University of Arkansas Graduate School and International Education

Environmental Dynamics Program

Annual Report

2023 - 2024

ENDY Annual Report 2023-2024

I. Executive Summary

This has been an exciting year in ENDY with many pivotal events.

A. ENRE

Our new online professional Masters degree program, graduate certificates, and graduate micro-certificates was approved by ADHE on October 27th, 2023. This enabled us to launch these programs with seven new courses ready for students in January 2024. These were self-supporting at the outset.! By the end of spring semester, we had accepted eight masters, four graduate certificate, and one micro-certificate applications with others in process! Tuition from this program is expected eventually to provide funds for additional assistantships in ENDY.

A second benefit of this program is that nearly all the instructors are ENDY Alumni, who suggested appropriate courses, developed them and are now teaching them. We are on track to complete development of 15 courses (our full complement) by the end of summer 2024. We will complete the first cycle in December 2024. In one semester, we have 19 students admitted for the programs. We also service students choosing to take the courses as electives in other programs.

B. UAF/UAM collaboration

We are still working on a partnership between UAF and UAM to provide students with the tools they need to move forward in their chosen area of research. We are now looking at two potential coordinated efforts. These include:

1) Students who finish the MS in Wildlife Management will still work with their advisor at UAM and enter the ENDY PhD program funded through grants from UAM.

2) Students finishing the UAM Wildlife Management Graduate Certificate will be able to transfer 15 hours toward the ENREMS (which is a 100% online program). This is of particular interest to those finishing the Certificate but wanting to continue into the work force, full time, while continuing their education toward the masters.

C. Conserving the Natural State

We are in the process of planning the *Conserving the Natural State* Forum at the Winfred Rockefeller Institute in Morrilton, AR from September 6-8th. We have invited researchers, companies and agencies from across the state to meet and discuss solutions for our states natural spaces. The response has been good, and we are working with fundraising to find appropriate sponsors to help offset the cost. We have 5 posters and 25 oral presentations accepted and registration is in process.

This is a great opportunity for researchers across the state to share research, network with other colleagues, and to show various stakeholders across the state what our universities and colleges are providing to assist our state conservation of our natural resources.

Our ultimate goals are 1) to highlight UA programs, 2) to develop a network of researchers across the state working in environmental sciences, and 3) to work with stakeholders to identify areas where such research is necessary and can help serve the state.

Student Output

ENDY awarded six PhDs Summer 2023 through Spring 2024 and two masters in the same time period. Of our students in the program this year, ten held DAF awards and five held DDF awards. We have also accepted two new DAF and two new DDF for Fall 2024 (for a total incoming cohort of eight). This is rather remarkable since we only had two ENDY assistantships available this year.

Our students published a book, 21 papers, presented18 oral and 8 poster presentations at regional, state, national and international conferences. They also presented 17 invited lectures, submitted one non-juried report, and have 14 manuscripts in process.

Funding and Awards

- 15 ENDY students hold DAF (10) and DDF (5) Fellowships. We have also accepted two new DAF and two new DDF students for fall 2024 (for a total incoming cohort of eight).
- An ENDY Student received a second year of Leakey Foundation Baldwin Fellowship ($15,500)

- An ENDY Student Received a Sturgis Fellowship to do dissertation research in Indonesia ($15,000)
- An ENDY student had an internship with NASA
- An ENDY Student received funding to attend PEARC
- An ENDY Student was awarded the Agricultural and Food Research Initiative Predoctoral Fellowship ($180,000) from the National Institute of Food and Agriculture
- One ENDY student was invited and gave a TedX Ferndale talk
- An ENDY Student wrote a children's book promoting sustainability (this was well received).
- An ENDY Student was part of a team that won the ASA-CSSA-SSSA Ag Hackathon competition.
- An ENDY Student was awarded Fulbright LASPAU funding for 2023-2025. (This makes three LASPAU students we have had one graduated, one transferred to UA funding, and one started in 2023).

This year ENDY students have shown they are engaged and focused.

Highlights:

Alumni, Community and campus engagement

Our Alumni are active and contributing to their profession of choice!

ENDY graduates were also instrumental in the development of the ENRE program. We reached out to those who are working outside of academia asking what they would like future and current employees to know. They sent back thirty courses they would like to see taught and when we decided to move forward with ENRE, we used those ideas (and alumni) to design and teach the courses! At this writing all instructors have said they will continue to teach their courses again during the second year of the program!

ENDY hosted a booth at the 2023 IMBRE Conference.

See Appendix II – Alumni publications.

Diversity and inclusion

- For the thirteenth year ENDY, Geosciences and Engineering hosted the Math, Science and Engineering Academy (M-SEA) with Fort Valley State University. This long-term partnership is not only good for students it has allowed us to recruit some outstanding students to the

ENDY, Geosciences and Engineering programs. For the 2024 summer Engineering will take over this partnership.

- This year the assistant director and former ENDY Director were awarded the Ambassador Award from the National Association of Black Geoscientists at the annual meeting held in Washington, D.C.
- The Assistant Director continued work with the Unity Alliance and Safe Zone Allies to help our students.
- ENDY was a lead in the first interdisciplinary programs and BGSA mixer to help students network and feel more of a sense of belonging.

Implementation of recent program changes

- The biggest change to ENDY was the start of the ENRE program. Our first semester we were already profitable, demonstrating there was a need for this program. We are working now on branding, advertising, and building the program.
- Assistant Director Jo Ann Kvamme retired at the end of this year, and we recruited and replaced her with Cay Nickell. Cay has been trained and is off to a great start (Jo Ann retired May 31).

II. Productivity Measures in numbers of grant dollars, student growth, new faculty, new administrators and award and honors

Our students are engaged professionals and one way to view this is through conference presentations. Thanks to GSIE and GPSC our students are able to present at many prestigious conferences nationally and internationally!

- Travel grant to our students totaled $14,000 this year.
- DAF/DDF received $104,000 this year.
- Student received $372,000 from TA/GA positions
- Student received $140, 300 on other fellowship and internships
- Grant applied for totaled $794,000
- Successful grants totaled $329,000 with $430,000 still pending
- Foreign Governments funded students for $44,000 this year with commitments for $134,000.

Since we do not accept students without funding or mentors, we are still tied to the ten original assistantships ENDY was provided at the founding nearly three decades ago. We work hard to find additional funding for students so we can

continue to maintain and grow our program. This year we graduated six PHD and two MA students, and in our Fall class for 2024 will add seven and possibly eight students (we have found funding for one additional student, but she is not through the application process as of this writing). This number of students should be contextualized relative to our limited hard-funded support (we only had two assistantships open for Fall 2024).

Our Directors are active in ENDY research and acknowledged for their work.

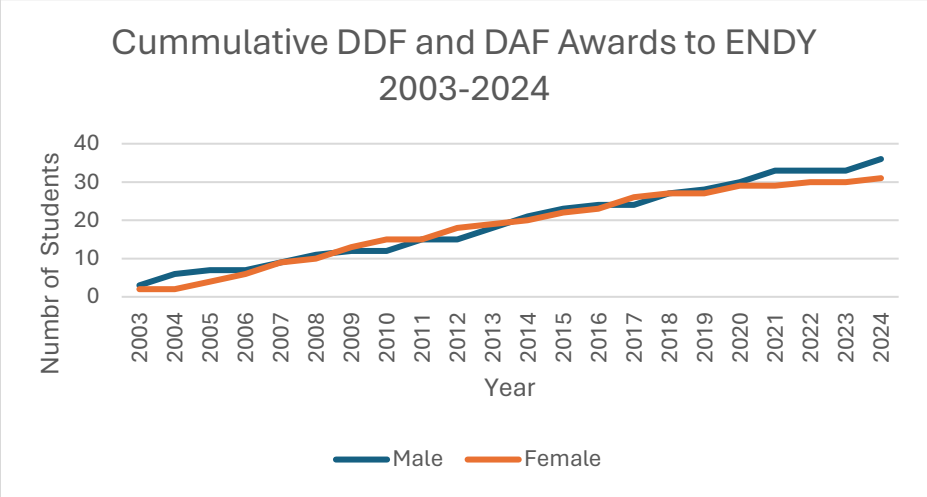
- ENDY Director became the first researcher from an institution in Arkansas to be admitted to the National Academy of Science. He also received the 2024 Omni Keeling-Hansen Climate Science award.
- The assistant director and former ENDY Director were awarded the Ambassador Award from the National Association of Black Geoscientists at the annual meeting held in Washington, D.C.

We will also welcome a new Assistant Director with the retirement of our current Assistant Director of 22 years. We are working to ensure that as much institutional knowledge regarding the program is passed on and our exceptional student experience is not diminished in any way.

Faculty are always being added and this year is no exception. We currently have over 70 affiliated faculty members, all with active research in environmental sciences. These are all available to serve as graduate student mentors and committee members. We have a reputation on campus for assisting students and working with departments and colleges across our campus. This makes ENDY a desirable choice for students whose career aspirations and interests are interdisciplinary and fall at the intersection of traditional disciplinary boundaries associated with human-environmental interactions.

We have also added our ENRE instructors as ENDY Faculty so our current students can take advantage of their wide ranging skills and work experiences.

Student DAF-DDF and Gender Graph 2003-2024



Appendix I – Student Bibliography

Publications

Books

Bruce, T. (2023). *The Young Garden King*. HBCU Green Fund. 2023. ISBN-13: 9781737800491.

Peer Reviewed Articles

Brye, K.R., **Della Lunga, D.,** & Slayden, J.M. (2023) Evaluation of the plant's role in greenhouse gas emissions in furrow-irrigated rice. Journal of Rice Research and Developments. Vol. 5, pp 439-448.

Chen, D., **O'Callahan, A.,** & Garrett-Kluthe, B. (2023). Immigrant foodways in Jersey City, NJ, Food, Culture & Society, 26:2, 387-408. DOI: 10.1080/15528014.2021.2000700

Della Lunga, D., Brye, K.R., Roberts, T.L., Henry (2023 7/26), C.G., Evans-White, M.A., and Lessner, D.J. (2023). Struvite effects on rice growth and productivity under flood-irrigation in the greenhouse. Cabi Digital Library Vol. 14, Issue 7, pp 864-877.

Hemmati *, Mahboobeh, Messadi *, Tahar, Gu, Hongmei (2023) Life cycle assessment of the construction process in a mass timber structure in Sustainability Special Issue Building and Construction Sustainability: Toward a Life Cycle Management of Materials and Processes Flows Sustainability Journal, 16(1), 262.
Website:
https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.mdpi.com%2F2071-1050%2F16%2F1%2F262&data=05%7C02%7Cjkvamme%40uark.edu%7Cc32241d1df794c2c326d08dc06e21c57%7C79c742c4e61c4fa5be89a3cb566a80d1%7C0%7C0%7C638392815422453991%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=3%2B6LkzN9wXPvhT8KaPkl0uScw98NfkHtu7L34CMiHxA%3D&reserved=0
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https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.mdpi.com%2F2071-1050%2F16%2F1%2F262%2Fpdf&data=05%7C02%7Cjkvamme%40uark.edu%7Cc32241d1df794c2c326d08dc06e21c57%7C79c742c4e61c4fa5be89a3cb566a80d1%7C0%7C0%7C638392815422453991%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=0S88AiHKzH21mjjmtbOxTdk5dQVZtvL74t8SyncQKUY%3D&reserved=0
Special Issue:
https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.mdpi.com%2Fjournal%2Fsustainability%2Fspecial_issues%2F1V69JC727D&data=05%7C02%7Cjkva

mme%40uark.edu%7Cc32241d1df794c2c326d08dc06e21c57%7C79c742c4e61c4fa5be89a3cb566a80d1%7C0%7C0%7C638392815422453991%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=qMN6BDJYPevY6X02sLBn%2FyEAr0GyaeShLeFNlmRaXcY%3D&reserved=0

Dunn, J.E. , Naithani, K., Sulman, B. (2024). Landscape effects of carbon offset projects on comastal wetlands. International Association of Landscape Ecologists - North America April 1-5, 2024. Oklahoma City, Oklahoma.

Escalante, L. E., & Brye, K. R. (2023). Relationships among soil properties, nematode densities, and soybean yield in a long-term, double-crop system in eastern Arkansas. *Agricultural Sciences*, *14*(12), 1605-1623.

Grantz. E.M., B.E. Haggard, & BENG 4973/5973. (2023). Informing volunteer water quality monitoring program design and watershed planning: Case study of StreamSmart Data Analysis in the Upper White River Basin, Arkansas. Journal of Contemporary Water Research and Education, doi: 10.1111/j.1936-704X.2022.3380.x

Haggard, B.E., **E.M. Grantz**, B.J. Austin, et al. 2023. Chlorophyll and phycocyanin raw fluorescence may inform recreational lake managers on cyanobacterial HABs and toxins, Lake Fayetteville case study. Journal of Contemporary Water Research and Education, doi: 10.1111/j.1936-704X.2022.3381.x

Khatiwada, K.R., Pradhananga, S., & Nepal, S. (2024) Inferring the impacts of climate change extreme in the Kabul River Basin. Regional Environmental Change, 24(1), 17. https://doi.org/10.1007/s10113-023-02167-3

López-Rojas, M., Cárdenes-Sandí, G., & Salgado-González, S. (2024). Botanical resources and PreColumbian subsistence in Nuevo Corinto, Costa Rica. Journal of Archaeological Science: Reports, 53, 104351, https://doi.org/10.1016/j.jasrep.2023.104351⇐

McMullen, T.**, E.M. Grantz**, G. Thompson & B.E. Haggard. (2024). Changes in streamflow statistics and catchment land uses across select USGS Gages in Northwest and West-central Arkansas. Journal of Contemporary Water Research and Education, doi: 10.1111/j.1936-704X.2024.3400.x

Omidire, N.S., Brye, K.R., **Della Lunga, D.,** and Roberts, T.L. (2023) Flood-irrigated rice response to fertilizer-phosphorus sources in a phosphorus-deficient silt-loam soil. Journal of Rice Research and Developments. Vol. 5 pp. 427-438.

Pujiantari, Putu, Delezene, Lucas K., Plavcan, J. Michael, Teaford, Mark F., and Ungar, Peter S. (2024) Stubby versus stabby: A preliminary analysis of canine microwear in primates: Implication for inferring ingestive behaviors. American Journal of Primatology Vol 86, Issue 5, e23608

Scales, W., Wiersma-Mosley, J.D., Dilley, K., **Bruce, T.**, Bledsoe, A., Best, S., & Wray, C. (2023). Creating a pathway program through CommUniversity partnerships. The Agriculture Education Magazine, 95(4), 32-34.

Seminario, J. F., Cruzado-Ortiz, A. M., Cunya, A. S., **Escalante, L. E**., & López, S. Y. R. (2023). Factores asociados a los cambios en las bebidas nutracéuticas de venta ambulatoria en la ciudad de Cajamarca (Perú) - Factors associated with changes in nutraceutical beverages sold in outlets in the city of Cajamarca (Peru). *Bonplandia*, 32(1), 5–26.

Smith, H.W., Ashworth, A.J., Nalley, L.L., Schmidt, A., Turmel, M.S., Owens, P.R., *2023.* Boundary line analysis and machine learning models to identify critical soil values for major crops in Guatemala. *Agronomy Journal*. https://doi.org/10.1002/agg2.20414

Wang, S., Huang, X., Liu, P., Zhang, M., Biljecki, F., Hu, T., **Yan, J.,** ... & Bao, S. (2024). Mapping the landscape and roadmap of geospatial artificial intelligence (GeoAI) in quantitative human geography: An extensive systematic review. International Journal of Applied Earth Observation and Geoinformation, 128, 103734.

Yan, J., Huang, X., Wang, S., He, Y., Li, X., Hohl, A., ... & Lin, B. (2023). Toward a comprehensive understanding of eye-level urban greenness: a systematic review. International Journal of Digital Earth, 16(2), 4769-4789.

Yan, J., & Huang, X. (2023). Assessing simulated visible greenness in urban environments. Spatial Data Science Symposium 2023 Short Paper Proceedings, https://doi.org/10.25436/E2GW2W

Yan, J., Naghedi, R., Huang, X., Wang, S., Lu, J., & Xu, Y. (2023). Evaluating simulated visible greenness in urban landscapes: An examination of a midsize US city. Urban Forestry & Urban Greening, 128060.

Ylagan, S., Brye, K.R., Ashworth, A.J., Owens, P.R., **Smith, H.W.**, Poncet, A.M., Sauer, T.J., Thomas, A.L., and Philipp, D., (2023). Relationships among apparent electrical conductivity and plant and terrain data in an agroforestry system in the Ozark Highlands. *Agrosystems,*

Reports

Brye, K.R., **Della Lunga, D.,** and Roberts, T. (2023) Greenhouse gas emissions from rice production in Arkansas. Factsheet FSA2204 University of Arkansas Division of Agriculture, Agricultural and Natural Resources.

Grantz, E.M., & Haggard B.E. (2023). Constituent loads and trends in the Upper White River Basin: A Nonpoint Source Management Program Priority Watershed. Arkansas Water Resources Center, Fayetteville, AR, MSC 395: 25 pp.

Invited Lectures

Bruce, T. (April 2024). *Book Reading:* "The Young Garden King." Held at the Hillary Rodham Clinton Children's Library & Learning Center during Saturday Storytime. Read my children's book, which addresses food insecurity through urban gardening. The event included an interactive session where participants planted seedlings to take home.

Bruce, T. (April 2024). *Our Green Adventure Begins!* Guest Presentation on Environmental Story Mapping. Presented to the undergraduate class EVR1001: Fundamentals of the Environment, focusing on the use of interactive story maps to explore environmental issues. The session was designed to engage a class of 40 students in understanding the practical applications of environmental science through digital storytelling. https://arcg.is/0LiLfL0.

Bruce, T. (April 2024). *Young Writer's Workshop Series.* Facilitated a series of workshops for middle school students at Arkansas Lighthouse Charter Schools. The workshops were designed to guide scholars through the development, writing, and publishing processes, helping them to enhance their writing skills and understand the dynamics of literary creation and storytelling**.**

Bruce, T. (March 2024). Empowering Underserved Communities for Sustainable Living. Presentation at the Envisioning Justice Conference, hosted by the Volunteer Action Center at the University of Arkansas. This talk focused on the critical role of environmental education among youth in underserved communities, emphasizing strategies for empowering young people to foster sustainable living practices.

Bruce, T. (January 2024). Book Reading and Presentation at Dream Big Community Day. Delivered a talk and read excerpts from relevant works at a community event in Atlanta, Georgia. The presentation focused on land stewardship, sustainability, and youth advocacy, aiming to engage and educate the community about the importance of environmental responsibility and active participation in sustainable practices.

Bruce, T. (October 2023). TEDx Presentation: "Ensuring Food Security in a Changing Climate." The presentation, themed "Exploring Innovations in Agriculture that Tackle the Climate Crisis," aimed to raise awareness about the urgent need to address climate change's impact on food security. Emphasizing the interconnectedness of social justice, environmental health, and climate resilience, the talk highlighted the disproportionate effects on vulnerable populations and advocated for community empowerment and sustainable agricultural practices. Its goal was to inspire collective action towards a resilient and equitable future for all.

Bruce, T (October 2023). Spatial Storytelling with Story Maps for the Digital Humanities. Workshop held for the undergraduate-graduate seminar WLLC 398V-004/575V-004 "Introduction to the Digital Humanities." Students gained an overview of Story Maps as a digital tool for research and pedagogy; they also learned how to build Story Maps of their own, with a focus on the media theoretical implications of spatial storytelling.

Bruce, T (August 2023). History of Race in Agriculture & Food in Arkansas. Presentation held for the Rural Sociological Societies Conference at the University of Vermont. Participants were able to gain an overview of the history of race in agriculture and food in the state of Arkansas.

Peter, B. G., **Nabuwembo, M.,** and Tay, W. (April 2024) Big pixel problems: Land-use/land-cover change uncertainty in Malawi. Environmental Dynamics (ENDY) Lunch Lecture. Fayetteville, AR. Presentation.

Nabuwembo, Maria (2024) Learning Session: Advanced StoryMap making" YouthMappers at UArk Fayetteville, AR.

Nabuwembo, M.G., Ouafri, H.E., and Nassozi, S. (March 2024). The road to the Geospatial field – What to do. Women's Month webinar series.

Nabuwembo, M.G. and Gilmore, C. (March 2024). Environmental Justice in the Built Environment. Environmental Dynamics (ENDY) Lunch Lecture. Fayetteville, AR.

Nabuwembo, Maria. G. (December 2023). Exploring the vibrant culture of Uganda, Africa presented to the Global Series (GS).

Nabuwembo, Maria G. (November 2023) Spatial planning in the water and sanitation sector using GIS tools Presented at the International Education Week. Hosted the International Bazaar-Uganda Booth. Presentation. Summer School.

Smith, H.W. (October 2023), Introduction to boundary line analysis (international workshop, delivered in Spanish). *Catholic Relief Services*. Invited Presentation.

Williams, D. (2023) Stress Management Essentials. Presented as Official DDEI presenter to University of Arkansas for Medical Sciences

Presentations – oral

Bonilla, J. and M. Guccione (September 2023). The role of precipitation in the Guarare River (Pacific Coast of Panama) 1981-2020. Presented at the XIX National Congress of Science and Technology APANAC 2023. Panama City, Panama.

Dunn, J.E., Naithani, K., Sulman, B. (April 2024). Landscape effects of carbon offset projects on Comastal Wetlands. International Association of Landscape Ecologists - North America. Oklahoma City, Oklahoma.

Della Lunga, D. (October 2023). Water regime and fertilizer-phosphorus source effects on greenhouse gas emissions from rice in the greenhouse. Paper presented at the ASA, CSSA, SSA International Annual meeting.

Dotse Bampoe, Gertrude, Huang, Qiuqiong, and Henry, Christopher (February 2024). Producers' perception of water shortage risks and the use of irrigation practices. Southern Agricultural Economics Association, 56th Annual Meeting, Atlanta, GA.

Grantz, Erin and Haggard, Brian (January 2024). Stream water quality and land use in the Upper Saline River watershed, Arkansas. Presented at the Arkansas Soil and Water Conference Arkansas State University.

Grantz, Erin and Haggard, Brian (October 2023). Stream water quality and land use in the Upper Saline River watershed, Arkansas. Presented at Saline River Watershed Management Plan Stakeholder Meeting, Benton, AR.

Grantz, Erin and Haggard, Brian (July 2023). Stream water quality and land use in the Upper Saline River watershed, Arkansas. Presented at the Arkansas Water Resource Conference, University of Arkansas.

Haggard, B.E. & **E.M. Grantz** (July 2023). Stream nutrient concentrations show management effects and limitations in the Eucha-Spavinaw Watershed. ASABE Annual International Meeting in Omaha, NE.

Mahbub, R. B., Moreno-Garcia, B., Peter, B. G., Reba, M., & Runkle, B. (January 2024). Predicting planting and harvesting date of rice in Arkansas using satellite images and machine learning algorithms. American Geophysical Union, United States.

Mahbub, R. B., Reba, M., Runkle, B. R. (September 2023). ASABE State Section Meeting, "Rice from space: Inferring spatial information of rice photosynthesis and growing season length from satellite imagery", AR, United States.

Smith, H.W., Ashworth, A.J., Kharel, T.P., Bullock, D., Nalley, L.L., Owens, P.R. (December 2023) Machine learning to understand and predict soil, climate, and terrain effects on suitability of U.S. maize and soybean crops. *American Geophysical Union Annual Meeting*, San Francisco, CA..

Smith, H.W., Ashworth A.J., King, S., Kreman, C., Owens, P.R., Nalley, L.L., Miller, D. (October 2023) Timeseries satellite imagery enables monitoring of vegetation recovery at the Tar Creek superfund site. *ASA-CSSA-SSSA International Annual Meeting,* St. Lois, MO. Awarded 3rd place best presentation in Airborne and Satellite Remote Sensing category.

Smith, H.W., Ashworth A.J., Nalley, L.L., Schmidt, A., Turmel, M.S., Owens, P.R. (October 2023). Optimizing yields for major crops in Guatemala using boundary line analysis and machine learning models. *ASA-CSSA-SSSA International Annual Meeting*, St. Lois, MO.

Yan J., & Huang X. (2023). Environmental justice in visible urban greenness across nine big cities in United States, City+2023@Perth Conference.

Yan J., & Huang X. (2023). Assessing simulated visible greenness in urban environments, Spatial Data Science Symposium (SDSS).

Yan J. (April 2024). Inequality of eye-level urban greenness provision in eight big cities, American Association of Geographers (AAG) Annual Meeting 2024, Honolulu.

Yan J., Naghedi S., & Huang X. (March 2023). Evaluations on viewshed green view index at distinct local climate zones, Oral presentation, American Association of Geographers (AAG) Annual Meeting 2023, Denver.

Zarei *, Arastou, Rostami, Ehsan, **Vahid, Rasool**, Amani. Meisam (2023). Dynamic analysis of water surface extent and climate change parameters in Zarivar Lake, Iran, Presented at The 5th International Electronic Conference on Remote Sensing.

Presentations – poster

Abrego Bonilla, Jessie (April 2024). Mapping the dynamics: Exploring the spatial distribution of Panama's water budget (1980 – 2020) Presented at the American Association of Geographers Annual Meeting, Hawaii (Virtual Session).

Dunn, J.E. , Sulman, B. (December 2023). Modeling coastal blue carbon sequestration in Northern Gulf Coast marsh migrations. American Geophysical Union Conference. San Francisco, California.

Dunn, J.E. (July 2023). Re-evaluating success in transboundary fisheries management: Pacific Halibut a case study. International Association of Landscape Ecology World Congress. Nairobi, Kenya.

Hemmati, Mahboobeh, Messadi, Tahar, and Gu, Hongmei (March 2024). Life cycle assessment of the construction process in a mass timber structure. Poster at International Mass Timber Conference, Porland, Oregon.

Khatiwada, K.R., Runkle, B., Moon, J.B., Stinchcomb, G.E., El Masri, B. (December 2023). Modeling forested wetland methane dynamics: Insights from 5 Flux Towers and observations. In American Geophysical Union (AGU) Annual Meeting.

Khatiwada, K.R., Runkle, B., Moon, J.B., Stinchcomb, G.E., El Masri, B. (October 2023). Modeling forested wetland methane dynamics: Insights from 5 Flux Towers. In American Society of Agricultural and Biological Engineering (ASBE) State Section Meeting.

McCarty, A., **E.M. Grantz**, & B.E. Haggard. (July 2023). Assessment of atmospheric deposition in Arkansas and Tennessee. Arkansas Water Resources Annual Conference.

Nabuwembo, M.G. and Peter, B. G. (March 2024). Measuring agricultural adaptation using remote sensing: A study of pigeon pea in Malawi. GeoHog—Department of Geosciences Conference. Fayetteville, AR.

Manuscripts in review

Ashworth, A.J., Avila, A., Winzler E., **Smith, H.W.**, Owens, P.R., Flynn, C., O'Brien, P., Philipp, D., Su, J. *Submitted*. Predicting spatiotemporal patterns of productivity and grazing from multispectral data using neural network analysis based on system complexity.

Dunn, J.E., Sulman, B., Naithani, K. (2023). Modeling coastal blue carbon sequestration in Northern Gulf Coast Marsh Migrations. In preparation.

Hemmati, Mahboobeh, Messadi, Tahar, and Gu, Hongmei (under review) LCA comparison of a mass Timber building with an equivalent steel alternative. Buildings Journal.

Ivanov, V., Ungar, P., Ziker, J., Abdulmanova, S., Celis, G., Dixon, A., Ehrich, D., Fufachev, I., Gilg, O., Heskel, M., Liu, D., Macias-Fauria, M., Mazepa, V., Mertens, K., Orekhov, P., **Peterson, A.**, Pokrovskaya, O., Sheshukov, A., Sokolov, A., Sokolova, N., Spiegel, M., Sponheimer, M., Stammler, F., Taylor, T., Terekhina, A., Valdayskikh, V., Volkovitskiy, A., Wang, J., Zhou, W., 2024. A convergence science approach to understanding the changing Arctic. Earth's Future. In Review.

López-Rojas, M., Cavallini-Morales, C., Acevedo-Peralta, B., & Benfer A. K. (under review). The Transportation of faunal and floral resources along the Agua Caliente - Nuevo Corinto Path from AD 800 to 1550 in Costa Rica. In Y. Núñez-Cortés, R. Herrera, & G. McCafferty (eds.), The Cultural Mosaic of Central America. University of Utah Press.

O'Callahan, A. & Naithani, K. (2023). Continental scale drivers of microbial biomass and community composition. In preparation.

Payami, Parya , Halakou, Salar, Harsini, Mansoureh Nazemi , Farghadani, Parmida, Ahmadi, Reyhaneh, **Hemmati, Moein**, **Vahid, Rasool**, Mijani, Naeim, Niccolai, Alessandro (2023). A large group spatial decision-making support system for urban solar photovoltaic potential assessment: A case study of Tehran City.

Smith, H.W., Ashworth, A.J., Nalley, L.L., Schmidt, A., Turmel, M.S., Owens, P.R., *Accepted*. Boundary line analysis and machine learning models to identify critical soil values for major crops in Guatemala. *Agronomy Journal*. https://doi.org/10.1002/agg2.20414

Smith, H.W., Ashworth, A.J., King, S.R., Kreman, C., Miller, D.M., Nalley, L.L., Owens, P.R., *In preparation*. Time series remote sensing to monitor vegetation recovery following tribal-led reclamation of a U.S. Superfund site.

St. Rose A., **O'Callahan A.,** Smith H., Muniyasamy A., Dunn III J. E., Bradford J., and Naithani K. (2023). A comprehensive review and synthesis of diversity indices and their use in ecology. In preparation.

Yan, J., Huang, X., Wang S., He, Y., Li, X., Hohl. A., Li. X., Aly, M., Lin, B., (2023). Toward a comprehensive understanding of eye-level urban greenness: A systematic review. International Journal of Digital Earth (Accepted) .

Yan, J., & Huang, X. (2023). Assessing simulated visible greenness in urban environments. Spatial Data Science Symposium 2023 Short Paper Proceedings, https://doi.org/10.25436/E2GW2W

Yan, J., Naghedi, R., Huang, X., Wang, S., Lu, J., & Xu, Y. (2023). Evaluating simulated visible greenness in urban landscapes: An examination of a midsize US city. Urban Forestry & Urban Greening, 128060.

Ylagan, S., Brye, K.R., Ashworth, A.J., Owens, P.R., **Smith, H.W.**, Poncet, A.M., Sauer, T.J., Thomas, A.L., and Philipp, D., *Accepted*. Relationships among apparent electrical conductivity and plant and terrain data in an agroforestry system in the Ozark Highlands. *Agrosystems, Geosciences, & Environment*. http://dx.doi.org/10.1002/agg2.20414

Certifications Completed

- Beyond the Shop Mental Health Training (2024)
- ESRI: Telling Stories with GIS Maps (2023)
- Certify researcher for Peru's National Scientific, Technological, and Technological Innovation (CONCYTEC). Registry Nº P0214799
- Graduate Certificate in Sustainability (UARK)
- Regression Analysis Using ArcGIS (ESRI)
- Building Models for GIS Analysis Using Arc GIS (ESRI)

Memberships

- American Society of Agronomy
- American Association of Lions Clubs – Environmental Panamanian Lions Club (Marketing Chairperson)
- Association of Women Geoscientists
- Crop Science Society of American
- American Geophysical Union (AGU)
- American Society of Agronomy
- American Society of Photogrammetry and Remote Sensing
- Cartography and Geographic Information Society
- Crop Science Society of America
- Ecological Forecasting Initiative
- Ecological Society of America
- EEE – Ocean Observation Systems and Environmental Sustainability – Oceanic Engineering Society Technology Committee.
- FLUXNET – Early Career Scientist Network
- IEEE – Geosciences and Remote Sensing Society.
- IEEE – Women in Power
- International Association of Landscape Ecology (IALE)
- Research Council U of AR (grant reviewer)
- Soil Science Society of America
- UAMS DDEI Veterans Subcommittee
- Uark GPSC At-Large Representative
- Women in Soil Ecology (WISE)

Volunteering

- Black Graduate Student Association
- Ecological Association AUNA- UTP Panama
- Graduate Grocery Giveaway
- Graduate Professional Student Congress (120 hrs)
- Holcomb Elementary school (3 hrs)
- International Culture Team, International Students and Scholars
- (60 hours)
- International Association of Lions Clubs – Environment Panamanian Lions Club (Marketing Chairperson).
- Intervarsity UARK
- NWA Black Heritage East Mountain Cemetery Project, Volunteer Technician https://nwablackheritage.org/cemeteries
- OpenSTreetMAp US
- Susan B. Komen More tha Pink Walk
- Tri Cycle Farms, Farm Committee Member https://www.tricyclefarms.org/
- University of Arkansas Panamanian Student Organization

- University of Arkansas Research Council
- Women in Uganda – GSI Volunteer
- YouthMappers at UArk, University of Arkansas https://www.hotosm.org/
- Faith based (20 hrs.)

In the News

ENDY had a big year with many headlines in the news.

6/21/2023 **Environmental Dynamics Student Earns Prestigious $180,000 Fellowship**

9/18/2023 ENDY Student band award KNWA Website - https://www.nwahomepage.com/video/kick-the-wicked-band-to-be-featured-in-upcoming-movie/9005456/

9/24/2023 Environmental Dynamics Lunch Lecture Monday- Harrison Smith presented Boundary line analysis and machine learning models for improved nutrient management in Guatemalan maize, bean, and coffee systems

10/4/23 Kvamme, Boss Earn Ambassador Award from National Association of Black Geoscientists | University of Arkansas (uark.edu)
10/20/24 Tedx Ferndale Bruce https://www.ted.com/tedx/events/54422

Ungar induced into National Academy of Arts and Sciences in Boston

11/15/2023 Environmental Dynamics Program Leads Bruce to Food Security Research, Community Involvement | University of Arkansas (uark.edu)

11/27/23 Crop Science Grad Students Win ASA-CSSA-SSSA Ag Hackathon Competition | University of Arkansas (uark.edu)

11/28/2023The TCC Garden King, Terrius Bruce Promotes Sustainability with Children's Book – Talon (tcctalon.com)

12/14/2023 Introduction of the ENRE program https://online-learner.uark.edu/build-skills-to-make-change-with-online-sustainability-graduate-programs/?utm_source=online&utm_medium=homepage&utm_campaign=mainfeed

1/5/2024 Environmental Resiliency Courses Open for Spring 2024 Enrollment | University of Arkansas (uark.edu)

1/8/24 Environmental Resiliency Graduate Degree, Certificates Offered Online | University of Arkansas (uark.edu)

1/8/2024 UA introduces a Master's degree in environmental resiliency (nwahomepage.com)

1/11/2024 Osborne Discovers Other Worlds as Ph.D. Student, NASA Intern | University of Arkansas (uark.edu)

2/7/2024 Osborne Discovers Other Worlds as Ph.D. Student, NASA Intern | University of Arkansas (uark.edu)

2/22/2024 Lanoue band Kick the Wicked won Best Rock and Roll song https://www.wea.earth/winners

2/29/2024 Conserving the Natural State Forum https://news.uark.edu/articles/69657/-conserving-the-natural-state-forum-calling-for-abstracts-deadline-march-22?utm_source=arkansas-news&utm_medium=email_2024-02-29&utm_campaign=news_headlines&utm_content=-conserving-the-natural-state-forum-calling-for-abstracts-deadline-march-22

4/3/24 Gilbert and Nabuwembo Environmental Justice lecture.

https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.uatrav.com%2Fnews%2Farticle_c016167e-f059-11ee-bba9-0b4bccd274f7.html&data=05%7C02%7Cmn046%40uark.edu%7Ce009ce2f65cb404530fe08dc53efe65f%7C79c742c4e61c4fa5be89a3cb566a80d1%7C0%7C0%7C638477537021690336%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=DvT8dLupCeiCc7b16GK6roFoP4Pf0JHkOlo3%2B5cKFTY%3D&reserved=0

4/4/24 Osborne Discovers Other Worlds as Ph.D. Student, NASA Intern | University of Arkansas (uark.edu)

Appendix II – Graduate Publications 2023-2024

Ahmed, Zobaer, Shew, Aaron, Nalley, Lanier, Popp, Michael, Green, V. Steven, Brye, Kristofor (2024). An examination of thematic research development, and trends in remote sensing applied to conservation Agriculture, International Soil and Water Conservation Research, Elsevier.

Ahmed, **Zoba,** Nalley, Lawton, Brye, Kristofor, Green, V. Steven, Michael … (November 2023). Winter-time cover crop identification: A remote sensing-based methodological Framework for new and rapid data generation. International Journal of Applied Earth Observation and Geoinformation Vol 125, Issue 103564 Elsevier.

Bhattacharya, Ruchi, Florea, Kyra M., North, Rebecca L (October 2023). Spatial variability in dissolved organic matter quantity and composition in Midwest reservoirs, USA Aquatic Sciences, Vol. 85, Issue 4, page 97 Springer International.

Collins, A. S., **Ernenwein, E. G.,** & Cochran, L. (2023). Geophysical and Archaeological Investigations of Enslaved Peoples at Cannons Point Preserve, Georgia.

Craig, Christopher A. (March 2024).Climate Resource View (CRV): A case of thermal safetu at United States national parks Journal of Outdoor Recreation and Tourism Vol. 45, pp 100737 Elsevier.

Craig, Christopher A. (2024). Boston Market: Cant he rotisserie chicken chain turn itself around? SAGE Publications: SAGE Business Cases Originals.

Craig, Christopher A. (December 2023). Nature-based tourism and climate facourability: a case of the Great Barrier Reef, Australia Tourism Recreation Research Pp1-11 Routledge.

De Jesus, Rener, **Alkendi, Ruwaya** (March 2023). A minireview on the bioremediative potential of microbial enzymes as solution to emerging microplastic pollution. Frontiers in Microbiology Vol. 13 pages 1066133 Frontiers.

Craig, Christopher A. (2023). The ransomwear case at Dish Network Journal of Critical Incidents Vol. 16, pp 103-105 Society of Case Research.

Craig, Christopher , Ma, Siyao, Feng, Feng, and Wood, Brittany (2023). Uncoupling electricy generating organizations from Climate Change: A policy perspective Journal of Business Administration Online Vol. 17, Issue 2 ATU Business school).

Craig, **Christopher** and Karabas, Ismail (2023). A STEM-based approach to sustainability learning Academy of Management Proceedings Vol 2023 Issue 1 pp 13153 Academic Management.

Friedman, Jared, Elliott, Emily, Tucker, Clay, Bregy, Joshua C., **Therrell**, **Matthew D.,** Pearl, Jessie K (December 2023). Stable Oxygen Isotopes as a proxy for climatic extremes in *Taxodium distichum* tree rings. AGU 23 pub. AGU.

Gunnin, D., **Schubert, B. W**., & Woodward H. N. (2023). Testing paleohistological assumptions using a large-scale study of Alligator mississippiensis with application to a fossil alligator from the southern Appalachians.

Harris, Ted D. , Reinl, Kaitlin L. , Marzi Azarderakhsh, Marzi, Berger, Stella A., Berman, Manuel Castro , Bizic, Mina, **Bhattacharya**, **Ruchi** , Burnet, Sarah H. , Cianci-Gaskill, Jacob A. , de Senerpont Domis, Lisette N., Elfferich, Inge, Ger, K. Ali , Grossart, Hans-Peter F., Ibelings, Bas W., Ionescu Danny Kouhanestani, , Zohreh Mazaheri , Mauch, Jonas, McElarney, Yvonne R., Nava, Veronica, North, Rebecca L. , Ogashawara, Igor, Paule-Mercado, Ma. Cristina A. , Soria-Píriz, Sara, Sun, Xinyu, Trout-Haney, Jessica V. , Weyhenmeyer, Gesa A. , Yokota, Kiyoko, Zhan, Qing (2024). What makes cyanobacterial bloom disappear? A review of the abiotic and biotic cyanobacterial bloom loss factors Harmful Algae p 102599 available 2/9/24 Elsevier.

Hayden Malloch, **Stephanie Shepherd**, Lorraine Wolf, Meghan Buchanan (December 2023). Ground-penetrating radar (GPR) survey and spatial analysis of the George and Addie Giddens Cemetery, Opelika, Alabama. Southeastern Archaeology, Pub. Taylor and Francis.

Johns, Rebecca, Viera,Matt, **Dixon, Barnali** (2023). Police violence as containment of black bodies during urban renewal: A spatial analysis of deaths by police in Florida. Southeastern Geographer Vol 63, Issue, 4, pp386-417.

Killian, Courtney D., **Knierim, Katherine J.** (2023). Machine-learning predictionsof groundwater specific condunctance in the Mississippi alluvial plain, south-central United States, with evaluation of regional geophysical aerial electromagneti data as explanatory variables. Scientific Investigations Report 2023-5099 Water Availability and Use Science Program. https://doi.org/10.3133/sir20235099 Publisher US Geological Survey.

Ma, Siyao, Craig, **Christopher A.** Feng, Song and **Liu, Chang** (September 2023). Climate resources at United States National Parks: A tourism climate index approach. Tourism Recreation Research, Vol. 48, Issue 5, pages 710-724. Routledge

Ma, Siyao, Craig, Christopher A., Feng, Song (November 2023). Applying a phenology algorithm to establish camping seasons in the United States Journal of Ecotourism pp 1-11 Routledge.

McCormick, Benjamin, **Craig**, **Christopher A.,** Gilbertz, Susan, Wood, Brittany, Karabas, Ismail (February 2024). Assessing the influence of traditional in-seat, online, and emergency remote teaching (ERT) modalities on sustainability learning in human geography. Journal of Geography in Higher Education pp 1-14 Routledge.

Mulimbi, Willy, Nalley, Lanier, Nayga Jr., Rodolfo M. and Gaduh, Arya (2022). Are Consumers willing to pay for conservation agriculture? The case of white maize in the Democratic Republic of the Congo. https://doi.prg/10.1111/1477-8947.12268 Received certification of Wiley Top Downloaded Paper!

Mulimbi, **Willy,** Brye, Kristofor R., Nalley, Lawton L., Birindwa, Damas R. (October 2023). Conservation agriculture assists smallholder farmers and their agroecosystem in the Democratic Republic of the Congo. Agriculture, Ecosystems, & Environment. Vol. 355, p 108597 Elsevier.

Nottmeier, Anna M., **Knierim**, **Katherine J.,** Hays, Phillip D. (2023). Potentiometric surfaces (2013, 2015), groundwater quality (2010-15), and water-level changes (2011-13, 2013-15) in Sparta-Memphis aquifer in Arkansas. Scientific Investigations Report 2023-5103 Publisher US Geological Survey.

Obembe, Oladipo S., Wang, Tong, **Shew, Aaron M.** (2023). Effect of conservation practice adoption on perceived changes in production cost and yield in South Dakota. Journal of Agricultural and Resource Economics. Vol. 48, issue 2, 325-341.

Pierce, B. Z., & **Ernenwein, E. G.** (2023). Extracting Topography from Historic Topographic Maps Using GIS-Based Deep Learning.

Roland II, Victor L. (2023). Application of the Precipitation-Runoff Modeling System (PRMS) to simulate the streamflows and water balance of the Red River Basin, 1980–2016. No. 2022-5105. US Geological Survey, 2023.

Srigyan, Megha, **Schubert**, **Blaine W.,** Bushell, Matthew, Santos, Sarah H D., Figueiró, Henrique Vieira, Sacco, Samuel, Eizirik, Eduardo, Shapiro, Beth (December 2023). Mitogenomic analysis of a late Pleistocene jaguar from North America. Journal of Heredity, esad082, ps://doi.org/10.1093/jhered/esad082 Publisher Oxford Academic.

Thawaba, S. (2023). Jerusalem urban landscape fragmentation: from a city of peace into a city of pieces. Publisher Town Planning Review.

Ury, Emily, Cheng, Frederick Y., **Bhattacharya**, **Ruchi,** Singh, Nitin, Byrnes, Danyka, Malik, Lamisa, Hampton, Tyler B., Lakhanpal, Garima, Basu, Nandita B (December 2023). Beyond flood control :Assessment of nutrients retention in urban stormwater best management practices. AGU23 AGU publisher.

Weiss, E. (December 2023). The kissing spines of Carthage. Spine. Vol. 48, issue 24, pp 1763-1766. Pub. LWW.

Yagoub, MM, **AlSumaiti**, **Tareefa,** Alhosani, Naeema, Elmubarak, Marwan, Kortbi, Othmane, Tesfaldet, Yacob T., Al Namani, Mohamed Aldhanhani, , Sarah R (December 2024). Potential of using groceries in disasters/pandemics management: case of Al Ain City, UAE Cogent Business & Management Vol. 11, Issue 1, pages 2307639.

Yagoub, M.M., **AlSumaiti**, **Tareefa**, Tesfaldet, Yacob T., AlArfati, Khaled, Alraeesi, Maythaa, Eid Alketbi, Mariam (June 2023). Integration of analytic Hierarchy Process (AHP) and remote sensing to assess threats to preservation of the oases: Case if Al Ain, UA Land, Vol. 12, Issues 7, pgs 1269 MDPI.

Zamanialaei, Maryam, **Shew**, **Aaron M.,** Fain, Justin J., Borkowski, Ally, McCarty, Jessica L. (December 2023). Crop residue burning from high-resolution satellite imagery and PH2.5 dispersion: A case study of Mississippi County, Arkansas, USA. Sustainable Environment Vol. 9, Issue 1 2274646, Taylor & Francis.

Appendix II – Assessment Protocol

(Summer 23, Fall 23, spring 24)

ASSESSMENT PROTOCOL BY SEMESTER OF ENROLLMENT	# STUDENTS (# ACCEPTABLE PROGRESS)
1. Successful completion of required courses (Student Learning Outcome 1, 3). How many students met this goal in 2023-2024, with the minimum GPA in #2?	36/30 8 completed this year
2. Maintain minimum cumulative GPA of 3.0 (Student Learning Outcome 1, 3).	36/36
3. Complete a minimum of six hours (with a GA) or 9 hours (without a GA) each semester (Student Learning Outcome 1, 2, 3). How many students met this goal in 2023-2024?	36/33
4. Successfully complete the written candidacy exams, with an oral defense of the dissertation proposal - Candidacy exam (Student Learning Outcome). How many students met this goal in 2023-2024?	36/22 Including this year 2 completed and two sitting for comps at this time
5. Enroll for at least one hour every semester after passing candidacy exams (Student Learning Outcome 1, 2, 3). How many students passed candidacy in 2023-2024?	18/18
6. Write, defend, and submit an approved dissertation. (Student Learning Outcome). How many graduated in 2023-2024?	Complete 6

students in program achieving goal / # students achieving goal this year.

For new MS program

(Summer 23, Fall 23, spring 24)

ASSESSMENT PROTOCOL BY SEMESTER OF ENROLLMEI	# STUDENTS (# ACCEPTABLE PROGRESS)
1. Successful completion of four required courses (Student Learning Outcome 1, 3). How many students met this goal in 2023-24, with the minimum GPA in #2?	5/6
2. Maintain minimum cumulative GPA of 3.0 (Student Learning Outcome 1, 3).	6/6
3. Complete a minimum of six hours (with a GA) or 9 hours (without a GA) each semester (Student Learning Outcome 1, 2, 3). How many students met this goal in 2023-24?	6/5
4. Complete a total of 30 hours including 6 hours of Thesis hours or 36 hours of coursework for the non- thesis option (Student Learning Outcome). How many students met this goal in 2023-24?	6/3
5. Write, defend and submit an approved thesis. (Student Learning Outcome). How many graduated in 2023-24?	2