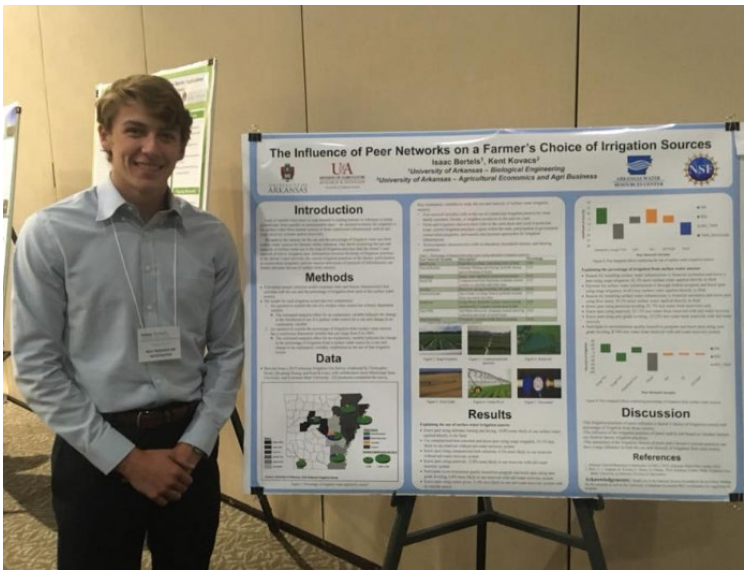
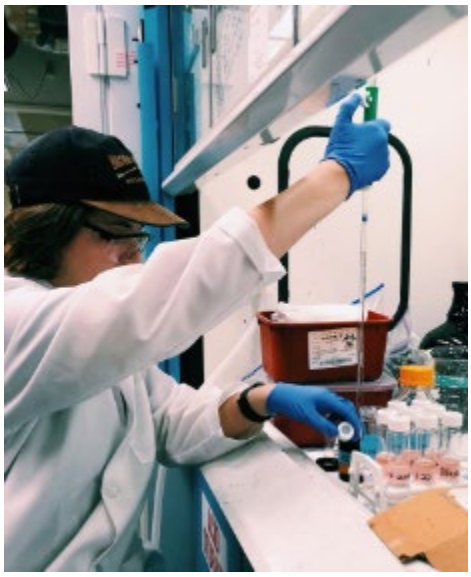
Gabriel Yerdon - **The Effects of Prairie Degradation and Restoration on Box Turtle Thermal Ecology**: The loss of prairie habitat in the United States, including Northwest Arkansas which has also lost most of its historic tall grass prairie, has caused population declines in many prairie specialist species. Simultaneously, the Ornate Box Turtle (*Terrapene Ornata*), which is a prairie specialist species, has experienced population declines in the state and it is currently listed as a Species of Greatest Conservation Need in Arkansas. Three-toed Box Turtles, primarily a forest species, have much more stable populations in Arkansas, and at times utilize the same remnant prairie as *T. ornata*. Limited information exists on the differences in thermal biology between these species and how those differences may influence their ability to utilize different habitat types. We approached these questions in a three part study. We completed evaporative water loss trials on turtles of both species. Afterwards, we returned these wild caught turtles to their remnant prairie capture sites with iButton data loggers and radio trackers attached to their carapaces. In addition, we placed turtle operative temperature models in degraded prairie, remnant prairie, and forest macrohabitats, and refugia, open and vegetated microhabitats. We found that *T. ornatahad* significantly lower rates of water loss, and tended to experience higher average and maximum carapace temperatures, and lower minimum carapace temperatures. *T. ornatatended* to use more open habitat while *T. carolinawere* more often found in forested habitat and were more likely to use refugia. Operative temperature models recorded higher average temperatures in degraded prairie than forested or remnant prairie habitat, while forest habitat maintained stable, cool temperatures, and remnant prairie had a wider range of cool refugia microhabitats and hot open microhabitats. Our results demonstrate key differences in box turtle thermal biology, and highlight important thermal characteristics of different habitat types that should be considered in *T. ornata* conservation planning.

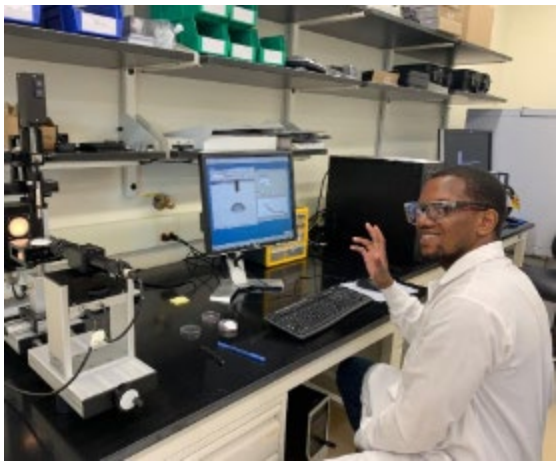
Karina Arellano - **The Effects of Soil Moisture and Temperature on Soil Respiration in a Silvopasture**: The purpose of this study was to compare unshaded and shaded regions of an agroforestry research site and quantify soil respiration in each region. We expected to see the unshaded regions to respire more than the shaded regions because of the higher temperatures from the lack of shade and the higher amounts of moisture due to less root competition.

Isaac Bertels - **Peer Networks of Irrigation Practices and the Choice of Irrigation Sources: Irrigation water is a critical resource for agriculture in Arkansas**. Depleted groundwater levels in the Arkansas Delta suggest the need for alternative sources of irrigation water such as surface water from on-farm collection. Understanding the use of alternative water sources for irrigated agriculture in the state can inform policy makers where to invest in surface water infrastructure. Peer networks of irrigation practices can influence the decision of farmers to pursue infrastructure investments in surface water, as well as the financial capital available to them for investments. We use survey responses from Arkansas irrigators to analyze the determinants of the participation and intensity of surface water use.





Lydia Ruben **Assessing the Impact of Chlorine-Boosting on Haloacetic Acid Formation in the City of Fayetteville Drinking Water Distribution System**: When we chlorinate water, we often form what are known as Haloacetic acids, a disinfectant byproduct. These are created when chlorine-based disinfectants meet the organic matter in the water. There are nine Haloacetic acids found in water, but only five of them are regulated by the environmental protection agency. This project focuses on the five regulated Haloacetic acids, but also takes notes of any of the unregulated ones that may appear in the data.



Jesutofunmi Palmer - **Tunable Coatings of Tempo-Oxidized Cellulose for Moisture and Gas Barrier Applications**: Cellulose nanomaterials (CNMs) are derived from plant matter and are comprised of nanoscopic cellulose crystals and fibers. It has a wide and diverse set of applications from cosmetics to oil recovery. This study focuses on the properties of Oxone-mediated TEMPO-Oxidized cellulose nanomaterials (OTO-CNMs) as well as explores the use of OTO-CNMs to control the gas and alkyl ketene dimers(AKD) wax to control the moisture properties of OTO-CNM coated substrates. This research utilized dipping and spraying applications as an innovative methodology to apply OTO-CNM and AKD wax modifications to the surface of polyvinyl difluoride (PVDF) supports. This study hopes to further the research in the application of CNM coating and films used in food products as well as establish an innovative technique to apply such coatings.The cup method, gas transport, SEM microscopy, tensile strength, contact angle, and FTIR Spectroscopy will be used to test the effectiveness of the modified OTO-CNMs barriers.

Lori Huck - **Assessing Preparative and Instrumental Techniques for the Analysis of Phosphorus**: Phosphorus is a naturally occurring nutrient that can be beneficial toplant and animal life in and around streams, rivers, and lakes. While occurring naturally, phosphorus can also be a by-product of runoff from waste from animal farms, agriculture fertilizer, organic wastes in sewage, as well as runoff from industrial wastes. Normal levels of phosphorus in uncontaminated water is between 0.01 and 0.03mg/L. Levels between 0.025-0.1mg/L stimulate growth of aquatic plants and algae while 0.1mg/L is the maximum acceptable level to avoid accelerated eutrophication. Eutrophication and its consequences are greatly accelerated at levels above 0.1mg/L. We tested several methods for measuring phosphorus to determine 1) How can we quickly, efficiently, and cost effectively measure phosphorus in water ways? 2) and 3) How can we more quickly, efficiently, and cost effectively measure this phosphorus?

Greta Savitsky - **Headwater Stream Algal Response to Nutrient Increase Across Flow Regime**: Anthropogenic processes in theOzark Interior Highlands of Arkansas and Missouri have greatly increased the amount of nutrients flowing into stream headwaters. This has the

potential to change the nutrient content of the stream ecosystems, affecting both biotic and abiotic aspects of the streams. Primary producers are highly vulnerable to nutrient fluctuations, which can reverberate up the food chain, changing ecosystem dynamics across all trophic levels. Eutrophication, or widespread algal blooms due to high nutrient content of agricultural runoff and other anthropogenic sources, is a well-known process, but less research has been done investigating how increased nutrients affect algae within different types of streams. In the Ozark Highlands, streams are categorized into several different flow regimes based on many aspects, including where water originates. We explore two different headwater stream flow regimes: runoff flashy and groundwater flashy. In this study, I seek to understand algal responses to increased amounts of Nitrogen and Phosphorus in headwater streams and how this differs by flow regime. We found that increased nutrients (nitrogen and phosphorus) had a significant effect on algae growth and that different sites showed different nutrient limitation on algae.

Ella Schultz - **The Effects of Anthropogenic Salinization on Fungal Biomass and Reproduction with an Emphasis on Sodium Chloride**: Riparian and stream ecosystems can be heavily affected by anthropogenic salinization, most particularly by the excess build-up of ions that it produces. Build-ups of excess ions could potentially alter an entire ecosystem, either negatively or positively, if decomposers such as fungi are affected. Fungi play an especially important role in detrital decomposition and carbon transferring through their ability to degrade recalcitrant materials that bacteria alone are unable to process. Therefore, an effect on fungi has the potential to both directly and indirectly alter multiple trophic levels. In this study we utilized a mesocosm experiment to observe the effects of sub-lethal additions of NaCl on aquatic hyphomycetes. Our goal was to better understand what effects anthropogenic salinization have on fungal respiration rates, sporulation rates, and biomass measurements in order to add to the small pool of knowledge about this overlooked topic.

Alyssa Ferri - **The Biological Treatment of Hydroponic Wastewater using Spent Substrates as a Carbon Source for Denitrification**: Hydroponic cultivation of fresh produce requires fertilizer-rich irrigation water containing nutrients in excess of what is taken up by plants. Spent nutrient solutions cannot be reused due to the potential of plant pathogen accumulation and differential uptake of nutrients. Therefore, spent nutrient solution is released into the environment and poses risks such as eutrophication. A passive biological method such as denitrification may be away to inexpensively treat wastewater, but heterotrophic microbes require an organic carbon food source that must be added to otherwise carbon-limited wastewater. One potential source of carbon is from spent grow mats since the mats cannot be reused. This study observed the generation of bioavailable carbon from the anaerobic digestion of BioStrate™ mats and BioStrate™ mats with leaf waste in water. In the BioStrate™ treatments, total organic carbon increased from Week 0 until Week 1,then declined. Ammonia and ammonium concentrations increased in the BioStrate™ treatments from Week 0 to Week 3. The production of ammonia may be due to dissimilatory nitrate reduction to ammonium since nitrogen was the limiting nutrient. Furthermore, anaerobic digestion could have proceeded into fermentation and acidogenesis, breaking down desired organic carbon polymers into undesired forms. Two systems, are circulating and a non-recirculating, were built to denitrify hydroponic wastewater with the carbon digestion liquid. The recirculating system was built to treat 8 L of water a day with a retention time of 3.8 hours. Environmental conditions, nutrient concentrations and bacteria present may influence the pathways of nutrient conversions. Future research is necessary to understand the factors that influence sustained organic carbon production from anaerobic decomposition.