.com/science/article/pii/S2212096317301407?via%3Dihub

Drought Index-based Insurance for the US Cattle Ranching Industry 08/15/2018
Travis Williams
University of Colorado - Dissertations and Theses: 10843790
www.proquest.com/openview/85fc8e0e239dd79f9bcf646536cb338d/1?pq-origsite=gscholar&cbl=18750

Evaluating Alternative Drought Indicators in a Weather Index Insurance Instrument 06/01/2019
Travis Williams and William Travis
American Meteorological Society: Weather, Climate, and Society 11(3), 629-649
doi.org/10.1175/WCAS-D-18-0107.1

FIRED (Fire Events Delineation): An Open, Flexible Algorithm and Database of US Fire Events Derived from the MODIS Burned Area Product (2001–2019) 10/24/2020
Jennifer Balch, Lise St. Denis, Adam Mahood, Nathan Mietkiewicz, Travis Williams, Joe McGlinchy, and Maxwell Cook
Remote Sensing 12(21),3498
doi.org/10.3390/rs12213498

The Renewable Energy Potential (reV) Model: A Geospatial Platform for Technical Potential and Supply Curve Modeling 06/01/2021
Galen Maclaurin, Nick Grue, Anthony Lopez,Donna Heimiller, Michael Rossol, Grant Buster, and Travis Williams
National Renewable Energy Laboratory, NREL/TP-6A20-73067
docs.nrel.gov/docs/fy19osti/73067.pdf

Land Use and Turbine Technology Influences on Wind Potential in the United States 05/15/2021
Anthony Lopez, Trieu Mai, Eric Lantz, Dylan Harrison-Atlas, Travis Williams, and Galen Maclaurin
Energy 223, 210044
doi.org/10.1016/j.energy.2021.120044

2021 Standard Scenarios Report: A U.S. Electricity Sector Outlook 11/01/2021
Wesley Cole, J. Carag, Maxwell Brown, Patrick Brown, Stuart Cohen, Kelly Eurek, Will Frazier, Pieter Gagnon, Nick Grue, Jonathan Ho, Anthony Lopez, Trieu Mai, Matthew Mowers, Caitlin Murphy, Brian Sergi, Dan Steinberg, and Travis Williams
National Rnewable Energy Laboratory, NREL/TP-6A40-80641
doi.org/10.2172/1834042

Wind Energy Costs in Puerto Rico Through 2035 09/01/2022
Patrick Duffy, Gabriel Zuckerman, Travis Williams, Alicia Key, Luis Martinez-Tossas, Owen Roberts, Nina Choquette, Jaemo Yang, Haiku Sky, and Nate Blair
National Rnewable Energy Laboratory, NREL/TP-6A40-83434
doi.org/10.2172/1891213

Turbine Scale and Siting Considerations in Wind Plant Layout Optimization and Implications for Capacity Density 03/07/2022
Andrew Stanley, Owen Roberts, Anthony Lopez, Travis Williams, and Aaron Barker
Energy Reports 8, 3507-3525
doi.org/10.1016/j.egyr.2022.02.226

National-Scale Impacts on Wind Energy Production under Curtailment Scenarios to Reduce Bat Fatalities 05/24/2022
Galen Maclaurin, Cris Hein, Travis Williams, Owen Roberts, Eric Lantz, Grant Buster, and Anthony Lopez
Wind Energy 25(9)

doi.org/10.1002/we.2741

Exploring the Impact of Near-Term Innovations on the Technical Potential of Land-Based Wind Energy 03/01/2023

Owen Roberts, Travis Williams, Anthony Lopez, Galen Maclaurin, and Annika Eberle

National Rnewable Energy Laboratory, NREL/TP-500-81664

doi.org/10.2172/1963405

Impacts of Siting Considerations on Offshore Wind Technical Potential in the United States 07/01/2023

Gabriel Zuckerman, Anthony Lopez, Travis Williams, Rebecca Green, and Grant Buster

National Rnewable Energy Laboratory, NREL/TP-6A40-85088

doi.org/10.2172/1989233

Impact of Siting Ordinances on Land Availability for Wind and Solar Development 08/03/2023

Anthony Lopez, Wesley Cole, Brian Sergi, Aaron Levine, Jesse Carey, Cailee Mangan, Trieu Mai, Travis Williams, Pavlo Pinchuk, and Jianyu Gu

Nature Energy 8, 1024-1043

doi.org/10.1038/s41560-023-01319-3

Estimating National-Scale Wind Potential Using Spatially Explicit Turbine Layout Optimization 10/01/2023

Anthony Lopez, P. J. Stanley, Owen Roberts, Trieu Mai, Travis Williams, Pavlo Pinchuk, Grant Buster, and Eric Lantz

National Rnewable Energy Laboratory, NREL/TP-6A20-85075

doi.org/10.2172/2203429

Incorporating Wind Turbine Choice in High-Resolution Geospatial Supply Curve and Capacity Expansion Models 01/15/2024

Annika Eberle, Trieu Mai, Owen Roberts, Travis Williams, Pavlo Pinchuk, Anthony Lopez, Matthew Mowers, Joseph Mowers, Tyler Stehly, and Eric Lantz

National Rnewable Energy Laboratory, NREL/TP-6A20-87161

doi.org/10.2172/2283923

Solar Photovoltaics and Land-Based Wind Technical Potential and Supply Curves for the Contiguous United States: 2023 Edition 01/07/2024

Anthony Lopez, Pavlo Pinchuk, Michael Gleason, Wesley Cole, Trieu Mai, Travis Williams, Owen Roberts, Marie Rivers, Mike Bannister, Sophie-Min Thomson, Gabe Zuckerman, Brian Sergi

National Rnewable Energy Laboratory, NREL/TP-6A20-87843

doi.org/10.2172/2283517

2023 Standard Scenarios Report: A U.S. Electricity Sector Outlook 01/15/2024

Pieter Gagnon, An Pham, Wesley Cole, Sarah Awara, Anne Barlas, Maxwell Brown, Patrick Brown, Vincent Carag, Stuart Cohen, Anne Hamilton, Jonathan Ho, Sarah Inskeep, Akash Karmakar, Luke Lavin, Anthony Lopez, Trieu Mai, Joseph Mowers, Matthew Mowers, Caitlin Murphy, Paul PinchukAnna Schleifer, Brian Sergi, Daniel Steinberg, and Travis Williams

National Rnewable Energy Laboratory, NREL/TP-6A20-87724

doi.org/10.2172/2274777

Puerto Rico Grid Resilience and Transitions to 100% Renewable Energy Study (PR100): Final Report 03/01/2024

Murali Baggu, Robin Burton, Nate Blair, Manajit Sengupta, Tom Harris, Clayton Barrows, Haiku Sky, Vahan Gevorgian, Jeremy Keen, Elena Smith, Mike Campton, Sushmita Jena, Jaemo Yang, Travis Williams, Paritosh Das, James Elsworth, Prateek Joshi, Cameron Weiner, James Morris, Joseph McKinseySurya Chandan Dhulipala, Sam Molnar, Weihang Yan, Pranav Sharma, Wenbo Wang, Aadil Latif, Daniel Thom, Sourabh Dalvi, Ian Baring-Gould, Matthew Lave, Amanda Wachtel, C. Birk Jones, Emily Moog, Andrea Mammoli, Richard Garrett, Thad Haines, Will Vining, Cody Newlun, Olga Hart, Marcelo Elizondo, Xiaoyuan Fan, Patrick Maloney, Alok Bharati, Bharat Vyakaranam, Vishvas Chalishazar, Patrick Royer,

Fernando Bereta dos Reis, Xue (Michelle) Li, Kaveri Mahapatra, Jeff Dagle, Xinda Ke, Meng Zhao, Orestis Vasios, Tycko Franklin, Michael Abdelmalak, Kishan Guddanti, Samrat Acharya, Marcos Cruz, Pavel Etingov, Chuan Qin, Juan Carlos Bedoya, Tony Nguyen, Sraddhanjoli Bhadra, Ahmad Tbaileh, Laura Ward, Victoria Sinnott, Pablo Mendez-Curbelo, Peter Cappers, Jeff Deason, Margaret Pigman, Lawrence Paul Lewis, John T. Murphy, Tomaz Kobayashi-Carvalhaes, Melanie Bennett, Yilu Liu, Harvey Cutler, Martin Shields, Hwayoung Jeon, and Michele Chait
National Rnewable Energy Laboratory, NREL/TP-6A20-88384
doi.org/10.2172/2335361

The interplay of future solar energy, land cover change, and their projected impacts on natural lands and croplands in the US 10/15/2024
Jay Diffendorfer, Brian Sergi, Anthony Lopez, Travis Williams, Michael Gleason, Zach Ancona, Wesley Cole
Science of the Total Environment 947, 173872
doi.org/10.1016/j.scitotenv.2024.173872

System-cost-minimizing deployment of PV-wind hybrids in low-carbon U.S. power systems 07/01/2024
Patrick Brown, Travis Williams, Maxwell Brown, and Caitlin Murphy
Applied Energy 365, 123151
doi.org/10.1016/j.apenergy.2024.123151

Renewable Energy Technical Potential and Supply Curves for the Contiguous United States: 2024 Edition 01/07/2024
Anthony Lopez, Gabriel Zuckerman, Pavlo Pinchuk, Michael Gleason, Marie Rivers, Owen Roberts, Travis Williams, Donna Heimiller, Sophie-Min Thomson, Trieu Mai, and Wesley Cole
National Rnewable Energy Laboratory, NREL/TP-6A20-91900
doi.org/10.2172/2500362

Winds of Change: A Study of Future Wind Energy Resources and Cost Uncertainties Across the United States (Under Review) 11/20/2025
Grant Buster, Owen Roberts, Travis Williams, and Tyler Stehly
Nature Energy

Extracurricular Activities

- I enjoy researching consumer hardware and building personal computers. Aside from the joy of assembling a complex machine, seeing it work, and optimizing for performance, this is a useful hobby for work. I've found it helps me to understand computer systems from a more bottom-up perspective than any of my jobs so far have allowed for. This is useful for someone without a computer science background.
- I'm a big Linux enthusiast and enjoy tinkering with it as a hobby. Ever since I learned that Linux has desktop environments in 2017 (having only seen it on cloud servers), I abruptly adopted it as my personal OS of choice. This, and graduate school in general, also introduced me to the free software movement and the utility of open-source software, of which I am now a full proponent.