Jeremy D. Forsythe

EDUCATION

Clemson University (Ph.D. student, Forestry & Env. Cons. Jan. 2019-present) Clemson, SC

- **Award**: Phi Kappa Phi Honor Society Membership
- **Coursework**: Applied Data Science & Machine Learning, Statistical Methods, Global Change Ecology, Micrometeorology, Quantitative Ecology, Scientific Writing, Wetland Biology, Ecology of Freshwater Forests, Fire Ecology & Management

University of Kansas (M.A., Ecology & Evolutionary Biology - August 2018) Lawrence, KS

- **Award**: Department of Ecology and Evolutionary Biology Summer Fellowship
- **Coursework**: Biometry, Forest Ecosystems, Simulation Modeling, Plant Ecology, Likelihood Methods, Plant Systematics, Responsible Research & Teaching Effectiveness

University at Albany (B.S. Biological Sciences - December 2013) Albany, NY

- **Award**: Dean's List
- **Coursework**: Theoretical Ecology, Experimental Ecology, Biological Consequences of Climate Change, Geographic Information Systems, Statistical Inference, Evolution, Behavioral Ecology, Cell Biology, Genetics, Grazing in Terrestrial Ecosystems (Graduate Level), Integrated Principles of Ecology (Graduate Level)

Hudson Valley and Broome Community Colleges Troy/Binghamton, NY

- **Award**: Dean's List
- **Coursework**: Field Ecology, Zoology, Animal Behavior, Organic Chemistry, Introductory Science Courses, Multi-Variate Calculus, Differential Eq.

SKILLS

- Acquired substantial skills in eddy covariance & field ecology methods through experience in research & coursework, including flux sensor installation & maintenance, data processing (i.e fluxes, partitioning, & gapfilling), LAI measurements, FIA style forest surveys, plant identification, GIS, and remote sensing (satellite and ground based).
- Strong working knowledge of relevant software: *R, Python, LaTeX, Eddypro, REddyProc, caret & Scikit-learn, Google Earth Engine, neonUtilities, ArcGIS/QGIS, Microsoft Office*, *Windows, & Unix*
- Practical skills developed in and out of academia include excellent public speaking and communication, ability to work as part of a team, leadership, dependable work ethic, time management, a clean driver's license, ability to operate manual transmission vehicles, an above average amount of patience, and an eccentric sense of humor.

TEACHING & OUTREACH

Clemson University

- Mentored through Clemson's UPIC - Professional Internship and Co-Op Program, advising 1-2 undergraduate students each summer through a research program and presentation of an independent project.
- Data Management and Visualization in Natural Resources - Designed and led a guest lecture for a graduate level class teaching techniques on how to organize, manipulate, and visualize biological data in the R programming language.

University of Kansas

- Aided in developing and executing a course redesign for an undergraduate level introductory course for biology majors that emphasized alternative learning strategies such as learning groups, real time response surveys, and integrated on-line tools.
- Mentored through the NSF's REU program, instructing a cohort of 12 students through a 10 week research program that included the design, implementation, and presentation of an independent experiment.

RESEARCH EXPERIENCE

Clemson University Ph.D.

- Dissertation
  - Examined the drivers of photosynthetic uptake of atmospheric carbon by coastal ecosystems, including diffuse radiation enhancement, an effect of the light scattering from clouds and aerosols that often increases photosynthesis by more evenly distributing the incoming solar energy through the canopy.
  - Developed ecosystem management support tools for coastal ecosystems and Southern pine forests by combining flux tower and satellite remote sensing vegetation indices to monitor long-term changes in carbon sequestration with a newly optimized "two-leaf" light use efficiency (LUE) model.
  - Improved understanding of the physical mechanisms controlling the coupling of evapotranspiration to carbon fluxes in coastal Southern pine forests by investigating the effects of light quality in addition to quantity on water cycling and productivity.
- Labwork
  - Worked with my lab and collaborators to build a new eddy covariance mesonet for measuring greenhouse gas fluxes in coastal South Carolina, including tower construction, sensor calibration & maintenance, and data workflow from raw measurements through a final partitioned & gapfilled product (i.e. QA/QC, developing machine learning algorithms, and an Ameriflux submission pipeline).

University of Kansas Master's Degree

- Joined a long term community analysis project exploring forest succession in an ecotone between eastern deciduous forests and tall-grass prairies.
- Adapted a novel statistical methodology for interpreting the underlying distribution of diameters for tree populations using maximum likelihood and contributed a new spatial component to the ongoing research.

University of Kansas National Science Foundation Research Experience for Undergraduates

- Developed an independent research project exploring the interactive effects of management practices (fertilization, haying, and native seed addition) on the restoration of native tall grass prairie across increasing spatial scales from community to landscape.

University at Albany

- Developed an independent research project investigating invasive plant species and planning a management strategy utilizing ungulate grazing as a biological control.

REFERENCES

- Dr. Tom O'Halloran: Ph.D. Advisor; Associate Professor at Clemson University. tohallo@clemson.edu (843) 546-1013
- Dr. Bryan Foster: Master's Advisor, REU Mentor, and University of Kansas Faculty. bfoster@ku.edu (785) 864-4361
- Dr. Joshua Fisher: Mentor; Presidential Fellow of Ecosystem Science at Chapman University. jbfisher@chapman.edu
- Dr. Gregory Goldsmith: Mentor; Chapman University Faculty. goldsmit@chapman.edu

PUBLICATIONS

- {In Preparation} Forsythe, J.D., O'Halloran T.L., Hawman, P. Satellite Data Infused Light Use Efficiency Models Reveal Importance of Diffuse Light Fertilization In U.S. Southern Pine Ecosystems. *In Preparation For : Agricultural and Forest Meteorology.*
- {Submitted} Zhu, Q., Cheb, J., Bourque, CP.A., Sonnentag O., Montagnani L., O'Halloran T.L., Scott R.L., Forsythe, J.D., Song, B., Zou, H., Duan, M. Albedo-Induced Global Warming Potential following Disturbances in Global Temperate and Boreal Forests. *In Submission To : Agricultural and Forest Meteorology.*

- Williams, T.M., B. Williams, B. Song, T.L. O'Halloran, J.D. Forsythe. 2022. Mapping natural forest stands with low-cost drones. Mathematical and Computational Forestry & Natural-Resource Sciences: Vol. 14: Iss.1, pp 22-42.
- Ahlswede, B. J., O'Halloran, T. L., Forsythe, J. D., & Thomas, R. Q. 2021. A minimally managed switchgrass ecosystem in a humid subtropical climate is a source of carbon to the atmosphere. GCB Bioenergy, 14, 24– 36.
- Williams, T.M., T.L. O'Halloran, B. Song, J.D. Forsythe, and B.J. Williams. 2021. Sources of error from dense understory vegetation in Coastal Plain forest hydrologic analyses using LiDAR DEMs. In Proceedings 13th Southern Forestry and Natural Resource Management GIS Conference. Athens, GA. pp. 41.
- Williams, T.M., T.L. O'Halloran, B. Song, J.D. Forsythe, and B.J. Williams. 2020. Evaluating high water table hydrology and eddy covariance measurements of evapotranspiration at a newly instrumented watershed in coastal South Carolina. In Proceedings 7th Interagency Conference on Research in the Watersheds. Tifton, GA: USDA-Agricultural Research Service. pp. 47.
- Forsythe, J. D., O'Halloran, T.L., M. A. Kline. 2020. An eddy covariance mesonet for measuring greenhouse gas fluxes in coastal South Carolina. Data 5:1–20.

PRESENTATIONS

- **Poster:** Forsythe J D, O'Halloran TL, Wise M, Balkcum O, Song B, Kline M A, DeGarady C. How do fire & management alter longleaf pine understory carbon stocks & whole ecosystem carbon sequestration? 14th Biennial Longleaf Conference; 10/2022.
- **Invited Talk:** Carbon Management & Clearcut Recovery in Longleaf Pine Ecosystems. J.D. Forsythe, O'Halloran, T.L. Jones Center at Ichauway. Newton, GA. 4/2022.
- **Invited Talk:** Managing land to sequester carbon and greenhouse gases. O'Halloran, TL., J.D. Forsythe, L. Clay. SC Soil & Water Conservation Society. Charleston. 2/2022.
- **Invited Talk:** Carbon and climate benefits of longleaf pine forests. O'Halloran, T.L., C. DeGarady, M. Motallebi, B.S. Song., L. Clay, J.D. Forsythe. SC Native Plant Society, Lowcountry Chapter (virtual). 2/2022.
- **Poster:** Marshes Migrating Into Forests: Effects of Sea Level Rise on Coastal Ecosystems. Balkcum O, Song B, Forsythe J D, Wise M, Kline M A, O'Halloran T L. Clemson University Baruch Institute of Coastal Ecology and Forest Science Behind the Gate; Georgetown SC, 7/2021.
- **Poster:** How Does Fire Alter Carbon Stocks and Plant Diversity in a Longleaf Pine Understory? Wise M., Forsythe J.D., Song B., Balkcum O., Kline M.A., O'Halloran T.L. Clemson University Baruch Institute of Coastal Ecology and Forest Science Behind the Gate; Georgetown SC, 7/2021.
- **Poster:** Role of Phenology in Switchgrass Carbon Fluxes. Kuleba A, O'Halloran T L, Rady J, Powell L, Forsythe J D. Clemson University Baruch Institute of Coastal Ecology and Forest Science Behind the Gate; Georgetown SC, 7/2021.
- **Poster:** Comparing Carbon Dioxide and Methane Fluxes between a Natural Salt Marsh and Managed Wetlands. Clay, L., Forsythe, J.D., and O'Halloran, T.L. Behind the Gate. Baruch Institute for Coastal Ecology and Forest Science, 7/2021.
- **Poster:** Forsythe J. D., O'Halloran T L, Williams T, Kaminski R, Kline M A. An Eddy Covariance Mesonet Measuring Coastal Carbon Fluxes in South Carolina. 7th North American Carbon Program OSM; 3/2021.
- **Poster:** Forsythe, J. D., O'Halloran, T.L. and M. A. Kline. Establishing An Eddy Covariance Mesonet in Coastal South Carolina Ameriflux; 2020.
- **Poster:** Forsythe J. D., Foster, BL. The Effects Of Disturbance And Soil Nutrient Enrichment On Grassland Community Biodiversity Across Spatial Scales. KU Madison & Lila Self Graduate Fellowship Symposium