Danny Avery

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EDUCATION

B.S. Computer Science and Engineering: Computer Systems Concentration, University of California, Santa Cruz, 2020

COURSE WORK

Ecohydrological measurement and modeling, vegetation remote sensing, isotope hydrology

Classification and clustering of multispectral imagery for object detection and segmentation

Spatial data science, machine learning, big data, visualization, spatial analysis

Coupled human-natural systems and water resources management

PUBLICATIONS

Manuscripts in Preparation

2020 Avery, R., K. Caylor, M. McCabe, M. Mayes, L. Estes "Field-Scale Maps of Evapotranspiration across Center Pivot Agriculture in Drylands" Target: *Remote Sensing of Environment*, Fall 2019.

2020 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.

2020 Tuholske, C., K. Caylor, T. Evans, R. Avery "Triangulating Urban Agglomerations Hotspots Across Africa" Target: *Environmental Research Letters*, Spring 2019.

2020 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.

Reports

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.

Conference Presentations

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

2019 Honorable Mention, National Science Foundation Graduate Research Fellowship Program.

2019 Scipy 2019 Scholarship Award, Full Conference Scholarship ($1903).

2019 Travel Scholarship to attend Isocamp 2019 ($1000).

2019 Travel Scholarship to AI for Earth Summit 2019 ($1500 approx.).

2018 National Geographic and Microsoft AI for Earth Innovation 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.

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.

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

TEACHING EXPERIENCE

University of California, Santa Barbara

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

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

SERVICE

Service Workshops

The Unix Shell, Git/Github, Python, Center for Scientific Computing, May 11–12, 2019 (upcoming)

Jupyter Notebooks and Python for Ecologists, EcoDataScience at UCSB, November 13, 2018

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

The Unix Shell, Git/Github, Python, CSU Monterey Bay, January 19–20, 2018

The Unix Shell, Git/Github, Batch Processing with GDAL, NASA JPL, September 18–19, 2017

The Unix Shell, Git/Github, Python, NASA DEVELOP at Wise County, June 12–13, 2017

The Unix Shell, Git/Github, Python, NASA Langley Research Center, June 8–9, 2017

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

Service to Department

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

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

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

2019 *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, radiometric and atmospheric calibration of multispectral and hyperspectral imagery, evapotranspiration estimation (leaf to canopy scales), water balance modeling, isotope mixing models

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 digital terrain modeling based on structure from motion, LICOR infrared gas analyzers, thermal radiometers, plot level plant morphology measurements, biomass weighing, and geolocating transect and point data. I also have experience with taking cores of riparian trees, measuring leaf level transpiration and carbon assimilation with LI-COR instruments, collecting water samples and tree cores for isotopic analysis, auguring for soil samples and taking soil moisture profile measurements.

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