Ryan Avery

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EDUCATION

Ph.D. student Geography, University of California, Santa Barbara, 2021 (expected)
Adviser: Kelly Caylor

B.S. Environmental Sciences: Biological Sciences Concentration, University of California, Berkeley, 2016

RESEARCH INTERESTS

Ecohydrological measurement and modeling, particularly isotope hydrology and water balance estimation

Classification and clustering of multispectral imagery for object detection and segmentation

Spatial data science: computational statistics, machine learning, big data, visualization, spatial analysis

Coupled human-natural systems and decison making and policy around water resources

PUBLICATIONS

Reports and Working Papers

2017 "Detecting Changes in Nighttime Sky Brightness over Grand Teton National Park with the Suomi NPP VIIRS Sensor" Avery, R., V. Warda, S. Chu, S. Chao. 2017. NASA DEVELOP Technical Report.

2017 "Enhancements to Visualization of CALIPSO (VOCAL) through Case Studies of Saharan Dust" Pampalone, C. R. Avery, W. Turner. 2017. NASA DEVELOP Technical Report.

2017 "A Threshold-Based Decision Tree Approach to Mapping Landscape Disturbance in Glacier National Park" Avery, R., Mays, C., Alvarado A. 2017. NASA DEVELOP Technical Report.

2016 "Mapping Invasive Species to Efficiently Monitor Southwestern National Park Areas" Avery, R., K. Landesman, T. Whaley. 2016. NASA DEVELOP Technical Report.

Manuscripts in Preparation

2019 Avery, R., L. Estes, K. Caylor, S., R. Eastman, Ye, L. Song "A Convolutional Neural Network Approach for Segmenting Smallholder Agriculture and Comparison to Modern Machine Learning Methods" Target: *Remote Sensing of Environment*, Summer 2019.

2019 Avery, R., K. Caylor, M. McCabe, M. Mayes, L. Estes "Field-Scale Evapotranspiration Maps across Global Dryland Center Pivot Agriculture" Target: *Remote Sensing of Environment*, Fall 2019.

2019 Tuholske, C., K. Caylor, T. Evans, R. Avery "Triangulating Urban Agglomerations Hotspots Across Africa" Target: *Environmental Research Letters*, Spring 2019.

2019 Elmes A., L. Estes, M. Friedl, V. Gammino, J. McCarty, M. Jain, L. Fishgold, K. Caylor, R. Eastman, G. Pontius, J. Bayas, H. Alemohammad, J. Rogan, D. Kohli, R. Avery, D. Lunga, I. Bouvier "Quantifying Error in Training Data and its Implications for Land Cover Mapping" Target: *Remote Sensing of Environment*, Summer 2019.

CONFERENCE ACTIVITY

Conference Presentations

Presenting author *italicized*, if other.

2018 Avery, R., "A Convolution Neural Network Approach for Segmenting Center Pivot Agriculture" American Geophysical Union Fall Meeting. Washington D.C. Dec 10–14.

GRANTS AND AWARDS

Grants and Fellowships

2018 National Geographic and Microsoft AI for Earth research grant ($100,000). Role: Primary Author and Project Member.

RESEARCH EXPERIENCE

January 2019 – present
National Geographic AI for Earth Fellowship, Primary Researcher and Project Team Member. University of California, Santa Barbara, California.

January 2018 – present
Clark Labs, Graduate Research Assistant. Worcester, Massechusetts;

September 2016 – August 2017
NASA DEVELOP National Program, Geoinformatics and Project Coordination Fellow. NASA Langley Research Center, Virginia.

June 2016 – August 2016
NASA DEVELOP National Program, Team Lead and Researcher. NASA Langley Research Center, Virginia.

May 2015 – December 2015
Berkeley Energy and Climate Institute, Undergraduate Research Fellow. University of California, Berkeley, California.

September 2014 – April 2015
Kelly Research and Outreach Lab, Undergraduate Researcher. University of California, Berkeley, California.

TEACHING EXPERIENCE

University of California, Santa Barbara

Oceans and Atmosphere, Teaching Assistant. (Fall '18)

Oceans and Atmosphere, Teaching Assistant. (Winter '19)

SERVICE

Service Workshops

Programming with Python, NASA Langley Research Center, January 26–27, 2017

The Unix Shell, Version Control with Git, Programming with Python, NASA Langley Research Center, June 8–9, 2017

The Unix Shell, Version Control with Git, Programming with Python, NASA DEVELOP at Wise County, June 12–13, 2017

The Unix Shell, Version Control with Git, Batch Processing with GDAL, NASA Jet Propulsion Laboratory, September 18–19, 2017

The Unix Shell, Version Control with Git, Programming with Python, CSU Monterey Bay, January 19–20, 2018

The Unix Shell, Git and Github, R for Reproducible Scientific Analysis, Old Dominion University, October 25–26, 2018

Jupyter Notebooks and Python for Ecologists, EcoDataScience at University of California, Santa Barbara, November 13, 2018

Service to Department

Computing Resources Committee, University of Santa Barbara, 2017–2018

Geography Ph.D. program faculty representative, University of Santa Barbara, 2018–19

PROFESSIONAL AFFILIATIONS

American Geophysical Union

The Carpentries (Software and Data Carpentry)

National Geographic Explorers

CREDENTIALS

Certified Instructor for Software and Data Carpentry, including geospatial data science lessons

SELECTED MEDIA COVERAGE

2018 *The UCSB Current*. "Eyes in the Sky: National Geographic awards geographer Kelly Caylor an 'AI for Earth Innovation' grant" January 29, 2019.

2018 *southbigdatahub.org*. "Old Dominion University: A Melting Pot of Learners and Perspectives Creates an Impactful Workshop" October 27, 2018.

SKILLS AND METHODS

Statistical and Computational Methods

Computational statistics and machine learning, data mining, data wrangling, Python (including numpy, scipy, pandas, matplotlib, statsmodels, scikit-learn, and scikit-image), deep learning (including keras, imgaug, and mrcnn), Apache Spark, Amazon Web Services, Microsoft Azure, JavaScript, HTML, MySQL.

Geospatial Methods and Tools

ENVI, MODTRAN, geopandas, rasterio, rasterstats, rasterfames, geopyspark, rastervision, Planet Labs API, spatial analysis, QGIS, GRASS GIS, ArcGIS, Leaflet

Field Methods

I have experience with drone remote sensing for structure from motion based digital terrain modeling, plot level plant morphology measurements, biomass weighing, and geolocating transect and point data.

Updated January 2019