Moyo AJAYI

Earth Scientist | Environmental Engineer

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Enthusiastic geoscientist, dynamic leader, and productive data analyst with skills summarized as :

- Gas Geochemist : Gas Chromatography & Cavity Ring Down Spectroscopy
- Applied Field Geoscientist : Multiple years of experience in deploying, maintaining, and designing research in remote locations
- Earth Data Scientist : Highly skilled in cleaning, analyzing, and visualizing gigabyte-sized data sets
- Effective Data Communicator : Talented narrator of data stories, ensuring comprehension for diverse audiences

Professional Experience

Present – May2018 | **Long-term Continuous Observations of Gas Emissions in Upland Forest, Oak Ridge, TN**

One of three projects of my dissertation :

- Working with NOAA's Atmospheric Turbulence Diffusion Division (ATDD) to quantify CH_4 emissions at soil-, stem-, canopy-atmosphere interfaces
- Deployed CRDS (Picarro G2201-i) coupled to an autochamber (eosAC) and a homemade sleeve for soil- and stem-gas measurements, respectively
- Plan to collect 6+ months (tens of GBs) of measurements
- Applying time-series & signal processing analysis (wavelet & spectral analysis)

MATLAB | Python | Electrical Eng. | Chamber Fabrication | Continuous Measurements

Present – Jul2017 | **Survey of Gas Emissions in Valles & Yellowstone Calderas, Sandoval Co., NM &, Yellowstone, WY**

Two of three projects of my dissertation :

- Developed mobile laboratory using cavity ring-down spectroscopic technology to measure CH_4 & CO_2 and carbon isotopes
- Investigated spatial and temporal trends of gas emissions at both calderas to compare and contrast the two supervolcanoes
- Designed project to gather first measurements of diffuse CH_4 emissions in N. American calderas
- Constructed an algorithm to model the sampling of soil gas emissions with linear programming and Monte Carlo simulation
- Devised algorithms to quantify hundreds of flux and isotopic measurements at dozens of locations between both calderas
- Recorded emissions prior, during, after geyser eruptions (including tallest active geyser, Steamboat)
- Corresponded with hundreds of patrons during data collection

MATLAB | Python | Lab to Field Instrument Deployment | Survey Measurements | Science Communication

Aug2016 – Oct2015 | **Surface Fluxes at Hydraulic Fracturing Sites, Morgan County, TN**

Master's Thesis, Completed in 2016 :

- Established methodology for spectroscopic-chamber (Picarro G2201-i & eosAC) measurements at several hydraulic fracturing sites
- Sought to detect thermogenic CH_4 from leaking natural gas wells with surface flux measurements and carbon isotope measurements
- Fabricated static chambers to sample heavier hydrocarbons; processed samples with gas chromatograph
- Final products include data reduction algorithms and a manuscript

Environmental Assessment | Energy Science | MATLAB | Gas Chromatography | Lab to Field Instrument Deployment

May2014 – Jan2013 | **Arctic Shrub Carbon Assimilation, Toolik Lake, AK**

Senior Thesis, Completed in 2014 :

- Traveled above the Arctic Circle to the tundra as a team member of a multi-institution NASA funded project
- Examined carbon assimilation by deciduous shrubs in a warming tundra
- Drafted and constructed homemade chamber in the lab and deployed the chamber and infrared gas analyzer in the field

Open Path Infrared Gas Analysis | MATLAB | Chamber Fabrication

Education

Summer 2020	PhD Candidate, Earth Science & Environmental Engineering, Vanderbilt University, Nashville, TN
Summer 2016	MS Candidate, Earth & Environmental Sciences, Vanderbilt University, Nashville, TN
Spring 2014	Bachelor's, Environmental Biology, Minor in Earth Science, Columbia University, New York, NY

Skills

Programming & Software | Advanced	**MATLAB**, Tableau
Programming & Software | Experienced	**Python**, **Git**, Web Scraping, ArcGIS, Linux, AWS
Frameworks & IDEs	**Microsoft VS Code**, MATLAB Live Editor, **Pandas**, Bokeh, **scikit-learn**, scipy, numpy, Jupyter
Algorithms	**Monte Carlo Simulation**, Bayesian Hierarchical Modeling, Supervised Classification & Regression

Publications

2018 Hornberger, George, Ayers, John, & **Ajayi, Moyo** 2018 : "Hydraulic Fracturing" *Oxford Bibliographies*, DOI : 10.1093/obo/9780199363445-0006

2018 Taylor, B. N., Patterson, A. E., **Ajayi, M.**, Arkebauer, R., Bao, K., Bray, N., ... & Guerin, M. 2018 : "Growth and physiology of a dominant understory shrub, *Hamamelis virginiana*, following canopy disturbance in a temperate hardwood forest" *Canadian Journal of Forest Research*, 47(999)

2017 **Ajayi, Moyo**, Ayers, John, & Hornberger, George 2017 : "Detection of Surface Fluxes of Thermogenic CH4 at HVHF Sites in Morgan Co., TN," Presented at Goldschmidt Annual Meeting, Paris, France, 14 Aug 2017

2017 **Ajayi, M.** : "Methane Rising". 2017 *Web Blog Post*

2015 **Ajayi, M.**, Ayers, J., Hornberger, G. 2015 : "Geochemical and Isotopic Analysis of Escaped Natural Gases in Hydraulically Fractured and non-Fractured," Abstract A43F-0343 presented at AGU Fall Meeting, San Francisco, CA 14-18 Dec

Professional Enrichment

Sci Com
Mar2019

ComSciCon, Atlanta, GA

- Drafted a thinkpiece on the integration of computational technology and geosciences and presented an oral rendition of my research
- Engaged with over two dozen faculty and professionals on the best practices on scientific communication

Science Communication for non-Scientists | Writing and Oral Communication

Invited Speaker
Nov2018

Graduate Climate Conference, Pack Forest, WA

- Presented preliminary results from my dissertation at a small conference among other scientists interested in aspects of climate change

Science Communication for Scientists | Professional Presentation

Participant
Jul2016

Deep Carbon Observatory Summer School, Yellowstone Nat. Park, WY

- Graduate students and post-doctoral associate learned in the field and in the classroom about the complex nature and processes of deep carbon within the Yellowstone caldera
- Forged a connection with colleagues at Univ. of New Mexico, which turned into research for dissertation

Explored New Field Area | Connections with Other Scientists

TA
Aug2015-Present

Creating Course Materials for Computational Geosciences, Nashville, TN

Geoscience Computation Instruction :

- Created multiple modules, daily quizes, and HW materials that guided students toward the fundamentals of introductory earth sciences
- Lessons were created to supplement course material and to introduce computational (MATLAB and Excel) skills to younger undergraduates

Teaching | Mentoring | Computational Earth Sciences

Honors and Awards

2019 National Association of Black Geoscientists, 1st Place Oral Presentation, Fayetteville, AR
2019 Vanderbilt Summer Research Award, Research Grant Awardee, Nashville, TN
2016 American Geosciences Institute, Diversity Grant Recipient, Alexandria, VA

References

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