University of Arkansas Graduate School and International Education

Environmental Dynamics Program

Annual Report

2022 - 2023

I. Executive Summary

ENDY was busy this year building bridges with other units on the UAF campus and across the UA system. We have engaged in developing two principal projects in this regard this year.

A. Online professional master's program (ENRE). We have moved forward developing a 100% online professional master's program in collaboration with the Sustainability program in the Fay Jones School of Architecture and run through Global Campus The ENRE program has been approved through campus and we are hoping to accept our first class of students in January, 2024. This program:
    a. Is designed to provide advancement opportunities for students who are professionals in fields related to resilience and sustainability.
    b. Will provide funds to expand ENDY GAships to be used by the FJSA faculty.
    c. is interdisciplinary and works across colleges (GISE, FJSA, WCOB and hopefully more in the future).
    d. Uses ENDY PhD alumni who work in private sector, governmental agencies, and NGOs as instructors to engage them in continued campus activities while benefiting the ENRE program students given their "real life" experiences.
    e. Will provide graduate certificates and micro certificates available in four focus areas: Sustainability, Environmental Resiliency, Environmental Leadership, and Certifications, Accounting and Metrics.
    f. Will be directed by Ken McCown, Director of Landscape Architecture, and led by a committee including both ENDY and FJSA faculty and staff.

B. Collaboration with UA Monticello College of Forestry, Agriculture, and Natural Resources and ENDY. We worked this year with Dr. Douglas Osborne from UAM to develop a collaborative program to serve as a pipeline for Arkansas students into ENDY and ENRE and provide development opportunities for the program. UAM currently has a Graduate Certificate in Waterfowl Habitat and Recreation Management (WHRM) through collaboration with/funded by the Five Oaks Ag Research and Education Center. Building a partnership with UAM WHRM would in addition serve to connect UAF and UAM within the system. We are currently working on three pathways:
    a. UAM WHRM certificate – UAF MS in ENDY. This is the path we first identified. It would depend on students doing the WHRM certificate at UAM and being interested in continuing immediately on to the MS program at UAF. ENDY would pursue an exception to the credit transfer limitation to take full advantage of the certificate so the MS degree could be completed in one academic year. This would require students interested in pursuing graduate degrees on the UAF campus immediately after certification and would require a funding model.
    b. UAM WHRM certificate – UAF MS in ENRE. This path would entail the student getting the WHRM certificate at UAM and then once the student has gained employment, the student would take the online MS in ENRE. This program is a professional MS program designed for professional advancement of full-time working students. ENRE would pursue an exception to the credit transfer limitation to take full advantage of the

certificate to allow completion of degree requirements in as little as one year online. This has support of the ENRE program directors.

c. UAM MS – UAF PhD in ENDY. This would provide a pathway whereby Doug Osborne could bring students to UAF to pursue PhDs and he would serve as primary advisor. This would require that he be granted graduate faculty (G1) status in ENDY. This has support of the ENDY directors' group. Since Dr. Osborne is on the faculty in the Division of Agriculture for UA, this should be doable. Doug has sent his CV and we have prepared and submitted the paperwork to the Graduate Council. Since the UA GC doesn't meet again until August, it will need to wait for approval.

In addition, we are in the very early stages of proposing a joint forum to be entitled, *Preserving the Natural State*. We would co-host the forum for faculty, government officials, and other stakeholders across the state who are engaged in research and teaching involved with the preservation of Arkansas' natural resources. Various stakeholders, philanthropists, and decision makers would be invited to the table, and this would likely bring significant positive attention to the ENDY program from across the state and serve the larger community as part of our Land Grant mission. We are trying to secure the Winthrop Rockefeller Institute for this forum, planned for approximately 100 participants.

Student output

ENDY had 9 graduates from fall 2021-Summer 2022 (this may be attributed to the effects of covid). However, in Fall 2022-Summer 2023 we anticipate five PhD and four MS student graduations. Our students published 13 papers, gave 28 oral presentations including 6 invited lectures, and 14 posters at conferences regionally, nationally, and internationally. Students also reported 12 manuscripts in preparation at this time.

Funding and awards

Highlights:

- An ENDY Students was awarded Agriculture and Food Research Initiative (AFRI) Predoctoral Fellowship from the National Institute of Food and Agriculture (NIFA Fellow)
- An ENDY Graduate was part of a team of CAST researchers who were awarded a NEH grant on digital storytelling about precolonial Africa
- Three ENDY students were awarded Sturgis grants (two students worked in Peru and one in Spain)
- An ENDY Student was awarded a Baldwin Fellowship through the Leakey Foundation and will conduct research in Indonesia.
- An ENDY Student received an NSF Doctoral Dissertation Improvement Grant (DDIG) funding
- Two ENDY students are part of the USDA Project Quantifying 'Climate-Smart' Rice Production
- Three ENDY students met with the Chancellor to discuss how to assist international graduate students
- An ENDY Grad was appointed Director of Service Learning on the UAF campus
- An ENDY Students was awarded Sylvia Lane Mentor Fellowship
- An ENDY Student won first place in the Fresh Ideas Poster Competition at the American Water Works Associations Annual Conference and Exposition Southwest Section

- ENDY Grad awarded SEC Emerging Post Doctoral Fellowship Award, University of Arkansas 2022-2023
- An ENDY Student was awarded a Yale Environmental Fellowship for the summer, NY
- Another ENDY Student was awarded a summer internship with Oak Ridge Laboratory, TN
- ENDY supports DDF (3)/DAF (7)
- 29 students were supported on Graduate Assistantships
- The Director of ENDY was elected the first ever member of the American Academy of Arts and Sciences from the University of Arkansas.

Alumni, community and on campus engagement

We continue to have a strong connection to our alumni and they refer their students to the University of Arkansas because they believe in our program and what we have to offer.

Last summer we decided to reach out to alumni not in the academic setting and see how we could help them. Through discussions of what our alumni saw as needs in the workforce, we created a list of potential courses they felt would help employees with regard to environmental expertise. This led to the creation of a structure for a professional masters to offer solutions to these potential deficiencies and to assist employees with promotions. We presented the framework and courses to the Global Campus and our Benchmark review was very favorable! However, we were notified of another group that was interested in similar subject matter and so a partnership between GSIE/ENDY and Fay Jones School of Architecture formed to create the Environmental Resiliency professional master's program ENRE that will be 100% online and taught by ENDY Alum who are working in private, governmental and NGO across the country. We are in the process of creating eleven courses with our alums. We also have support for this program from the City of Fayetteville and companies as large as Meta. See above section on ENRE for details.

Over half of our alumni have chosen the professoriate as their employment. Appendix II you will see the materials that are being published by our alumni.

Diversity and Inclusion

ENDY has been involved in student success throughout our existence. We realize this is different for each student and strive to meet each student where they are with the support they need. ENDY has always drawn strength through the diversity of our students and their shared and not shared experiences.

ENDY has been instrumental in the implementation of the new 3+3 program that will start in Fall between Geosciences and HBCU Fort Valley State University. This will allow students to complete a BS at Fort Valley and transfer to the UA and complete a MS in Geosciences with three years of funding from Geosciences. This is a win for the students and the university since all the students are highly motivated and capable, having shown strong academic potential in finishing a STEM bachelor's degree in three year with high GPAs.

We will host the Math, Scholars, and Engineering Academy (M-SEA) June 10-17, 2023. This is the 14th year we have been partnered with Fort Valley State University for this well-established and successful

program. This will be the first year since the pandemic began that the camp will be live on our campus, and we will host 16 students.

Thanks to a grant from NSF to Dr. Steve Boss we arranged for the participation of 61 students to attend the National Association of Black Geoscientists annual conference in person (Houston) and 80 students attending virtually. We have two new students beginning the ENDY program in Fall 2023 as a result of our recruiting at that conference and through word of mouth from the conference.

Implementation of recent program changes

We are now seeing graduations of the first students who entered for the new ENDY MS program. The students are doing quite well, and three have decided to continue on for their PHDs!

Having the MS in place will also facilitate the MOU with UAM for the joint MS program we hope to implement in the next year (see above).

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

The ENDY students have, in conjunction with their mentors, applied for over two million dollars in grants this year. More than $590,000 has been awarded to date with nearly one million still pending.

The number of students enrolled in ENDY continues to rise in the program due to our established and growing relationships with faculty across campus. We had more than 30 applicants this year. This should be interpreted within the context of the fact that we are limited to 10 ENDY GAships and only admit students we can fund. That said, we have been successful in placing many students in other departments for funding purposes, thus increasing the number of students we may admit from one or two this year to eightfor this upcoming year.

We have new faculty joining our ENDY faculty each semester as students reach out to faculty who are not part of our program and as faculty find out about our program. We even have ENDY faculty suggesting new faculty bring in students to the ENDY program!

ENDY has one full-time employee (the assistant director) paid with part-time funds originally allocated by Fulbright College but later matched by GSIE to create a full-time position. Later the position was moved from ARSC to GSIE while the cost is still split evenly between the two colleges. The director receives summer salary from ARSC for his role in ENDY. The associate director, executive committee members, and teaching and mentoring faculty members receive no compensation from GSIE and their time is provided as a courtesy of the respective home units (or in the summer in some cases, on a voluntary basis by the faculty member).

Through our efforts next year we will begin a new online terminal Master's program in Environmental Resiliency. This program is a collaboration with the Fay Jones School of Architecture, but the actual program resides in GSIE under ENDY. Instructor pay will come from tuition, and we anticipate additional revenue will be used for ENDY graduate assistantships to assist in the growth of the ENDY program.

For MS program

ASSESSMENT PROTOCOL BY SEMESTER OF ENROLLMENT	**# STUDENTS (# ACCEPTABLE PROGRESS)**
1. Successful completion of four required courses (Student Learning Outcome 1, 3). How many students met this goal in 2021-2022, with the minimum GPA in #2?	3/4
2. Maintain minimum cumulative GPA of 3.0 (Student Learning Outcome 1, 3).	3/4
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 2021-2022?	3/4
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 2021-2022?	3/4
5. Write, defend and submit an approved dissertation. (Student Learning Outcome). How many graduated in 2021-2022?	2

Appendix I – Student Bibliography

Publications

- **Ahmed, Z. Shew, A.M., et al.** (2022). Climate change risk perceptions may drive agricultural technology adoption in the polder areas of Bangladesh, *Journal of Rural Studies*, 94:274-286.
- **Price, S. J**., Adams, M. J., & Tepper, Y. (2022). An integrated spatial approach to archaeological prospection using GIS and pedestrian survey data at Tell Abu Shusha, Israel. *Archaeological Prospection*, 1–15. https://doi. org/10.1002/arp.188
- **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, 177:46-62.
- Haggard, B.E., **E.M. Grantz**, B.J. Austin, N.D. Wagner, and J.T. Scott. (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, 177:63-71.
- Haggard, B.E., **E.M. Grantz**, B.J. Austin, A.L. Lasater, L. Haddock, A. Ferri, N.D. Wagner, & J.T. Scott. (2023). Microcystin shows hierarchical structure with physicochemical properties at Lake Fayetteville, Arkansas, May through September 2020. Journal of the ASABE. 66:307-317, doi: 10.130131/ja.15273
- **Hemmati, M.,** Messadi, T., & Gu, H. (2022). *Life cycle assessment of cross-laminated timber transportation from three origin points*. Sustainability, 14(1),336. https://doi.org/10.3390/su14010336
- Marzolf, N. S., Baca, D. M., **Bruce, T. K.**, Vega-Gómez, M., Watson, C. D., Ganong, C. N., Ramirez, A. & Ardón, M. (2022). Do experimental pH increases alter the structure and function of a lowland tropical stream? Ecosphere, 13(7), e4097.
- **Price, S.**, Adams, M., and Tepper, Y. (2022) An integrated spatial approach to archaeological prospection using GIS and pedestrian survey data at Tell Abu Shusha, Israel." Archaeological Prospection. https://doi.org/10.1002/arp.1888
- 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.
- **Smith, H.W.**, Ashworth, A.J., Owens, P.R., (2022). GIS-based multicriteria evaluation of crop and soil suitability for optimized production on U.S. Tribal Lands. *Agriculture.* DOI: https://doi.org/10.3390/agriculture12091307
- **Smith, H.W.,** Owens, P.R., and Ashworth, A. J. (2022) Applications and analytical methods of ground penetrating radar for soil characterization in a silvopastoral system*. Journal of Environmental and Engineering Geophysics* 27(4): 167-179 DOI: 10.32389/JEEG22-001
- Ylagan, S., Brye, K.R., Ashworth, A.J., Owens, P.R., **Smith, H.W.**, Poncet, A.M.,(2022). Using apparent electrical conductivity to delineate field variation in an agroforestry system in the Ozark Highlands. *Remote Sensing. DOI:* https://doi.org/10.3390/rs14225777

Reports

- **Price, S.** (2022) 3D Modeling: Bluff Shelter photogrammetry in the Petit Jean Mountains, Arkansas." Article published in the Arkansas Archeological Survey Field Notes. https://www.arkarch.org/field-notes/

- **Price, S.** (2022) Sinis Archaeological Project: Landscape survey in West-Central Sardinia." Technical report on archaeological survey fieldwork, submitted to government of Sardinia, Italy.

Presentations - oral

- **Bonilla, J.** (January 2023) IEEE Computer Society 2022: Academic Experience Abroad. Quantifying the role of climate on Tropical River flow along the Panamanian Pacific Coast. Univeridad Tecnoligica de Panama.
- **Cooper, C.** and Malone, T. (February 2023) *Assessing the value of "wilderness" to US consumers with application to farm-raised and wild-foraged mushroom demand*. Presented at SAEA, OK City, OK.
- **Cooper, C.** (March 2023) Economic and food system infrastructure mapping in the Delta. Presented at the Next California Project Meeting World Wildlife Fund
- **Grantz, E.** and Haggard, B., (2023) Trends in the Eucha-Spavinaw watershed show management limitations to reducing in-stream nutrient concentrations. Presented at the 13th National Monitoring Conference, North American Lake Management Society April 24-28, 2023 Virginia Beach, Va.
- **Hemmati, M**.; Messadi, T.; Gu, H. (2022) *Life cycle cost analysis of cross-laminated timber in a building structure*. Society of Wood, Science, and Technology (SWST) 65th International Convention, Kingscliff, NSW, Australia, July 10-15, 2022.
- **Hemmati, M**.; Messadi, T.; Gu, H. (2022) *Life cycle assessment of mass timber structure, construction process as system boundary.* Society of Wood, Science, and Technology (SWST) 65th International Convention, Kingscliff, NSW, Australia, July 10-15, 2022.
- **Hemmati, Moein.; Hemmati, Mahboobeh**. (2022). *Comparative analysis of thermal comfort performance of wood, brick, and concrete.* Society of Wood, Science, and Technology (SWST) 65th International Convention, Kingscliff, NSW, Australia, July 10-15, 2022.
- **Khatiwada, K. R**., Pandey V.P.; (2022). Characterization of hydro-meteorological drought in Nepal Himalaya, case studies from Nepal, In International Conference on Sudurpaschim Studies, 12 December 2022, Online, Nepal
- **O'Callahan, A**. Naithani, K.N. (August 2022). *Continental scale drivers of microbial biomass and composition*. Oral presentation at the Ecological Society of America Conference. Toronto, Canada.
- **Osborne, S.D.** (2022). Oral presentation Lunar and Planetary Space Sciences Conference, Houston, TX.
- **Osborne, S.D.** (2022). *Chao/kosmotropic properties of brine solutions in the presence of ancient proteins and their assistance in the bioavailability and precipitation of life-necessary organic molecules*. Oral Presentation. International Aeronautics Congress, Paris France.
- Seddelmeyer, J., **Hemmati, M**.; Messadi, T.; Gu, H. (2022). *LCA comparison of a mass timber building with an equivalent steel alternative.* Society of Wood, Science, and Technology (SWST) 65th International Convention, Kingscliff, NSW, Australia, July 10-15, 2022.
- **Price, S.** (2022) Built to Last?: Raised field cultivation and resource conservation on the North Coast of Peru. Guest lecture for the Arkansas Archeological Survey Ko-Ko-Ci lecture series. Fayetteville, AR.
- **Price, S.** (2022) Archaeo-environmental perspectives on raised field agriculture on the North Coast of Peru. Guest lecture for the Environmental Dynamics lecture series at the University of Arkansas. Fayetteville, AR.
- **Hemmati, Moein.; Hemmati, Mahboobeh**. (2022) *Comparative analysis of thermal comfort performance of wood, brick, and concrete.* Society of Wood, Science, and Technology (SWST) 65th International Convention, Kingscliff, NSW, Australia, July 10-15, 2022.

- Jacob Seddelmeyer, **Hemmati, M**.; Messadi, T.; Gu, H. (2022). *Strengths and weaknesses of Tally, an LCA tool for comparative analysis*. International Conference on Building Life Cycle Assessment and Analysis, Dubai, United Arab Emirates, July 28-29, 2022.
- Jacob Seddelmeyer, **Hemmati, M.,** Messadi, T.; Gu, H. (2022) *LCA Comparison of a mass timber Building with an equivalent steel alternative.* Society of Wood, Science, and Technology (SWST) 65th International Convention, Kingscliff, NSW, Australia, July 10-15, 2022.
- **Martin, S.A.,** Shaw, J., Cathcart, C., Marino, M., Hughs, C., Okunbor, G. (2022). *Flooding at scale: Modeling resilience practices in Ancient Peru using a stream table Experiment.* Paper presented at the Graduate Professional Student Colloquium 2022. Fayetteville, AR, USA.
- **Smith, Harrison W**., Ashworth, A.J., and Owens, P.R. (2022) *GIS-based evaluation of soil suitability for optimized production on U.S. Tribal Lands* **DOI**: **10.3390/agriculture12091307**
- **Smith, H.W.** (2023). Boundary line analysis can improve nutrient management in Guatemalan maize, common bean, and coffee farms. Graduate Student Professional Congress Colloquium, University of Arkansas, Fayetteville, AR, April 17, 2023.
- **Smith, H. W.** (2022). Monitoring and assessment of reclamation at Tar Creek Superfund Site using timeseries satellite imagery. Tribal Land and Environment Forum (TLEF) 2022, Milwaukee, WI, August 8-11, 2022.

Invited lecture

- **Bruce, T.** (February 2023). *A crash course on Story Maps*. Lecture given to LARC 2345: *Landscape Architecture Design IV Studio* as part of the "Fate of the Water" collaboration between Landscape Architecture, the Department of Geosciences, and Environmental Dynamics (ENDY) at the University of Arkansas—a joint effort to teach and engage students on the when/where/why of water dynamics and the impact on people and the environment. https://arcg.is/18yKOf
- **Bruce, T.** (2023) Panelist for Engaging Conversations: Public service through advocacy. Honoring the Legacy of Congressman and Civil Rights Leader John Lewis. Hosted by Arkansas Lighthouse Charter Schools.
- **Bruce, T.**, (2023) Knowing where your food comes from presented on Undisciplined hosted by Dr. Caree Banton on KUAF April 2023. Knowing Where Your Food Comes From (kuaf.com)
- **Martin, S.A.**. (March 2023) *River Business: The hydrosocial cycle and ancient flood risk in North Coastal Peru.* BAOBAB Brownbag, University of Arkansas, Department of Anthropology.
- **Price, S.** (2023) LiDAR technology for the Identification of cultural heritage sites. Guest lecture for the Frost Town Symposium at SUNY Brockport University. Rochester, NY.
- **Pujiantari, P.** University of Arkansas, Fayetteville, Department of Anthropology—Primates adaptation and evolution, ANTH 4613 (Dr. Peter S. Ungar): Malagasy Primates. Lecture 7.

Presentations – Poster

- **Everett, B.** (2022). Land use effects on water quality in the rapidly urbanizing White Oake Bayou Watershed, Arkansas. Presented at the Arkansas Water Resource Conference, Fayetteville. July 2022.
- **Hemmati, M**., T. Messadi, and H. Gu (August 2022). Life cycle analysis (LCA) for transportation of cross-laminated timber panels from three origin points of supply. Society of Wood, Science, and Technology (SWST) 65th International Convention, Kingscliff, NSW, Australia, July 10-15, 2022.
- **Hemmati, Moein** & **M. Hemmati** (July2022). Comparative analysis of thermal comfort performance of wood, brick, and concrete Case study: part of 17 Shahrivar Street in Tehran, Iran. Presented at the Society of Wood, Science, and Technology (SWST) 65th International Convention held in Kingscliff, Australia

- **Khatiwada, K. R**., Runkle B., Moon J.B., Stinchcomb, G. E., El Masri, B. (2023). Modeling methane dynamics in a bottomland hardwood wetland. In Department of Energy's Environmental System Science (ESS) PI Meeting, May 16-17, 2023, Bethesda, MD, USA
- **Martin, S.** and J. Shaw.(2023) *Current ecological knowledge: Quantifying and spatializing flood risk using a stream table experiment.* Poster presented at the GeoHogs Student Conference. Fayetteville, AR, USA.
- **Martin, S.** and J. Shaw (April 2023). Current ecological knowledge: Quantifying and spatializing risk using a stream table experiment. Poster presented at the 2023 Geohog Conference Fayetteville, AR.
- Martinez-Soler, B., **O'Callahan, A.**, St. Rose, A., and Naithani, K. 2022). Effects of Hurricane Maria in Guanica's dry forest soil properties. July 13, 2022. Arkansas Water Resources and Watersheds Conference, Fayetteville, AR, USA. Contributed poster.
- **McIntyre, B,** B. Haggard, B. Austin, and J. Rios. (October, 2022) *Biochar: Literature review and management option for harmful algal blooms (HABs).* Poster Presentation at the American Water Works Association's Annual Conference and Exposition Southwest Section. Won 1st place and she will present it again at the National meeting.
- **McIntyre, B,** B. Haggard, B. Austin, and J. Rios. (June, 2023) *Biochar: Literature review and management option for harmful algal blooms (HABs).* Poster Presentation at the American Water Works Association's Annual Conference and Exposition. Toronto, Canada.
- **O'Callahan, A.** and Naithani, K. Continental scale drivers of microbial biomass and community composition. August 15, 2022. Ecological Society of America and Canadian Society for Ecology and Evolution Joint Annual Meeting, Montreal, QC, Canada. Contributed poster.
- **Osborne, S.D.,** (2022) Poster presentation. Astrobiology Science Convention, Atlanta, GA.
- **Osborne, S. D.** (2023) Assessment of chao-versus kosmotrophic properties of brine solutions through their effects on ancient protein structure. Poster presentation at Lunar and Planetary Space Science Conference (LPSC). Houston, TX March 11-17, 2023.
- **Smith, H.W.** Boundary line analysis can improve nutrient management in Guatemalan maize, common bean, and coffee farms. (2023) Graduate Student Professional Congress Colloquium, University of Arkansas, Fayetteville, AR, April 17, 2023..
- **Smith, H. W.** Monitoring and assessment of reclamation at Tar Creek Superfund Site using timeseries satellite imagery. Tribal Land and Environment Forum (TLEF) 2022, Milwaukee, WI, August 8-11, 2022.
- **Vranovci, K.** (2023). Social and economic changes in a mid-size university city: The case of South Fayetteville, Arkansas. Poster presented at the 2023 Geohog Conference Fayetteville, AR.

Manuscripts in preparation:

- **Ahmed** et al., A systematic review of remote sensing for conservation agriculture (Under Review).
- **Ahmed** et al., Cover crop identification in the Mississippi Alluvial Plain using Google Earth Engine (Under Internal Review).
- **Ahmed** et al., Quantify and assess NRCS cover crop cost-share conservation program impacts on adoption and neighborhood effects using remote sensing.
- **Ahmed et al**., Identifying drivers of NRCS conservation cost-share program in the Arkansas delta
- **Cooper, C.F**., and T. Malone. Assessing the value of 'wildness' to U.S. consumers with application to farm-raised and wild-foraged mushroom demand." *Agricultural & Resource Economics Review* (In Preparation).
- **Cooper, C.F.,** L.L Nalley, A.M. Shew, J. Tack. "Evolution of Bacillius thuringiensis Maize Yields in South Africa." *Global Food Security* (In Preparation).
- **Dunn, J.E.** and Naithani, K. (2023). Re-evaluating success in transboundary fisheries management: Pacific Halibut a case study. *In preparation.*

- Kuruçayırlı, E., Lehner, J., Blackwell, N., Hirschfeld, N., Jansen, M., **Martin**, **S.,** Langis-Barsetti. D. *Research on the Cape Gelidonya Metal Cargo: New Insights into Existing Questions.* Western Anatolia in the Second Millennium BCE (WANAT). In prep
- **Smith, H.W.**, Ashworth, A.J., Nalley, L.L., Schmidt, A., Turmel, M.S., Owens, P.R., *Submitted*. Boundary line analysis and machine learning models to identify critical soil values for major crops in Guatemala
- **Webhi, H.** Gaps and barriers affecting the design and construction of a new low carbon on house in a fast-growing city: Fayetteville, Arkansas, in progress.
- **Webhi, H.** Comparative analysis Of 3-Story residential design for a passive low environmental impact house and conventional house using energy modeling and life cycle assessment: Case study Caja PH, in progress.
- 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., *Submitted.* Relationships among apparent electrical conductivity and plant and terrain data in an agroforestry system in the Ozark Highlands,

Certificates Completed

EnergyPlus for Practitioners
EnergyPlus EMS Controls
Sustainability Graduate Certificate

Memberships:

American Association of Biological Anthropology
American Geophysical Union
American Society of Agronomy
American Women of Geosciences
Anthropology Graduate Student Cosortium (University of Arkansas)
Association for Women in Mathematics
Crop Science Society of America
Ecological Society of America
Geological Society of America (Hydrogeology Division)
International Association of Landscape Ecologists
IEEE
International Association of Lions Club Youth Leadership
PERMIAS – Indonesian Student Association Chapter Arkansas (President)
Lutung – Primate Study Group
IKA FABIONA - Fakultas Biologi Universitas Nasional Alumni Association
Sigma Gamma Epsilon
Soil Science Society of America
YouthMappers at UArk

Volunteering

Arkansas Audubon
Citizens Climate Action
Ecological Association AUNA

Graduate Dean's Student Advisory Board Member
GPSC Election Chair
GPSC Graduate Life Committee – Vice Chair
Holcomb elementary instructor
International Culture Team
Invasive Species Removals, Fayetteville, AR
Lions Club
Northwest Arkansas Science Fair, Fayetteville, AR
Public Archaeology Day at the Frost Town Excavations in Naples, NY
"STEM Night", Holcomb Elementary, Fayetteville, AR.
Agricultural Economics and Agribusiness Department Seminar Committee
Reviewer for International Food and Agribusiness Review

Appendix II – Graduate Publications 2022-23

- **Ahmed, Z., Shew, A.** M., Mondal, M. K., Yadav, S., Jagadish, S. K., Prasad, P. V., ... & Bakuluzzaman, M. (2022). Climate risk perceptions and perceived yield loss increases agricultural technology adoption in the polder areas of Bangladesh. *Journal of Rural Studies*, *94*, 274-286.
- Allen, C.D., Kennedy, C.D., **Groom, K.M.**, Cerveny, N.V., Dorn, R.I., Whitley, D.S. (2022). 5 The Rock Art Stability Index. *Global Perspectives for the Conversation and Management of open-air rock art sites*. DOI: 10.4324/97804293555349-8 Taylor & Francis
- Ashworth, A.J., Putman, W.B., Kharel, T., Thoma, G., **Shew, A.**, Popp, M., and Owens, P, (2022) Environmental impact assessment of tractor guidance systems based on pastural management scenarios. *Journal of ASABE*, *65*(*3)*:645-653.
- Brochu, C. A., de Celis, A., Adams, A. J., Drumheller, S. K., Nestler, J. H., Benefit, B. R.,Grossman, A., **Kirera, F. ...** & Nyaboke Juma, R. (2022). Giant dwarf crocodiles from the Miocene of Kenya and crocodylid faunal dynamics in the late Cenozoic of East Africa. *The Anatomical Record*, *305*(10), 2729-2765.
- Bapana, S., House, A., Arney, I., Beck, C. C., Grossman, A., **Kirera, F**. M., ... & Russo, G. R. (2022, December). Heterogeneous Hydroclimate and Vegetation in the Miocene East African Rift Valley. In *AGU Fall Meeting*.
- **Bhattacharya, R**., Jones, J. R., Graham, J. L., Obrecht, D. V., Thorpe, A. P., Harlan, J. D., & North, R. L. (2022). Nonlinear multidecadal trends in organic matter dynamics in Midwest reservoirs are a function of variable hydroclimate. *Limnology and Oceanography*, *67*(11), 2531-2546.
- Brye, K.R., **Omidire, N.S.,** English, L., Parajuli, R., Kekedy-Nagy, L., Sultana, R., Popp, J., Thoma, G., Roberts, T.L. and Greenlee, L.F., (2022). Assessment of Struvite as an Alternative Sources of Fertilizer-Phosphorus for Flood-Irrigated Rice. *Sustainability*, *14*(15), p.9621.
- **Burgess-Conforti, J.R**., Moore Jr, P.A., Owens, P.R., Miller, D.M., Ashworth, A.J., Hays, P.D., Evans-White, M.A. and Anderson, K.R. (2022). Relationships between land use and stream chemistry in the Mulberry River basin, Arkansas. *River Research and Applications*, *38*(6), pp.1031-1040.
- **Burnette, D.J**., Dye, D.H., Hill, A.A. (2022). Climate change, population migration, and ritual practice in the Lower Mississippi Valley. In: Cook, R.A., Comstock, A.R. (eds) *Following the Mississippian Spread*. Springer, Cham. https://doi.org/10.1007/978-3-030-89082-7_11
- Burns, B.W., Green, V.S., Hashem, A.A., Massey, J.H., **Shew A.M**., Adviento-Borbe, M.A.A., Milad, M. (June 2022) Determining nitrogen deficiencies for maize using various remote sensing indices. *Precision Agriculture* 23(3): 791-811.
- Tucker, C.S., Pearl, J.K., Elliott, E.A., Bregy, J.C., Friedman, J.M., **Therrell, M.D.** (2022) Baldcypress false ring formation linked to summer hydroclimatic extremes in the southeastern US. *Environmental Research Letters* 17(11) p. 114030.
- **Craig, C.** (2022) Managing campgrounds and "glampgrounds" *The CASE Journal*. Limited pp. 1-9
- **Craig, C. and Ma, S.** (2022) Weather and recreational vehicle camping businesses. *Annuals of Tourism Research Empirical Insights*. 3(2) https://doi.org/10.1016/j.annale.2022.100063
- **Christopher A. Craig, Ma, S.,** and Feng, S. (2023) Climate resources for camping: A resource-based theory perspective, *Tourism Management Perspectives*, *45*, 101072, ISSN 2211-9736,https://doi.org/10.1016/j.tmp.2022.101072
- **Craig**, **C.A.,** Petrun Sayers, E.L., Gilbertz, S., Karam, R., and Feng, S. (August 2022). The role of STEM-based sustainability in business and management curricula: Exploring cognitive and affective outcomes in university students. *Journal of Management Education*, 46(4):656-684.

- **Craig**, **C.A.,** Petrun Sayers, E.L., Gilbertz, S., Karabas, I. (2022). The development and evaluation of interdisciplinary STEM, sustainability, and management curriculum. *The International Journal of Management Education.* 20(2): p. 100652.
- Deckers, K., Karakaya, D., Poolman, L. Ogut, B, **Herrmann, J.T**., Morgan, K.R., and Herrmann, V. (2023) An estate at Zincirli? Land use and resource exploitation at the Middle Bronze Age monumental building Complex DD in Zincirli, Gaziantep Province of Turkey. *Archaeol Anthropol Sci* **15** (13). https://doi.org/10.1007/s12520-022-01709-w
- De Jesus, R., & **Alkendi, R.** (2022). A minireview on the bioremediative potential of microbial enzymes as solution to emerging microplastic pollution. *Frontiers in Microbiology*, *13*.
- De Lange, J., Nalley, L.L., **Yang, W**., Shew, A., and De Steur, H. (2022). The future of CRISPR gene editing according to plant scientists Iscience Vol 25, Issue 9, 105012.
- Duncan, J. M., Betsy Garrison, M. E., Killian, T. S., **Moon, Z. K**., & Way, K. A. (2022). Family Resilience: Variations by Individual Psychological and Health Resources, Social Capital and Sociodemographic Characteristics. *The Family Journal*, *30*(3), 376-383.
- Elkashlan, M., Poulose, V., Habib, R.Z., Karabala, O., Aldhanhani, A., Shakir, M., Shaath, H., Ramachandran, T., Mourad, A.H.I., Hamed, F. and **Al Kendi, R.,** (2022). Analysis of the solid contents of toothpastes available in UAE (United Arab Emirates) markets. *Journal of Environmental Protection*, *13*(7), pp.539-556.
- **Erneinwein, E.** (2023) Geophyscial Survey Techniques, Handbook of Archaeological Science, Vol. 2, pages 985-1004 John Wiley & Sons publisher.
- Fang, B., Kam, J., Elliott, E., Tootle, G., **Therrell, M.** Lakshmi, V. (August 2022) The recent decline of Apalachicola-Chattahoochee-Flint (ACF) River Basin Streamflow. *Hydrology* 9(8):140
- Fang, Y., Trupp, AHess, J.S., and **Ma, S.** (2022) Tourism under climate crisis in Asia: Impacts and implications. *Journal of Sustainable Tourism* pp. 1-17. , DOI: 10.1080/09669582.2022.2112202
- Formetta, G., Tootle, G., and **Therrell, M.** (2022) Regional reconstruction of Po River Basin (Italy) Steamflow. *Hydrology*, 9(10):163.
- **Groom, KM.,** Bevan, G., Al-Noaimat, S., d Al-Zalabiah, M., and Allen, C.D. (2022) Community engagement in geologic assessment of Thamudic inscriptions and petroglyphs in the Wadi Rum Protected Area, Jordan. (2022). *Global Perspectives for the Conservation and Management of Open-air Rock Art Sites* pp. 302-316.
- Habib, R. Z., **Kindi, R. A**., Salem, F. A., Kittaneh, W. F., Poulose, V., Iftikhar, S. H., ... & Thiemann, T. (2022). Microplastic contamination of chicken meat and fish through plastic cutting boards. *International Journal of Environmental Research and Public Health*, *19*(20), 13442.
- Habib, R. Z., **Kendi, R. A**., & Thiemann, T. (2022). Quantification and characterization of microplastic originating in the emirate of Abu Dhabi, United Arab Emirates. In *AIP Conference Proceedings* (Vol. 2676, No. 1, p. 030003). AIP Publishing LLC.
- Habib, R. Z., **Al Kendi, R**., Ghebremedhin, F., Elkashlan, M., Iftikhar, S. H., Poulose, V., ... & Thiemann, T. (2022). Tire and rubber particles in the environment–a case study from a hot arid region. *Frontiers in Environmental Science*, 2232.
- Habib, R.Z., Aldhanhani, J.A.K., Hilal Ali, A., Ghebremedhin, F., Elkashlan, M., Mesfun, M., Kittaneh, W., **Al Kindi, R.**, and Thiemann, T.. Trends of microplastic abundance in personal care products in the United Arab Emirates over the period of 3 years (2018–2020). *Environmental Science and Pollution Research* 29, no. 59 (2022): 89614-89624.
- Habib, R. Z., Ramachandran, T., Hamed, F., **Al Kindi, R**., Mourad, A. H. I., & Thieman, T. (2022). Microplastic in an arid region: Identification, quantification and characterization on and alongside roads in Al Ain, Abu Dhabi, United Arab Emirates. *Journal of Environmental Protection*, *13*(10), 671-688.

- Harley, G., **Therrell, M.D**., Maxwell, J.T., Bhuta, A., Bregy, J.C., Heeter, K.J., Patterson, T., Rochner, M., Rother, M.T., Stambaugh, M., Zampieri, N.E., Altman, J., Collins-Key, S.A., Gentry, C.M., Guiterman, C., Huffman, J.M., Johnson, D.J., King, D.J., Larson, E.R., Leland, C., Nguyen, H.TT., Pederson, N Puhlick, J.J, Rao, M.P., Rodriguez-Caton, M., Sakulich, J.B., Singh, N., Tucker,C.S., Van De Gevel, S.L., Kaiser, A.L., Ahmad, S. (2023) The longleaf tree-ring network: Reviewing and expanding the utility of Pinus palustris Mill. *Dendrochronological Data*. Progress in Physical Geography: Earth and Environment 03091333221147652 Sage publications.
- Isaacs, K.K., Wall, J.T., Williams, A.R., Hobbie, K.A., Sobus, J.R., Ulrich, E., **Lyons, D**., Dionisio, K.L., Williams, A.J., Grulke, C. and Foster, C.A., 2022. A harmonized chemical monitoring database for support of exposure assessments. *Scientific Data*, *9*(1), p.314.
- Kowalski, J. A., & **Lockhart, J. J.** (2022). Current Research: University of Arkansas Summer 2021 Field School at Watts Farm. *Caddo Archeology Journal*, 56.
- Linam, B, **E. Ernenwein** (Oct. 2022) A Re-examination of ground penetrating radar data collected at Presidio Los Adaes (16 NA16), capital of Spanish Texas 1729-1770. In *19th international Conference on Ground Penetrating Radar* Pages 27-30. Publisher Society of exploration Geophysicists.
- Maxwell, J.T., Harley, G.L., Tucker, C.S., Galuska, T., Ficklin, D.L., Bregy, J.C., Heeter, K.J., Au, T.F., Lockwood, B.R., King, D.J., Maxwell, R.S., Smith, L.G., Elliott, E.A., **Therrell, M.D.** (2022). 1,100-year reconstruction of baseflow for the Santee River, South Carolina, USA reveals connection to the North Atlantic subtropical high. *Geophysical Research Letters*, 49(22): epages e2022GL100742
- McKenna, K., Johns, R., & **Dixon, B.** (2022). Evaluating forms of engagement with environmental education in Florida. *The Florida Geographer*, *53*(1).
- **Mulimbi, W**., Nalley, L., Nayga Jr. R.N., and Gaduh, A. (2022) Are consumers willing to pay for conservation agriculture? The case of white maize in the Democratic Republic of Congo. *Natural Resources Forum* 47(1):22-41 **https://doi.org/10.1111/1477-8947.12268**
- **Mulimbi, W.,** Nalley, L.L., Strauss, J., & Ala-Kokko, K. (2023) Economic and environmental comparison of conventional and conservation agriculture in South African wheat production, *Agrekon*, DOI: 10.1080/03031853.2023.2169481
- **Mulimbi, W.,** Nalley, L.L., Strauss, J., and Ala-Kokko, K. (2022) Holistically examining the environmental and economic benefits of conservation agriculture adoption in the South African wheat production: A Stepwise life cycle analysis approach. Poster presented at the 2022 Agricultural and Applied Economics Association annual meeting Anaheim, CA July 31- August 2 also in digital library AgEcon Search Research in Agricultural and Applied Economics.
- **Mulimbi, W.** (2022) Assessing Consumer Demand, Producer Profitability, and the Environmental Impacts of Conservation Agriculture Adoption in Sub-Saharan Africa. *Graduate Theses and Dissertations* Retrieved from https://scholarworks.uark.edu/etd/4645
- Rutty,M., Hewer, M., Knowles, N., & **Ma, S.** (October 2022) Tourism & climate change in North America: regional state of knowledge, *Journal of Sustainable Tourism*, DOI: 10.1080/09669582.2022.2127742
- Nalley, L.L. Massey, J., Durand-Morat, A., **Shew, A.,** Parajuli, R., and Tsiboe, F., (2022). Comparative economic and environmental assessments of furrow-and flood-irrigated rice production systems. *Agricultural Water Management* Vol. 274, pp 107964
- Nalley, L.L., Roberts, C., Durand-Morat, A., **Shew, A.,** Parajuli, R., and Roberts, T. 2022). Precise nitrogen recommendations improve economic and environmental outcomes in rice production. SSRN 4127941

- Obembe, O. S., Wang, T., & **Shew, A. M**. (2022). Effect of Conservation Practice Adoption on Perceived Changes in Farm Outcomes in South Dakota.
- **Omidire, N. S.,** Brye, K. R., Roberts, T. L., Kekedy-Nagy, L., Greenlee, L., Gbur, E. E., & Mozzoni, L. A. (2022). Evaluation of electrochemically precipitated struvite as a fertilizer-phosphorus source in flood-irrigated rice. *Agronomy Journal*, *114*(1), 739-755.
- **Omidire, N.S.,** Brye, K.R., English, L., Popp, J., Kekedy-Nagy, L., Greenlee, L., Roberts, T.L. and Gbur, E.E., 2022. Wastewater-recovered struvite evaluation as a fertilizer-phosphorus source for corn in eastern Arkansas. *Agronomy Journal*, *114*(5), pp.2994-3012.
- **Omidire, N. S.,** & Brye, K. R. (2022). Wastewater-recycled struvite as a phosphorus source in a wheat–soybean double-crop production system in eastern Arkansas. *Agrosystems, Geosciences & Environment*, *5*(2), e20271.
- **Omidire, N.S.,** Brye, K.R., English, L., Kekedy-Nagy, L., Greenlee, L., Popp, J. and Roberts, T.L., (2023). Soybean growth and production as affected by struvite as a phosphorus source in eastern Arkansas. *Crop Science*, *63*(1), pp.320-335.
- Peterson-Wilhelm, B., Nalley, L.L., Durand-Morat, A., and **Shew, A.** (2022) Does rice quality matter? Understanding consumer preferences for rice in Nigeria. *Journal of Agricultural and Applied Economics* pg. 1-23. Cambridge University Press.
- Reardon, C.L., Klein, A.M., Melle, C.J., Hagerty, C.H., Klarer, E.R., Machado, S., Paulitz, T., Pritchett,L., Schlatter, D., **Smith, S.F.**, and Wuest , S.B. (2022) Enzyme activities distinguish long-term fertilizer effects under different soil storage methods. *Applied Soil Ecology*, Vol. 177, 104518
- Reinl, K.L., Harris, T.D., Elfferich, I., Coker, A., Zhan, Q., Domis, L.N.D.S., Morales-Williams, A.M., **Bhattacharya, R**., Grossart, H.P., North, R.L. and Sweetman, J.N., (2022). The role of organic nutrients in structuring freshwater phytoplankton communities in a rapidly changing world. *Water Research*, p.118573.
- Rutty, M., Hewer, M., Knowles, N. and **Ma, S.** (2022) Tourism and climate change in North America: regional state of knowledge. *Journal of Sustainable Tourism* pages 1-24.
- Scott, D., Knowles, N.L.B., **Ma, S.**, Rutty, M., and Steiger, R. (2023) Climate change and the future of the Olympic Winter Games: Athlete and coach perspectives, *Current Issues in Tourism*, 26:3, 480-495, DOI: 10.1080/13683500.2021.2023480
- Trubitt, M. B., & **Lockhart, J. J.** (2022). Current Research: Architecture within. *Caddo Archeology Journal* 47.
- Villanueva-Díaz, J., Stahle, D.W., Mills Poulos, H., **Therrell, M.D**., Howard, I., Martínez-Sifuentes, A.R., Hermosillo-Rojas, D., Cerano-Paredes, J., and Estrada-Ávalos, J. (2022). Climate and the radial growth of conifer in borderland natural areas of Texans and Northern Mexico. *Atmosphere*, 13(8) pp. 1326
- Wachira, C.M., Njambuya, J.W., and **Ndiritu, G.G**. Impacts of land use types on shallow groundwater quality sources in Mathira East Sub-County in Kenya, (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-2557070/v1]