

Emerging Scholars Program

2024-2025 Job Descriptions

POSITIONS OFFERED IN THE FOLLOWING FIELDS:

- ⇒ ARTS**
- ⇒ BUSINESS & COMMUNICATIONS**
- ⇒ ENGINEERING & COMPUTER SCIENCE**
- ⇒ HUMANITIES**
- ⇒ NATURAL SCIENCE**
- ⇒ SOCIAL SCIENCE**

ARTS

Position #1 China's Overseas Architecture. A database of spatial and social effects of China's driven urban development in foreign countries.

Mentor Name: Francesco Carota

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: By 2020, over 1,000 buildings had been delivered by China to more than 160 countries. So far, academic literature have mainly focused on the historical and cultural background of these buildings, while their impact at the urban level has largely been overlooked or misunderstood by the international community. The research program ""China's Overseas Architecture"" aims to fill this gap by mapping the outcomes of Chinese driven architectural endeavors in the world, evaluating their impact in spatial, societal, and environmental terms. The research is conducted through both qualitative and quantitative methods. The first three phases of the research, in which Research Assistant(s) will be mainly involved, are structured as follows:

- First, we will build a large database of China's financed, design and constructed building in the world. Buildings will be organized according to dates, location, built area, investment, building typology etc.
- Second, for selected buildings we will carry out analysis at the urban scale. We will collect through GIS technologies large amount of data (including but not restricted to business activities,).
- Third, we will draw large amounts of maps displaying all acquired data, which will be used to extract further considerations on the effects of China's transnational architecture practices on urban development in selected contexts.

Potential Job Tasks & Responsibilities: The student will work to build up and organize a large data base on Chinese overseas architecture and contribute to its analysis and diffusion. More specifically, student(s) will carry on the following tasks:

- On the basis of different sources (scientific papers, newspapers, websites) the Research Assistant(s) will firstly help to build a database of Chinese overseas buildings, organizing them according to instructions and categories given by the mentor.
- The Research Assistant(s) will engage with the mentor and the broader research team to run analyses and create maps with acquired data.
- Finally, the Research Assistant(s) will assist with tasks related to preparation of research project's outputs (website, social media, and scientific publications). Such tasks may include data transcription, layout development, and graphic adjustments."

Student Qualifications & Characteristics: Student(s) should be curious, organized, detail oriented and independent in managing their time. Student(s) is/are required to work about s 6-7 hours per week remotely and/or in office and meeting with the supervisor weekly (meeting hours are flexible). Student(s) are required to:

- Being able to use a personal computer.
- Being able to do online browsing and organizing documents and data.
- Possessing basic skills in Microsoft Excel (inputting data on the basis of the classification system given by the supervisor).
- Possessing basic skills in InDesign (not required but encouraged)."

Position #2 Stadia Urban Science and Data Visualization

Mentor Name: Gustavo Amaral

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: Stadiums are unique architectural structures that significantly impact urban areas. While they are privately owned, they are deeply intertwined with the social and political fabric of their communities. Understanding how stadiums interact with their urban surroundings is crucial for making informed decisions about future stadium construction projects.

This research project focuses on analyzing the performance of existing urban stadiums by examining their relationship with the surrounding street network, which includes streets, intersections, nearby economic activity, and human interaction as observed through social media. The aim is to gain a thorough understanding of how stadiums, especially the new generation of MLS stadiums, attract or deter business, and how changes to the street layout and city economy can affect the urban environment positively or negatively.

Successful completion of this project could provide valuable insights to developers, aiding in the selection of suitable locations for stadium projects. Furthermore, by extending the analysis to other types of buildings, this research could also assist in planning various types of urban development projects.

Potential Job Tasks & Responsibilities: The student will work to build up and organize a directory on data collected and contribute to its analysis and diffusion using basic Adobe software. More specifically, student(s) will carry on the following tasks:

1. On the basis of different sources (scientific papers, newspapers, websites) the Research Assistant(s) will firstly help to build a database of MLS stadia, organizing them according to instructions and categories given by the mentor.
2. The Research Assistant(s) will engage with the mentor and the broader research team to run analyses and create maps with acquired data using Adobe software.
3. Finally, the Research Assistant(s) will assist with tasks related to preparation of research project's outputs (website, social media, and scientific publications). Such tasks may include data transcription, layout development, and graphic adjustments.

Student Qualifications & Characteristics: Students should demonstrate curiosity, organization, attention to detail, and independence in time management. They are expected to work approximately 6-7 hours per week, either remotely or in the office, and attend weekly meetings with the supervisor (meeting hours are flexible). Specifically, students should:

1. Be proficient in using a personal computer.
2. Be capable of online browsing and organizing documents and data.
3. Have basic skills in Microsoft Excel, including data input based on the supervisor's classification system.
4. Have basic skills in InDesign (encouraged but not strictly required).

Position #3 Undergraduate Research Assistant

Mentor Name: Bushra Nayeem

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 3

Project Description: Just Environment Lab (JEL) is seeking undergraduate students who will assist in the development of content for website updates, newsletters, and related communications regarding sustainable architecture and urban environment. Student will work as a research assistant and participate in monthly professional development activities. This is a part of the Emerging Scholars Program that provides research experiences for students during their first year at KU and supports their overall transition to college. Students who are enrolled in architecture, humanities, environmental engineering, design, interior architecture, structural engineering are welcome to apply.

Potential Job Tasks & Responsibilities:

1. Work 4-7 hour per week as a research assistant for a research mentor for the fall and spring semesters (August through May). All positions are entry level and do not require previous research experience.
2. Attend paid monthly one-on-one meetings with a peer mentor who was in Emerging Scholars during their first year at KU. This peer mentor will guide you as you develop as a researcher and as you adjust to life in college.
3. Complete paid monthly activities and attend paid monthly professional development sessions through the Center for Undergraduate Research.

Student Qualifications & Characteristics:

1. Good writing, reading and communication skills
2. The student should be self-directed and able to prioritize tasks.
3. Basic skill of using email, Microsoft Office Suite, as well as web browser applications.
4. Students who are enrolled in architecture, humanities, design, interior architecture, structural
5. engineering are welcome to apply

Position #4 Reclaiming Home: Remembering the Topeka Bottoms

Mentor Name: María Velasco

Job Location: This position could be done remotely or in-person. **Number of Positions:** 2

Project Description: “Reclaiming Home” will tell the story of Topeka’s Bottoms neighborhood through oral history, a documentary and art. In the 1950s and ’60s, more than 3,000 Topekans were forced to leave their homes and businesses in the Bottoms district in downtown to make way for new real estate development as part of the Urban Renewal Project. The area, covering more than 20 blocks, was the heart of a thriving Black business district and robust Latinx community.

“Reclaiming Home” aims to reclaim the stories of these displaced communities through the use of oral histories, community mapping, a documentary and an exhibit that recreates the neighborhood through art — all at a critical time when the city is planning another round of urban renovation in the same area.

Velasco has partnered with Matthew Jacobson, professor of Film and Media Studies and local historians Donna Rae Pearson and Valerie Mendoza both of the Other Roads Consulting, Inc. for this project.

“This local story, in the backyard of both the Kansas state capitol and KU, resonates during a time of national violence against Black and Brown communities” said Velasco. “We hope this project will increase civic engagement among community members by addressing historical and current inequities,” she continued.

This project is supported by Stories for All, a partnership between the Hall Center for the Humanities and the Institute for Digital Research in the Humanities at the University of Kansas, and The Andrew W. Mellon Foundation.

Potential Job Tasks & Responsibilities:

Primary Activity: 1) converting audio & video to text files, essential for final editing and film subtitles. We plan to conduct about 20-30 interviews, and other activities. Transcripts are part of the workflow to carry the project to completion. Student doesn't need to be present for filming and will be trained to handle the audio and video files for logging, transcription, and basic organization.

Secondary Activities: 2) assist crew during filming sessions and community activities in Topeka location - if available, mostly Fri-Sun, but not required. No need to have own transportation, as there will be ride-share.

Student Qualifications & Characteristics: Students with an interest in Film, Art, History are welcome to apply. No previous experience is necessary. There will be weekly or bi-weekly meetings to review progress and make sure that we are meeting our deadlines. We are looking for a student who pays attention to detail, is organized, and reliable. This is a great project to be involved with and learn about our community and the little known history of the Topeka Bottoms, right here. This project offers students diverse research opportunities through the lens of art, film, and history.

BUSINESS

&

COMMUNICATIONS

Position #5 Working with AI

Mentor Name: Cameron Piercy

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: Are you interested in how people work with complex technologies (like algorithms, artificial intelligence [AI], and robots)? This is an opportunity to understand how people work with complex technologies in everyday work. In this position, you will help track new findings in technology at work. We'll work together with the other members of the HMC lab on experiments and surveys to better understand AI in everyday life. The only requirement is an interest in technology and work.

Potential Job Tasks & Responsibilities:

- Find and summarize new research on technology and relationships.
- Help maintain a growing database of human-machine communication research (see <https://hmc.ku.edu>)
- Help design and collect experimental data involving interaction with AI.
- Create and distribute new surveys to folks who work with emerging technologies like algorithms, artificial intelligence, and robots.
- Meet weekly with lab members.
- (Optional) Students who are interested in coding may have opportunities to learn and practice coding.

Student Qualifications & Characteristics: Scheduling is flexible, students can work in-person or online. Interest and curiosity are the most important skills for students considering this job. This position is suitable for social science students (e.g., students from psychology, sociology, public administration, communication studies, business) or professional programs (e.g., computer science, engineering) are welcome to apply.

Additional Comments: Check out my website: <https://hmc.ku.edu/> We have graduate and undergraduate students in the HMC lab and we're always glad to expand.

Position #6 Developing model agnostic methods for machine learning interpretability

Mentor Name: Karthik Srinivasan

Job Location: This position could be done remotely or in-person. **Number of Positions:** 3

Project Description: Machine learning and artificial intelligence algorithms use data to assist humans in decision making. They have been shown to be effective in solving complex problems in multiple problem domains including autonomous driving, medical diagnoses, cybersecurity, financial fraud, etc. It is often the case that more the complexity of the algorithms, better is their performance. But the complexity of the algorithm, commonly termed as its 'black-box', reduces the human interpretability of these systems. Humans as end users often prefer machine learning systems that are more interpretable as it garners trust and transparency in functionality. The project involves developing novel methods for improving interpretability of machine learning models. On successfully completing the project, the student will have a better understanding of machine learning interpretability, academic research methodologies, and a direction to pursue to a research intensive career in future.

Potential Job Tasks & Responsibilities: Reading literature in model-agnostic methods in machine learning interpretability (MLI) discipline. Brainstorming on basic methods such as Local Interpretable Model-Agnostic

Explanations (LIME), SHapley Additive exPlanations (SHAP) and its extensions such as Autoencoder LIME (ALIME), TreeSHAP, etc. Implementing existing models on sample datasets using R/Python, based on my step-by-step guidance.

Student Qualifications & Characteristics: I would require the student to have read relevant chapters from the Interpretable Machine learning book by Christoph Molnar <https://christophm.github.io/interpretable-ml-book/> and interpret the readings in their own words. The student should be interested in mathematics and analytical thinking. Data analysis skills and knowledge of programming software such as R or Python are not necessary but preferable and can be learned during the RAship. Important traits expected from the student include the desire to learn new topics such as machine learning interpretability and openness to do basic programming in either R or python. I would prefer blocking a suitable time of 1hr/week to discuss on zoom about progress and future steps.

Position #7 Media Studies Maven

Mentor Name: Judy Watts

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: If you are interested in understanding how television, film, and entertainment influence audiences, then apply for this research assistantship! This position is based in the School of Journalism and Mass Communication and will assist Dr. Watts in conducting research on media effects. No prior research experience or statistical knowledge is necessary for this position. Broadly speaking, students can expect a variety of tasks that include all phases of a research project, from preparation to data collection to data cleaning. Most of these tasks can be done remotely and at a time of the student's choice. An internet connection and computer are necessary to fulfill research assistance duties.

The research being conducted by Dr. Watts covers how audiences enjoy entertainment media, are persuaded by mass media, and learn information from popular television shows, movies, and/or books.

The types of research support in the school year 2024-2025 may involve coding YouTube videos, coding audience responses toward television shows, and support with light video editing or message design for research stimuli. Additional research studies and topics may arise throughout the year, and students are welcome to propose media studies if desired.

Potential Job Tasks & Responsibilities: Students may assist with various tasks and responsibilities according to their interests and skill levels. Examples include assistance with stimuli creation, which may involve editing clips of television shows, writing, and/or graphic design. The student worker may assist with data collection by sending reminder emails to research participants to take part in studies. Assistance may also be needed in coding open-ended data and videos. Finally, the research assistant will help with manuscript preparation by conducting searches on Google Scholar for appropriate academic research, etc.

Student Qualifications & Characteristics: A successful student worker will be curious, well organized, and have attention to detail. Although not necessary, those interested in learning about the effects of media and entertainment on behaviors and attitudes are encouraged to apply. Meetings will occur weekly. The applicant should be able to set aside an hour for weekly check-in meetings (in person or remotely). Finally, the student should be able to work independently.

ENGINEERING

Position #8 Exploring Water Adsorption on Surfaces using Nuclear Magnetic Resonance (NMR). [cross-listed with Transfer Scholars Program]

Mentor Name: Alan Allgeier

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1

Project Description: Research in the KU Center for Environmentally Beneficial Catalysis seeks to help the world use less petroleum fossil resources and use biorenewable / agricultural resources instead. As an example, polyester could be made from corn instead of from crude oil. When we make materials from crops, it is essential that we do reactions that dehydrate cellulosic biomass. Many of these reactions happen at the surface of a catalyst, which makes the reactions go faster but doesn't change their energy. To improve our catalysts, we want to know if the water is released from the surface or if it remains adsorbed to the surface. It's a challenging problem. Water molecules are too small to see, so we use advanced analytical instrumentation including Nuclear Magnetic Resonance (NMR).

The goal of this research is to develop an NMR method to prove that water molecules adsorb strongly on the catalysts that do not perform well and adsorb weakly on catalysts that perform better. If the water is desorbed from the surface, we expect that dehydration of cellulosic biomass will improve in both rate and yield."

Potential Job Tasks & Responsibilities: Student researchers will learn the basics of operating the NMR instrument and the science behind this technique. At the beginning, they will spend time reading about catalysts and their use in turning cellulosic biomass into materials. In lab, students will always be supervised by a professor or graduate student and will prepare mixtures of solid catalysts in solvents that contain different amounts of water. In doing so, they will use laboratory balances and precise pipettors. After preparation, each mixture will be characterized using the NMR instrument. The measurement involves placing the sample in a tube inside the instrument and using the computer to collect the data. Each measurement takes just 3 minutes to complete so we can collect a lot of data rapidly. Students will learn to analyze their data using the NMR computer software and also Microsoft Excel®. This aspect involves plotting graphs and making comparisons, e.g. three different concentrations of water will be compared. The student will also work in a team with a graduate student, who will be responsible for running reactions and together they can analyze how the NMR data correlates to the reaction data. A weekly meeting with the professor is an obligation. During this meeting they will discuss what has been happening in research and what new activities are required in the coming week.

Student Qualifications & Characteristics: A student who has passion for improving environmental sustainability through scientific research will be most appropriate for this assignment. Success in and enthusiasm for high school chemistry is essential, along with an aptitude for doing calculations of proportions / ratios. Attention to detail and interest in doing hands on work in a laboratory are critical. The student must be able to devote at least one 3 h block of time per week to the laboratory research, along with other smaller blocks that lead to 4-7 hours total. Students interested in chemistry, chemical engineering or other types of engineering are particularly encouraged to apply.

Position #9 Undergraduate Project Assistant [cross-listed with Transfer Scholars Program]

Mentor Name: Claudia Bode

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 1-2

Project Description: Along with the opportunity to be involved in research activities related to our National Science Foundation-funded project, the Undergraduate Project Assistant may participate in the following activities:

1. Create project focused social media postings on Facebook, Twitter, and Instagram
2. Engage with community partners and team members in designing education, outreach, and research activities
3. Contribute to writing blogs
4. Participate in team meetings
5. Other tasks that spark the student's interest"

Potential Job Tasks & Responsibilities:

1. Interest and willingness to learn about resilience & social equity
2. Interest in social media
3. Experience with Microsoft Word, Excel, Outlook, and PowerPoint
4. Student should be comfortable working independently with supervision as well as on a team
5. Interest in science communication.

Student Qualifications & Characteristics:

Position #10 Electrocatalysis - Chemical Engineering [cross-listed with Transfer Scholars Program]

Mentor Name: Elizabeth Corson

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1

Project Description: Nitrate pollution of ground water is the most common inorganic contaminant in Kansas and is dangerous for human consumption. Rural residents of Kansas face the highest risk from nitrate contamination. This project investigates electrochemical reduction of nitrate, which uses electricity to produce clean water and ammonia, a fertilizer. Electrochemical nitrate reduction is ideal for rural communities: it can be done at small scales, uses renewable electricity, and eliminates the need for hazardous chemicals. The key challenges are low selectivity, which requires costly separation, and low efficiency, which increases the operating costs from electricity. We seek to improve the selectivity and efficiency of nitrate reduction to ammonia through nanostructured electrodes.

Potential Job Tasks & Responsibilities: You will work closely with a graduate student mentor to conduct research on this project. Activities in the lab may include preparing chemical solutions, fabricating nanostructured electrodes, assembling electrochemical reactors, and conducting electrochemical experiments. No prior lab experience is necessary, we will teach you everything you need to know to conduct research and be safe in the lab.

In addition to lab work, you will meet weekly with your graduate student mentor (30 min, in person or virtual) and be invited to attend weekly research meetings (1 hour, in person or virtual). Occasional remote work may include data analysis (Excel), creation of figures and graphs (Excel, PowerPoint), and reading journal articles. There will be the

opportunity to continue as an undergraduate researcher beyond the Emerging Scholars program, based on your interest and performance.

Student Qualifications & Characteristics:

1. Desired behaviors: email responsiveness, good time management, attention to detail, organization skills, willing to learn, curiosity, asking questions.
2. Able to participate in in-person experimental activities.
3. Majoring in Chemical Engineering or a similar engineering or science field.
4. Familiarity with Microsoft Excel, Word, and PowerPoint.
5. 5. Available to work in the lab during normal business hours for at least 2-hour blocks of time. "

Additional Comments: The Corson Lab is at the Center for Environmentally Beneficial Catalysis (CEBC) at 1501 Wakarusa Dr, Lawrence, KS 66047. There is ample free parking and a convenient bus (#8) from campus.

Position #11 Wetlands for water quality – how do plants and water movement enhance contaminant removal?

Mentor Name: Amy Hansen

Job Location: The job requires the student to work in-person only. **Number of Positions:** 2

Project Description: Streams and rivers are often polluted by excess nutrients making their waters unfishable, unswimmable, and undrinkable. Wetlands that exchange water with streams and rivers, for example wetlands located in a river's floodplain, can significantly improve water quality by slowing water down and supporting plants and microbes that remove nutrients. In this project we will develop an experimental setup and collect field observations from local wetlands to investigate conditions where vegetation and water velocity have enhanced rates of nutrient removal. A second goal of this project is to promote healthy wetlands and streams by developing outreach activities aimed at the general public.

Potential Job Tasks & Responsibilities: In this project, the emerging scholar will work with other students to test experimental setups in the laboratory and in local wetlands. They may measure water velocity, collect water and soil samples, prepare samples for analysis, and complete general laboratory-based tasks. The student will also download data from sensors and create graphs to share experimental results. In the springtime, the student may participate in outreach events at Baker Wetlands. No experience is necessary - the student will be trained on the job and work closely with other members of the research group. After students have gained experience with the equipment and lab protocols, they may develop an independent research question to be tested in parallel to the planned experiments.

Student Qualifications & Characteristics: A flexible yet determined mindset is needed for experimental work to be successful. Many times, in the early stages of an experiment, things do not go the way you plan, so a willingness to ask questions and think creatively is also important. Our research is both outdoors and in laboratories so the student should be ready and willing to get their hands wet and often muddy. Finally, much of the work will be in collaboration with other students so clear communication and consistent work times is required.

Position #12 Enzymatic depolymerization of novel biopolymers [cross-listed with Transfer Scholars Program]

Mentor Name: Justin Hutchison

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1

Project Description: Plastics are produced mainly from non-renewable fossil-based resources and global plastic production reached 367 million tons in 2020. It is estimated that 150-200 million tons of plastic were accumulated in landfills worldwide. Since the discovery of the plastic-eating bacteria *Ideonella sakaiensis*, biocatalytic depolymerization is of growing interest to promote a circular plastic economy. The near-complete commercialization has been used to recycle polyester socks into plastic bottles. Despite its promising potential, enzymatic depolymerization may be limited by factors such as pH, buffer strength, crystallinity, and particle size. Although the biocatalytic plastic recycling method is still challenging for industrial-scale application, enzymatic depolymerization has been considered one of the most environmentally benign options, as no hazardous catalysts and no harsh process conditions are employed.

The project will use two wild-type biocatalysts (TfCut2 and LCC) and the activity-optimized, heat-stable cutinases (G62A/F209A TfCut2 and ICCM LCC) biocatalysts to depolymerize. Students will be responsible for growing organisms to produce the enzymes used in the study. The enzymes will be used to depolymerize novel biopolymers in collaboration with researchers across Kansas and Delaware.

Potential Job Tasks & Responsibilities: The student will be responsible for growing *E. coli* and producing necessary enzymes. Students will also have the opportunity to test depolymerization of PET plastic.

Student Qualifications & Characteristics: Students should be willing to participate in in-person experimental activities. Students should be familiar with (or willing to learn) Excel to manage data. Students interested in Environmental Engineering, Environmental Science, or Biological Sciences may find the work better aligned with their professional interests.

Position #13 Evaluating dimensions of equity for drinking water distribution systems. [cross-listed with Transfer Scholars Program]

Mentor Name: Justin Hutchison

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 1

Project Description: Rural water districts serve some of the most disadvantaged populations in Kansas and rely on extended distribution networks that pose chemical and biological hazards. These hazards arise due to extended water age that can climb to 28 days or longer in significant wet weather events (rural water networks also supply a portion for irrigation, and demand is reduced in wet weather events). Within the last ten years, there has been more evidence of pathogen growth within water distribution systems, especially if the residual disinfectant is reduced, including *Legionella* and *Mycobacterium*. This project seeks to address two fundamental research questions:

What is the threat of residual disinfectant breakdown and the rise of drinking water pathogens on rural water networks before, during, and post-disaster events?

How do water quality considerations integrate with measures of social equity to influence decisions related to the installation and maintenance of disinfection booster points?

The project will use open-sourced software to create drinking water distribution systems. The system performance will be evaluated for the decrease in residual disinfectant and the rise of opportunistic pathogens.

Potential Job Tasks & Responsibilities: The student will help create a water distribution system for one Kansas community. This network will be developed in US Environmental Protection Agency software, EPANet, and tested in the Water Network Tool for Resilience (WNTR). The student will be able to interact with a large team of researchers looking at Adaptive and Resilient Infrastructure driven by Social Equity (ARISE, <https://nsfepscor.ku.edu/track-1-arise/>). The Emerging Scholar would be paired with a senior undergraduate researcher to accomplish these tasks.

Student Qualifications & Characteristics: Students should be willing to learn new software platforms, including EPANet. Students should be familiar with (or willing to learn) Excel to manage data. Students interested in Environmental Engineering or Environmental Science may find the work better aligned with their professional interests.

Position #14 Human Robot Interaction Studies

Mentor Name: David Johnson

Job Location: In-person **Number of Positions:** 2

Project Description: The purpose of the project is to study the interaction between a human and a humanoid robot programmed to act as a companion to the human. As a companion, the robot will be designed to engage the human in conversations that might typically occur between two human companions. A lot of the work will be testing different robot programs to see which ones cause the human to want to engage in a conversation with the robot. **Potential Job Tasks & Responsibilities:** The student will learn how to program a humanoid robot to interact with humans. Then, the student will conduct experiments to collect data on the interaction between humans and the robot using standard methods. The ultimate goal will be for the student to prepare a research paper for submission to a scientific journal.

Student Qualifications & Characteristics: Currently enrolled in or have completed EECS 138, EECS 168, or equivalent high school or middle school programming course.

Position #15 Studying driver behavior and its impact on roadway safety and efficiency.

Mentor Name: Alexandra Kondyli

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 1

Project Description: Driver behavior is an important factor that affects both the safety as well as the efficiency of the transportation system. Each driver perceives the driving environment differently, therefore, understanding driver behavior variability will significantly help us with developing strategies and methods to improve safety and transportation efficiency. In this project, we will investigate how driver behavior is affected by different roadway conditions and features, using driving simulator experiments. We will also investigate how drivers use in-vehicle systems to better understand driver distractions.

Potential Job Tasks & Responsibilities: The emerging scholar is expected to collaborate with other graduate students to design driving simulator experiments, assist with data collection and human-subjects research, and extract and analyze the collected data. The driving simulator collects a great variety of data from each driver, such as speeds, accelerations, vehicle position and trajectory, distances with other vehicles, eyelid and pupil diameter, etc. The emerging scholar will assist in downloading and sorting these data and creating formats and graphs that

can be used in future analysis. The emerging scholar will be trained on these tasks by the mentor and other graduate students, so prior knowledge or experience is not required.

Student Qualifications & Characteristics: This is collaborative work, therefore, the emerging scholar should be able to communicate effectively with other students and be available to support, when required. Basic skills in using MS Office tools (Word and Excel) are needed. Prior knowledge or other technical skills are not required. Some work/presence in the KU Driving Simulator lab is required during data collection, while other analysis work can be done remotely.

Position #16 Computer vision and Artificial Intelligence for the built environment

Mentor Name: Jian Li

Job Location: The job requires the student to work in-person only. **Number of Positions:** 2

Project Description: With the support of the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law, over the next ten years, the long-overdue investments in maintenance, rehabilitation and replacement of the US infrastructure have finally had a chance to slowly catch up. However, effective spending of taxpayers' money requires timely and accurate understanding of the in-situ health condition of civil infrastructure at scale for informed funding allocation. In the meantime, climate change and its associated uncertainties have not only exacerbated the deterioration of civil infrastructure, but also made future structural conditions more unpredictable. Building on advanced sensing, computer vision, and data analytics, my research seeks to formalize cost-effective and robust structural health monitoring (SHM) and novel inspection techniques for assessing the integrity of critical civil infrastructure. These systems also enable learning the long-term behavior of individual structures and a network of structures for improving modeling, design, and construction.

The Smart Structures and Earthquake Engineering (SSEE) group aims at developing cutting edge sensing and structural health monitoring (SHM) technologies to ensure safety of civil engineering structures (e.g., buildings, bridges, dams, highway auxiliary structures, etc.) under operational and extreme loading conditions including earthquakes and strong wind, etc. Analogous to human health diagnosis and monitoring, we take various kinds of measurements from structures such as acceleration, strain, temperature, and images/videos, and use various algorithms including artificial intelligence and machine learning to uncover the physical condition of structures (damage or deterioration). With such understanding of structural integrity, informed maintenance or repair can be performed to improve the sustainability and resilience of structures.

Potential Job Tasks & Responsibilities: Tasks include assisting with image acquisition, field visits, image labeling, machine learning model training, and participating in weekly group discussions.

Student Qualifications & Characteristics: Show interest in structural engineering and would like to try new things from other disciplines (such as computer science and electrical engineering, computer vision, artificial intelligence, machine learning) to improve the civil infrastructure integrity and hence the well-being of society.

Position #17 Engineering Research on Next-generation Lithium-ion Batteries

Mentor Name: Lin Liu

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: Currently, we are supported by NASA and National Science Foundation to develop a next-generation rechargeable battery; The students will work approximately 4-7 hours per week during academic sessions in the research laboratory of Dr. Lin Liu at the KU Lawrence campus. Dr. Lin Liu research program involves electrochemistry modeling and experimentation including but not limited to batteries and fuel cells design and fabrication. The students will initially assist Dr. Liu and his graduate students in specifying, acquiring, and troubleshooting new instrumentation for the lab, and subsequently, designing experiments, performing experimentation.

Potential Job Tasks & Responsibilities: The duties may include:

- Designing and conducting experiments involving prototypes of next-generation battery concepts, and/or novel designed biomimetic self-assembled, hierarchical nanostructure.
- Simulating batteries and fuel cells electrochemical performance during calendar life and cycle life.
- Assisting in the specification and calibration, testing, and characterizing of various instruments.

The students will also:

- Review the pertinent literature.
- Fabricate newly-design batteries or fuel cells.
- Analyze data.
- Prepare and present routine summaries and presentations (oral and written) involving literature reviews and research results.
- Help prepare scientific manuscripts for publication.
- Prepare presentations for undergraduate and graduate research competitions.

Student Qualifications & Characteristics:

- Excellent performance in high school math classes and an interest in engineering
- Strong oral and written communication skills.
- Strong organizational and time management skills.
- Interest in learning more about graduate-level research.
- Interest in prototyping hardware in a research setting
- Interest in possibly continuing in the position through summer of 2025 and the next academic year.
- Women and minorities, and candidates who will contribute to the climate of diversity in the School of Engineering, including a diversity of scholarly approaches, are especially encouraged to apply

Position #18 Radar Data Analysis and Web Programming

Mentor Name: John Paden

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 1-2

Project Description: The Center for Remote Sensing and Integrated Systems (CReSIS) designs and develops radar systems and conducts ground based and airborne field experiments in the polar regions with those systems. The 1500 TB of raw data collected by these systems over the past several decades are processed using custom signal processing and remote sensing software in a cluster computing environment. Student research assistants work with a team of engineers and scientists on a variety of research problems to understand, analyze, and serve the radar data via the web for the international glaciology science community.

Potential Job Tasks & Responsibilities: Radar image analysis, programming, and geographic information system tasks which we will provide training for. Producing reports and giving presentations at group meetings.

Student Qualifications & Characteristics: We expect qualified students to be

1. interested in learning about multi-disciplinary research (computer programming, geographic information systems, radars, or ice sheets);
2. willing to work hard and hold themselves accountable to support the project objectives and tasks and to gain the technical and academic skills required to perform the research tasks
3. interested in being a part of, and contributing to, a strong and supportive team environment that respects everyone;
4. able to pay attention to the importance of coursework and self-care, and balance that with the demands of the research position;
5. studying one of our core fields: electrical engineering, computer engineering, computer science, geology, or geography."

Position #19 Characterizing and Understanding Complex HPC and Data Science Algorithms through Visualization

Mentor Name: Hongyang Sun

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 1

Project Description: Many complex algorithms (e.g., involving matrices, graphs, and sequencing or combinatorics) in the field of data science and high-performance computing (HPC) are hard to understand, even for experts. Yet, their importance has been underlined by the many use cases that rely on these algorithms to perform essential computations and data analysis. The goal of this project is to develop tools to visualize the working of these algorithms and make them easy to understand for both education and research purposes. The project involves understanding some important algorithms in the domain through the help of the faculty advisor and using simple tools such as MS PowerPoint or more sophisticated tools such as Python animation packages to create comprehensive visualization under certain guidelines. The outcome will benefit both future students learning these algorithms as well as facilitating future research around these algorithms. This is currently considered a standalone project but could be integrated into teaching or future research projects of the faculty advisor.

Potential Job Tasks & Responsibilities: The student is expected to be familiar with MS PowerPoint (for creating visualizations) as well as basic math (for understanding the algorithms). Knowledge of the programming language Python is a plus but not required for the start. The algorithms to be visualized will be conveyed to the student upon the start of the project but the faculty advisor will guide the student along the way through regular meetings.

Student Qualifications & Characteristics: The student is expected to be motivated, responsible, and committed to the project. Regular meeting (every week or every two weeks) with the faculty advisor in person is required.

Position #20 Equity-driven Infrastructure Resilience in Kansas

Mentor Name: Elaina Sutley

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: This project, Adaptive and Resilient Infrastructures driven by Social Equity (ARISE) addresses disparities in response to extreme events that rarely consider resilience preparation and relief efforts through an equity lens. Recovery for historically underserved communities lag far behind on average. ARISE's vision is to create a new social-equity-driven paradigm for resilience analysis and a pipeline of community leaders and decision-makers who will transform how a community invests in and manages human and physical infrastructure. Using Kansas-based testbeds that span population and climate gradients, along with case studies that encompass transportation, water, and energy sectors, ARISE will build a stakeholder-informed resilience-focused research community based on: (1) a novel stochastic hetero-functional graph-theoretic (SHFGT) framework for interdependent human and physical infrastructures informed by a six-dimensional approach to measuring social equity; (2) new stakeholder relevant resilience metrics powered by novel machine-learning-based evaluation techniques; and (3) unique decision-support structures grounded in behavioral economic theories.

Potential Job Tasks & Responsibilities: The Emerging Scholar will help create the Kansas testbeds. This will include collecting population, business, and infrastructure data available online, and will help prepare and send out mailed surveys to thousands of Kansas residents. As well as contribute to the data cleaning and entry process for the returned mailed surveys.

Student Qualifications & Characteristics: Passion for social equity, interest in disasters like floods and tornadoes, and some competence in Microsoft Excel and online search.

Position #21 Undergraduate Research Assistant/ Harnessing Zero-Shot Predictive Capabilities of LLMs in Healthcare Analytics

Mentor Name: Zijun Yao

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: Recent literature has highlighted the extraordinary capabilities of Large Language Models (LLMs) such as OpenAI's ChatGPT, in zero-shot prediction tasks. Without the need for explicitly training a model on task-specific data, zero-shot techniques enable LLMs to deliver insightful predictions based solely on their pre-trained knowledge. Our project focuses on exploring the zero-shot learning potential of LLMs within the healthcare domain, particularly for predicting critical conditions of patients using longitudinal observational data. By the conclusion of the program, the participant will gain a robust understanding of the latest developments in LLMs zero-shot learning. Additionally, the emerging scholar will acquire practical experience in LLM prompting and API

automation, preparing them for further academic or professional pursuits in artificial intelligence and machine learning.

Potential Job Tasks & Responsibilities:

1. Conduct a comprehensive literature review to identify relevant research and methodologies.
2. Develop and refine prompt engineering techniques to optimize model performance.
3. Utilize LLM APIs for data collection and to evaluate model performance across various predictive tasks.
4. Collaborate with a team of senior students to design and implement effective testing frameworks.

Student Qualifications & Characteristics: Due to the demand for coding skill and literature survey, a STEM background student would be preferred.

Position #73 Fatigue & Fracture - Research in Structural Engineering

Mentor Name: Caroline Bennett

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions: 3**

Project Description: This project is aimed at exploring the structural performance of steel and aluminum highway structures, including bridges, large overhead highway sign structures, and tall lighting structures. In particular, the project is aimed at characterizing the performance of these highway structures with regard to fatigue cracking and sudden failure through brittle fracture and developing techniques to minimize such failures.

Potential Job Tasks & Responsibilities: Potential student tasks include the following:

- Preparation of laboratory fatigue and fracture tests. This could include creation/fabrication of test specimens, inspection of test specimens for fatigue cracking, and installation of instrumentation.
- Execution and monitoring of physical laboratory tests. This could include inspection of test specimens for fatigue cracking, recording test data, manipulating test data, etc.
- Involvement with computer simulations of structural behavior. This could include the creation of computer simulations, or manipulation of existing computer models.
- Manipulation and analysis of experimental and analytical data. This could include plotting data using Excel (or other software) and presenting findings in written and spoken communication formats.
- Participation in weekly research meetings

Student Qualifications & Characteristics: Successful applicants for this position should:

- exhibit responsible behaviors, including email responsiveness, good time management, attention to detail, and organization skills.
- Be interested in learning more about structural engineering, which is a subfield of both civil engineering and architectural engineering.
- Students should be available for minimum blocks of time of two hours at least a couple of occasions a week.

Additional Comments: The fatigue and fracture research group is vibrant and diverse! We aim to make the built environment safer and more reliable.

HUMANITIES

Position #22 Student Assistant, Latino Studies Journal

Mentor Name: Marta Caminero-Santangelo

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 1

Project Description: Student would assist the faculty member and GRA in research related to the journal Latino Studies. The journal is an interdisciplinary journal produced four times a year, and the faculty member is the editor in chief. Student would assist with researching books that need reviewing, checking on references, and journal outreach to solicit research submissions, as well as an ongoing podcast series.

Potential Job Tasks & Responsibilities:

- Searches of new books on Latino Studies that could be reviewed by the journal
- Searches of scholars of Latino Studies who could review such books
- Checks on references in articles for publication
- Research to assist the editor in the writing of the Editor's Letter for each issue
- Research and communication with potential authors on special issues focusing on specific topics
- Keeping track of the Latino Studies email account (proposals for book reviews, queries from authors and potential authors)
- Assistance in podcast creation (public-facing research)

Student Qualifications & Characteristics:

- Student writes well; Student communicates clearly and professionally
- Student is self-motivated, organized, and timely
- Preferred: Student has an interest in Latino Studies or Ethnic Studies more generally
- Preferred: Student is interested in an academic, publishing, or writing career

Position #23 Esoteric Fascism, New Age Culture, and the Crisis of Masculinity

Mentor Name: Christopher Forth

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: This project explores the surprising overlap between “New Age” spiritual beliefs and practices, esoteric fascism, and the so-called crisis of masculinity in Western societies as expressed today in social media and other online networks. “Esoteric fascism” refers to a onetime marginal strand of far-right political culture emphasizing “spiritual” links to imagined white homelands, hollow earth theories, Nazi UFOs, and depictions of Hitler as a kind of transcendent being, aspects of which are alive in meme culture and other online practices. Albeit seemingly unrelated, all three of these tendencies – alternative spiritualities, esoteric fascism, and crises of masculinity – have historically deplored the physical and “spiritual” impact of urban modernity while promoting conspiracy theories and utopias of various sorts. As their technology-driven entanglement in the present has become increasingly evident, this project proposes that alternative wellness and spiritual cultures have at times engage with esoteric versions of fascist ideology as ways of promoting the regeneration of white masculinity. To support this argument this project 1) surveys the past and present links between white masculinity and esoteric fascism; 2) explores far-right flirtations with New Age ideas and imagery in select social media platforms; and 3) analyzes how user comments register a variety of responses to these beliefs and practices. Overall, this project sheds light on more subtle and less examined dimensions of male complaint in the modern world.

Potential Job Tasks & Responsibilities: The research for this project would take place almost entirely online, and student researchers would be given a variety of options for what they may wish to explore. What is broadly referred to as the online “manosphere” will be the primary focus, with special attention given to far-right or “alt-right” websites, forums, and channels. Research will be mostly restricted to Anglophone materials, which could include social media platforms from North America, Britain and Ireland, Australia/New Zealand, and South Africa. However, students with proficiency in other languages may be invited to focus on relevant materials in different locations. In some cases, this includes taking screenshots from relevant websites and downloading video content from YouTube, Tik Tok, and Telegram as well as more “alternative” platforms like Bitchute, Parler, etc. In others it may entail the extended exploration of one or more particularly large websites and channels, such as AlphaAffirmations, Return of Kings, and the 21 Studios. The project is thus sufficiently broad to allow for considerable flexibility depending on student skills and interests. Weekly or semiweekly meetings (either remote or in person) as well as careful note-taking are expected.

Student Qualifications & Characteristics: While students considering a major in gender studies, media studies, or religious studies would be ideal, anyone interested in social science, or humanities disciplines should be able to do this work. Of course I will be on hand to assist as needed, but the preferred student researcher would have the maturity and sense of responsibility needed to conduct research without direct supervision while providing weekly or semiweekly updates, reports, and notes.

Position #24 Online edition of María de Zayas’ short stories for undergraduate students

Mentor Name: Patricia Manning

Job Location: Other (please explain)

Number of Positions: 1

Project Description: Prof. Patricia Manning in the Department of Spanish and Portuguese is preparing an Open Educational Resource (OER) edition of several of seventeenth-century writer María de Zayas’ short stories. The completed OER edition will be available online for free and will be used in 400-level Spanish literature courses at KU and likely at other institutions. The Emerging Scholar will assist in the preparation of this edition by reading Zayas’ texts, noting terms that they do not understand and helping with annotations to clarify them for other students.

Potential Job Tasks & Responsibilities: This position assumes that the Emerging Scholar is not very familiar with seventeenth-century Spanish culture. This will be an asset to the project since most of the students who will use the edition will not have much background in the time period. After an initial period of readings about seventeenth-century Spain and Spanish grammar of the era to help orient the Emerging Scholar to the field, the student will be reading Zayas’ short stories and signaling points that they do not understand. The Emerging Scholar will then, with guidance from Prof. Manning, begin to research the points in need of further clarification. It is likely that much of the Emerging Scholar’s initial work on the edition will be looking up terms in online Spanish dictionaries, like the Diccionario de la Real Academia Española and dictionaries of seventeenth and eighteenth-century Spanish. Depending on the Emerging Scholar’s areas of interest, other tasks may include reading more of Zayas’ short stories to help decide which texts to edit next, finding and reading secondary sources concerning topics related to the short stories, consulting seventeenth and eighteenth-century editions of Zayas’ work that are available online or consulting rare books in the Spencer Research Library.

The annotation work currently is being done in Word. If more a specialized platform (such as Pressbooks) is required, training will be provided as part of the Emerging Scholar’s paid work time.

Student Qualifications & Characteristics: Native or near-native level of Spanish. (If you have questions about what this means and/or whether your level of Spanish would be a good fit for this position, feel free to email Prof. Manning at pwmannin@ku).

Since helping to develop explanations for terms and other elements will be an essential part of this position, it will be important that the Emerging Scholar is comfortable admitting what they do not know and is curious enough to contribute to the research required to learn more about these elements. Also, because the job will be hybrid or entirely remote if that is the student's preference, it will be important that the student is self-motivated and has good time management skills to be able to work on their own to accomplish their assigned tasks.

This job likely will be of the most interest to a student who has extensive experience with Spanish and is considering majoring or minoring in Spanish or a student with strong background in Spanish who is interested in a related field, such as History, English or Women, Gender, and Sexuality Studies.

Additional Comments: Although I envision the job as hybrid, it could be done remotely if that is the student's preference. In that case, we will hold our meetings via Zoom.

Position #25 How do young children interpret the meaning of 'hard' words?

Mentor Name: Utako Minai

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 1

Project Description: The Developmental Psycholinguistics Laboratory (DPL), a research laboratory in the Department of Linguistics, is conducting studies on preschool-age children's understanding of 'hard' words (words whose meaning is abstract, such as "every", "some", "no", and "only"). While children's interpretation of such words is known to be often different from that of adults in a number of domains, research to date has suggested that children are able to comprehend 'hard' words in certain circumstances, despite the abstractness of their meaning. Our studies investigate the similarities and differences between children and adults in a range of aspects of meaning comprehension, particularly focusing on the meaning of 'hard' words. This line of research provides a window through which one can view the development of language comprehension abilities, increasing our understanding of how a child becomes a mature native speaker of a language.

Potential Job Tasks & Responsibilities: Research assistants in this lab are expected to commit to following duties:

1. Assisting in developing experimental materials (e.g., simple sentences, image files)
2. Assisting in the recruitment of study participants, by contacting local preschools, community institutes and businesses, and making announcements via social media
3. Assisting in scheduling experiments
4. Assisting in data collection, either at off-campus research sites (e.g., local preschools) or at the lab
5. Assisting in data organization (e.g., entering data into a database)
6. Other general duties assisting in lab management/administration, such as printing, photocopying, checking email, and checking office supplies

Student Qualifications & Characteristics: Currently, we are particularly looking for a new research assistant who:

1. Is able to comfortably and confidently interact with young children (having previous experience in interacting with children, such as volunteer work at childcare facilities, would be a plus)
2. Is interested in language development

3. Is able to work both independently and cooperatively with other lab members
4. Is responsible and reliable
5. Possesses the basic knowledge of Microsoft Word, Microsoft Excel, and some Social Networking Systems (e.g., Facebook)
6. Has access to a car (preferred but not required)

Position #26 Japanese War Brides Oral History Project

Mentor Name: Ayako Mizumura

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1

Project Description: Project description: More than 50,000 Japanese women married US servicemen in post-World War II Japan and migrated to the US. The women left their families, friends, and homeland without knowing if or when they could visit Japan again. These Japanese women were dispersed across the country. Some moved to Kansas and other Midwestern states to start new lives. Using audio tape-recorded interviews I conducted with approximately 20 Japanese war brides, this oral history project explores their life experiences in Kansas between 1950s and late 1960s. While these women represent pioneers of early female Asian migration to the US and specifically to the Heartland, they are marginalized in Kansas's migration history. The purpose of this project is to make Japanese war brides' experiences more visible by completing my digital storytelling project and preparing a manuscript for publication.

The main tasks for emerging scholars are reconstructing Japanese interview transcripts in Microsoft Word documents, translating these into English with translation tools, organizing narratives for the storytelling website and manuscripts, and conducting preliminary library research to add more historical context for the primary sources."

Potential Job Tasks & Responsibilities:

- Converting handwritten documents and hard copy interviews written in Japanese into Word Document format
- Using Google Translation or other suitable applications for translating Japanese interviews into English
- Proofreading translations and organizing by sorting and analyzing interview data
- Editing content/narratives published in my digital storytelling project in ArcGIS StoryMaps

Student Qualifications & Characteristics:

- Organized, attention to detail, open communication, willingness to learn new skill sets, interest in learning about Japanese migration experiences, interracial marriages, postwar Japan, Asian American experiences in the US.
- Familiarity with ArcGIS StoryMaps is helpful. Training/tutorial is required. No Japanese language skills required but course work in Japanese language is strongly preferred.

Position #27 Digital Materials Assistant

Mentor Name: Heaven Snyder

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 1

Project Description: Themes of interest: Latin America, Education, Languages & Cultures

Key tasks: Digitizing books, organizing digital files, editing video lectures, and writing video descriptions.

Seeking a student worker to support language courses being taught in the Center for Latin American and Caribbean studies (CLACS). Students who are interested in Latin America, education or languages and cultures overall would be ideal for this work as you'll be directly involved with helping to prepare future courses for our department." **Potential Job Tasks & Responsibilities:** Tasks include light video editing and indexing such as writing video descriptions/titles and organizing digital content. A significant portion of time would be devoted to digitizing paper materials that are used in our courses; using Adobe to edit/crop and create searchable PDFs. Digital file organization in Canvas is needed as well.

Student Qualifications & Characteristics: This is a hybrid position as video editing and file organization can be accomplished remotely while digitizing materials necessitates being in person to use the scanning equipment. Progress meetings can be either remote or in-person. Having Spanish language proficiency will be useful for processing certain video and book items, but it's not a necessity.

Additional Comments: Looking forward to mentor a student worker! Many skills can be gained from this work experience.

Position #28 Asian Student Experience in the Midwest

Mentor Name: Akiko Takeyama

Job Location: In-person; some remote work can be arranged. **Number of Positions:** 3

Project Description: Conducting interviews with Asian (and Asian American) students in the Midwest, this project contributes to better understanding particular challenges and needs Asian/Asian American students face on campus and beyond in the region. This project includes Interviews with Asian/Asian American students, transcription and coding of the interview data, and analysis of them so that the finding will be presented at conferences, symposiums, and other public events. The result will be also published in journals, newsletters, and other outlets.

This research project is designed to identify areas where Asian/Asian American students do well and where they need help so that necessary changes are made on campus and in the community toward the creation of diverse and inclusive environments.

This research is particularly important in the Midwest where Asians and Asian Americans are often invisible. It is also a timely topic to study as Asian Americans are the fast-growing racial and ethnic group in the US.

Potential Job Tasks & Responsibilities:

- Contact potential interviewees
- Assist to collect, transcribe, and analyze interview data
- Create creative outlets to share results

- Reach out to student organizations and relevant units for awareness raising

Student Qualifications & Characteristics:

- Open-minded, non-judgmental attitudes
- Good communication skills and work ethics
- Experience in working in a team
- Familiarity with basic software and digital technologies (Word, Excel, PDF, etc.) or willing to take some online tutorials to acquire basic skills in creating, editing, and formatting collected data for analysis, presentation, and archiving

Additional Comments: Some remote work can be arranged.

Position #29 Research Assistant, Improvising Across Abilities: The Adaptive Use Musical Instrument

Mentor Name: Sherrie Tucker

Job Location: This position could be done remotely or in-person. **Number of Positions:** 2

Project Description: This is an interdisciplinary research project on collaborative, interactive all-ability musical improvisation using the Adaptive Use Musical Instrument (AUMI). AUMI is a free download (aumiapp.com) that uses camera-tracking technology to adapt sound to movement of users across a wide range of abilities, including mobility, sensory perception, cognitive processing, and neurodiversity. The research questions posed by this project include: how can creative improvisation across ability create more inclusive communities, increase mixed-ability social interaction, and create more inclusive aesthetics and artistic practices? The project is a collaboration among KU faculty in American Studies and Dance, in partnership with Independence Inc. (a grassroots organization that serves people with disabilities), and the Sound/Vision Studio at the Lawrence Public Library. Before the COVID pandemic, we held monthly all-ability jam and recording sessions at the Lawrence Public Library, in which all participants are researchers. During the shut-down, we continued to facilitate jam sessions on Zoom, but will return to the Lawrence Public Library as conditions permit.

Potential Job Tasks & Responsibilities: The Research Assistant(s) will work as a liaison between faculty, community partners, and participants of the monthly “Do You AUMI?” jam sessions at the Lawrence Public Library. This includes working with contacts at the Lawrence Public Library and Independence Inc. to advertise the jam sessions, and providing support for the jam sessions, whether online or in person. If we are able to return to in-person jam sessions, the emerging scholar should be prepared to arrive at the library early to help set up the iPads (on which the Adaptive Use Musical Instrument is downloaded) and assist participants of all abilities and ages throughout the jam session (one afternoon per month, 4:30-6:00 pm). If we continue instead to provide on-line jam sessions, the Research Assistant will provide similar support, but over Zoom. The Research Assistant must learn how to use the instrument well enough to demonstrate how to use it, but it is very user friendly. In addition, the Research Assistant will assist with website updates, social media, and related tasks.

Student Qualifications & Characteristics:

1. Must be available one day per month (to-be-determined) in late afternoon 3:30-6:30, for improvisation sessions at the Lawrence Public Library (includes set-up and pack-up time). Other hours are flexible.

2. Experience in interacting with people with disabilities as evidenced in application materials (need not be work experience; navigating the world with a disability and/or having a family member with a disability absolutely counts).
3. Organizational skills as evidenced in application materials (email communications, scheduling, multi-tasking, keeping track of details).
4. Interest in creative expression, performing arts, and/or community music and social justice as evidenced in application materials (musical background not required).
5. Basic technical proficiency with laptop computers and/or tablets/iPads as stated in application materials.
6. Interest in learning about improvisation as stated in application materials.

Position #30 The Druze Studies

Mentor Name: Rami Zeedan

Job Location: Hybrid **Number of Positions:** 2

Project Description: The two main goals of this project are to produce an extensive survey of all existing research conducted so far on the Druze and to produce new research on under-researched topics on the Druze. The project will include all relevant countries- Syria, Lebanon, Israel, Jordan, and the diaspora. It will include research from all aspects- religion, history, society, culture, politics, gender, DNA, etc. Students can gain experience in conducting research: choosing a topic, conducting a literature review, formulating a research question, choosing a research method, conducting the research, and writing the outcome in the form of a final paper. Students involved will have the chance to learn about the Druze and the Middle-East and learn about conducting research from their own contribution to the project and from their interaction with Prof. Zeedan.

Potential Job Tasks & Responsibilities: Student's involvement in the project can vary widely. However, any student involved in the project should at the minimum help in conducting the survey of the literature. The minimum requirement is to produce an outcome that is equivalent to 5 weeks of work. Each such weekly outcome will include adding about 10 new entries of academic articles, books, and book chapters to the spreadsheet and write a one-paragraph literature review of 3 weekly new entries. In addition to that, after completing 5 weekly outcomes any student involved in the project can choose one of three options for their own individual project (or to choose to not continue):

Option 1: Comprehensive literature review on a topic of your choice. The final outcome is to produce a complete literature review for your chosen topic (equivalent to a major assignment in a 400-level course). Option 1 is excellent for an ambitious freshman or sophomore who wants to gain some experience in conducting research, mainly in conducting a literature review and formulating a research question.

Option 2: Research paper on a topic of your choice. You will formulate a research question, write a literature review, conducting the research itself, and writing the results in the form of a final paper (equivalent to a 400-level final paper). Excellent outcomes have the potential to give a head start for a capstone project, or in rare excellent cases, it can lead to a publishable article in a student journal.

Option 3: Research paper on a new topic- a capstone or a publishable article. You will formulate a research question on a topic of your choice, a literature review, conducting the research itself, and writing the results in the form of a final paper at the level of a capstone (600 level). You can plan to present the outcome at a conference if you wish to. Excellent outcomes have the potential of leading to a publishable article in a student journal or an academic journal.

Student Qualifications & Characteristics: I'm looking for a well-organized student, who can work on their own, however with close guidance. The desired candidate is a student who can commit to working on this project for the duration of two-semester

Position #72 Creating a new edition of William Shakespeare's comedy, *Love's Labour's Lost*

Mentor Name: Jonathan Lamb

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: I am seeking a student to help me create a new scholarly edition of William Shakespeare's play *Love's Labour's Lost*. One of Shakespeare's most interesting plays (even though it is not as popular as *Romeo and Juliet* or *Hamlet*), LLL is a comedy, but unlike most comedies it does not end in marriage. Rather, it ends with a fight, an unexpected pregnancy, a death, and a love test. Most of the play consists of jokes, pranks, love sonnets, lots of wordplay, flirty banter, and one hunting party. What makes the play great is its concern with its own value as a piece of entertainment. It is a play, in short, about FUN. It is also about love, sex, gender, race, social class, language, and more.

The editing process is a complex and enjoyable one, and I am seeking 1-2 research assistants to help with the process. Not simply a "copy" of the earliest version of Shakespeare's play, an edition requires a huge amount of research to prepare the text, add glosses, notes, and longer scholarly notes, write the long scholarly introduction, and more.

Potential Job Tasks & Responsibilities: At every stage of the process, students can support the creation of the edition while also acquiring valuable skills, knowledge, and experience for their own aims. The team will work together to:

- Establish the play text by collating the earliest printed copies of the play with editions published in the subsequent 400+ years.
- Correct the text where there may be errors or textual cruxes. This part of the process is notoriously difficult.
- Modernize the spelling and punctuation, another notoriously controversial stage.
- Research and gloss unfamiliar terms.
- Research and compose short notes and longer scholarly notes (called "Openings"). These often require considerable research, as we seek to create new knowledge about the play and make that knowledge accessible to readers.
- Research the play's performance history, the substantial scholarship on the play, and new avenues of inquiry. Here, I hope students will be able to develop their own research interests based on their work with the edition.
- Research and write material for the scholarly introduction.

Student Qualifications & Characteristics: No prior experience with *Love's Labour's Lost* is necessary, though students should be prepared to study and think about Shakespeare's play. I am looking for students who want to think hard about language and learn and do library and digital archival research. Attention to detail is extremely important! Students who want to major in a humanities field may benefit most, but I am open to students in any major.

Most of the work can be done independently, but students will be expected to attend a biweekly team meeting.

Additional Comments: This will be fun!

NATURAL SCIENCES

Position #31 Genetic risk factors for tauopathies

Mentor Name: Brian Ackley

Job Location: This would be an in-person position. **Number of Positions:** 1

Project Description: The Ackley lab is interested in understanding how mutations in genes in different individuals might alter their risk for developing neurological disorders later in life. To do this we are using a genetically tractable system, *C. elegans*. By expressing disease-associated variants of the human gene tau we can induce progressive synaptic loss. We can accelerate that degeneration when we introduce mutations in a *C. elegans* gene that is similar to a human risk factor for Alzheimer's Disease. There are more than 20 known genetic risk factors for AD, and most of those genes have orthologs in *C. elegans*. We are currently working to combine the *C. elegans* with mutations in those genes with our lines expressing the tau variants. Students will contribute to the generation of these new strains of *C. elegans*.

Potential Job Tasks & Responsibilities: Tasks and responsibilities will include preparation of media for nematode growth and conducting genetic crosses to establish the new lines of *C. elegans* for our tauopathy model. *C. elegans* are simple to maintain and have a short generation time, and therefore, this work is well within the capabilities of a student who has never done genetic work before. Over the long term, the project may expand to learning how to do confocal microscopy and synapse analysis in the newly created strains.

Student Qualifications & Characteristics: Students should be well organized and attentive to detail. No previous experience with *C. elegans* is required. Curiosity about neural development and neurological disorders or a professional interest in biomedical research is preferred. The lab work is done using shared resources in the lab, and therefore students should be thoughtful and willing to maintain workspaces as they find them.

Position #32 Monarch butterfly responses to changing conditions

Mentor Name: Kristen Baum

Job Location: The job requires the student to work in-person only. **Number of Positions:** 2

Project Description: Monarch butterflies make a long-distance fall migration from the northern US and southern Canada to overwintering sites in central Mexico, with the same individuals returning to the southern US the following spring. Monarchs are also host plant specialists and require milkweed as food for caterpillars. This research will evaluate the effects of temperature fluctuations and other environmental factors on larval development and adult lifespan. The results will inform conservation actions for monarch butterflies.

Potential Job Tasks & Responsibilities: The student will assist with maintaining monarchs (caterpillars and adult butterflies) in the lab, as well as conducting experiments with monarchs. There will be the opportunity to participate in other activities related to Monarch Watch depending on student interest. Monarch Watch is an international organization based at KU that leads education, conservation, and research programs focused on the monarch butterfly, its habitat, and its spectacular fall migration.

Student Qualifications & Characteristics: No prior knowledge or experience is required. The student will receive training for all lab activities and research protocols. The student should be interested in insects, including working with and handling monarch caterpillars and butterflies. The student should be available during regular working hours for two-to-three-hour time blocks and willing to commit to a consistent weekly schedule. The student should be curious, organized, and detail-oriented.

Position #33 Water, Soil, and Gas Lab and Field Assistant

Mentor Name: Amy Burgin

Job Location: This job requires the student to work in-person only. **Number of Positions:** 1-2

Project Description: The Burgin Lab focuses on understanding environmental issues affecting aquatic ecosystems, including pollution, water quality impairments, greenhouse gas fluxes, climate change and changing patterns of stream flow. Students working in the lab gain exposure to a wide variety of projects, while also having the option to focus on learning a specific instrument or skill set relevant to environmental field science. We rely on field sample collection (going to established sites to sample soil, water, and gases) and processing those samples in the lab. We also use cutting-edge deployments of environmental sensors to monitor sites when we cannot be present to sample; sensors require frequent maintenance and operational checks. We use all these methods in many projects to understand how water, soil, and gas chemistry vary across different aquatic ecosystems.

Potential Job Tasks & Responsibilities: Talking with graduate students and senior undergraduates and assisting them with field work related to their projects. Reading articles related to on-going projects to determine whether there is an interest for building an independent aspect for your own interests. Learning how to operate analytical instruments to measure the chemistry of water, gas and soil samples.

Student Qualifications & Characteristics: Curiosity regarding the natural world and how humans interact with our surroundings. An interest in learning field and lab skills, particularly with regards to analytical chemistry and sensor technology. Ability to communicate clearly and follow instructions; attention to detail, particularly for taking lab and field notes. Interest in spending time outdoors. While not required for working in the lab, please highlight any skills you have pertaining to lifeguarding, boating, outdoor recreation, or using power tools. Comfort with building things using parts sourced from a hardware store is something we greatly value and use in our work.

Position #34 Laboratory Research Assistant

Mentor Name: Paulyn Cartwright

Job Location: This would be an in-person position. **Number of Positions:** 1

Project Description: The Cartwright Lab investigates the evolution and development of jellyfish and their relatives. We culture several species in our lab and use molecular methods to look at genes that regulate their development and life cycle transitions. The position is for a student to assist with general lab duties including helping to take care of the animals and observe their development under different experimental conditions. The student will develop skills in caring for marine invertebrates and basic molecular lab techniques that will prepare them for conducting independent research.

Potential Job Tasks & Responsibilities: The student would be responsible for making artificial sea water, setting up the food culture (brine shrimp), feeding the animals, washing the animal culture glassware and caring for the different species of marine invertebrates. Depending on the students engagement and interest, the student can gradually take on more responsibilities, including helping the graduate students with their experiments in molecular and developmental biology.

Student Qualifications & Characteristics: Students would be required to come in 3X/week (preferably MWF) for approximately two hours each time. The most successful students are those that love marine invertebrates, spend the time to observe their growth and overall health (paying attention to detail) and can reliably keep up the feeding schedule.

Position #35 Research assistant

Mentor Name: Josephine Chandler

Job Location: This would be an in-person position. **Number of Positions:** 1

Project Description: The Chandler lab seeks to understand how complex behaviors like communication and cooperation evolve in bacteria. Such behaviors are considered social and studying these behaviors is part of an emerging field called 'sociomicrobiology.' Many bacteria communicate with dedicated chemical or peptide signaling molecules. These communications systems are widespread and found not only in bacteria but in animals, plants and even insects. Our lab is particularly interested in a type of communication called quorum sensing. These systems enable cell density-dependent changes in behavior (hence the term 'quorum sensing'). We study quorum sensing and how it benefits bacteria in different environments such as soil, interspecies competition, and infections. We also study how quorum sensing systems evolve in these environments.

The position is for a student to assist with general lab duties and research-related activities in the Chandler laboratory. This position will begin broadly so that the student can learn basic skills applicable to all projects from routine lab maintenance (e.g. washing dishes) to microbiological and molecular biological skills (e.g. growing bacteria, working with DNA). It is expected that, over time, the student will master these basic skills and be able to take on more responsibility and independence. It is also expected that the student will engage in the research going on in the lab and eventually transition to a more research-focused role in the lab that will be determined based on interests of the student and project availability."

Potential Job Tasks & Responsibilities: The position would help support general lab activities by assisting with routine lab maintenance, such as washing dishes (automated dishwasher is available), making buffers, media and other lab reagents, autoclaving and disposing of lab waste, and general lab cleanup. As the position transitions to a more research-focused role, it would also involve learning and applying basic microbiological methods (growing bacterial cultures using aseptic technique), molecular methods (isolating and manipulating DNA), and other techniques specific to the particular research project.

Student Qualifications & Characteristics: We seek students that are interested and engaged in learning and the scientific process

1. is interested in molecular biology/microbiology
2. is available for ~2 hr. blocks several times a week (can be flexible), and available to stop by at other times briefly too.
3. will be committed and reliable with the agreed-upon schedule, and communicate changes as needed
4. is careful and detail oriented
5. is engaged and excited to learn, and comfortable asking for help
6. 6. Is a good communicator and team player

Additional Comments: This project does not require any field specific knowledge or experience. All that is needed is a willingness to try and the ability to communicate with others.

Position #36 The molecular sequence and evolution of a novel telomere regulating gene

Mentor Name: Jae Young Choi

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1

Project Description: Telomeres are crucial genetic structures that protect ends of chromosome from damage and erosion. It is so important that all multicellular organisms have telomeres. Naturally, genes that maintain the telomere are highly conserved, found in both animals and plants, and these genes do not show any signs of increased evolutionary change. However, my lab has discovered an exception to this rule and discovered a potentially novel telomere maintenance gene that has in recent evolutionary time arose in the Monkeyflower (*Mimulus guttatus*). The student hired for this project will be tasked with sequencing this novel telomere gene and depending on the progress study the genes' evolutionary history.

Potential Job Tasks & Responsibilities: This is a molecular biology project. The hired student will learn and conduct (1) basic molecular biology techniques (i.e. pipetting), (2) grow and maintain plants, (3) extracting DNA from plant samples, (4) with progress conduct molecular biology experiments (PCR and gel electrophoresis). The student will also be expected to conduct preparations for basic lab work (i.e. making solutions, autoclaving, etc.)

Student Qualifications & Characteristics: Student does not need any prior experience in molecular biology, and this can be taught to the student. However, a basic knowledge of genetics, DNA, and molecular biology (i.e. High school level advanced biology) will be required.

Prior experience in plant biology is not necessary, however any plant experience or interest in plant biology will be highly favored.

Student must also be ok with getting their hands "dirty". We will be working in the greenhouse working with soil to grow plants. Then bring them back in the lab and use chemicals and reagents to conduct experiments.

Attending weekly lab meeting (hour and half max) is required. Student must be available for at least three 2 hour blocks of time a week. The student must have attention to detail and be organized.

Position #37 Stars and Planets Beyond the Solar System

Mentor Name: Ian Crossfield

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: Surveys for new planets beyond our solar system are finding thousands of new 'exoplanets,' or planets orbiting in other Solar Systems. The study of these stars and planets using Space- and ground-based telescopes is an exciting and rapidly-expanding field in astronomy and astrophysics. The student researcher(s) will participate in astronomical observing, data analysis, and/or computer modeling of these planets and their stars, using a combination of new observations and/or measurements previously published in the scientific literature.

Potential Job Tasks & Responsibilities: The student researcher will begin by learning a suitable scientific programming language (e.g. Python) and by familiarizing themselves with the basic background material on exoplanets and their host stars. They will then run a series of analyses, including some or all of:

calibration and reduction of 'raw' digital astronomical data products to useful stellar and/or planetary spectra; calculation of new model planetary atmospheres; simulating synthetic spectra to predict what exoplanets may look like when observed; conducting numerical (computer-based) analyses of star and exoplanet observations to infer their physical properties. If the student does not have experience with computer programming, that will be the initial focus.

Student Qualifications & Characteristics: The student researcher must be willing to challenge themselves! A big plus is a strong determination to succeed in academics while simultaneously devoting time to an exploration of university student research. The student researcher will conduct research on their own in between frequent (at least weekly) consultations with the professor and other members of the KU ExoLab research group.

Position #38 Study of DNA-Protein Crosslinks: Formation, Repair, Biological Outcomes

Mentor Name: Luke Erber

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1

Project Description: High levels of reactive molecules in human cells lead to formation of toxic DNA-protein cross-links (DPCs). These bulky lesions alter the DNA structure, prevent DNA replication, lead to formation of mutations in the DNA and contribute to cancer, diabetes and neurological diseases. We use biochemical and quantitative techniques to define DNA-protein interactions contributing to disease initiation and progression. In this work, students will define formation and repair kinetics of DNA-protein cross-links formed by metabolic by-products. These quantitative approaches will be used to assess disease risk and therapeutic interventions to limit formation of DNA lesions. Research in the lab utilizes a variety of systems: extraction of DPCs, biochemistry of purified proteins, and manipulation of cultured human cells. Students will contribute to these studies by performing general lab maintenance, while also learning molecular biology skills required to perform research.

Linked is my lab website that provides additional information about the research I do:

<https://sites.google.com/erberlab.net/erber-research-group/home>

Potential Job Tasks & Responsibilities: The emerging scholar will assist with general lab duties and maintenance including tissue culture incubator and hood upkeep and monitoring, liquid nitrogen tank filling, glassware/labware cleaning and autoclaving, pipet rack filling, preparation of buffers and lab stock solutions, updating chemical inventory, monitoring, and taking care of lab waste. As the scholar demonstrates proficiency in performing routine laboratory maintenance, they will incorporate more research-oriented activities into their job. These include researching new DNA-protein crosslink structures, isolating, and measuring DNA-protein cross-links, and cell culture.

Student Qualifications & Characteristics:

1. Dependable, reliable, with a strong work ethic.
2. Attention to detail and careful record-keeping.
3. Ability to work as part of a research team/ good communicator.
4. Available for 3 hour blocks of time.
5. Curiosity about research system and eagerness to expand molecular and cancer biology knowledge.

Position #39 Social behavior in a small insect

Mentor Name: Jennifer Gleason

Job Location: The job requires the student to work in-person only. **Number of Positions:** 2

Project Description: When animals encounter each other, social interactions results. Such interactions include courtship behavior, when males attempt to entice females into mating with them, and aggression between members of the same sex fighting over resources. Emerging Scholars and other undergraduates in the lab have worked on aggression and courtship behaviors in a variety of species, making new discoveries that have not been anticipated. Emerging Scholars will have flexibility in deciding which behaviors they would like to study.

Potential Job Tasks & Responsibilities: The student will maintain cultures of the flies, sort flies for experiments, and perform experiments. All experiments will involve manipulation of the flies or environmental variables. The student will be completely trained by the advisor; thus, no prior experience is needed. As the student becomes familiar with the flies and how they behave, the student will have opportunities to develop new hypotheses and then design and execute the experiments to test the hypotheses. In addition to specific experiments, the student will be expected to contribute to basic lab maintenance (such as making fly food) as all lab members are required to do.

Student Qualifications & Characteristics: The ideal student for this project is excited to learn about evolutionary biology and animal behavior. The student will need to have a set schedule each week, though the exact schedule is flexible. The student must be available during regular working hours for at least three two-hour blocks a week, but fewer, longer blocks are good as well. Attention to detail, organizational skills, and a willingness to ask questions will all contribute to student success. The experiments are not technically difficult but may require some trouble shooting to be executed properly. The student will need to be persistent and not easily discouraged.

Position #40 Laboratory Research Assistant

Mentor Name: Lynn Hancock

Job Location: This would be an in-person position. **Number of Positions:** 1

Project Description: The Hancock Laboratory studies the opportunistic pathogen *Enterococcus faecalis*. Nearly all land animals, including humans, harbor enterococci in their digestive tract. In healthcare settings, particularly intensive care units, enterococci are able to transition to a pathogenic state when introduced into extraintestinal sites, they are leading causes of catheter-associated urinary tract infections, bloodstream infections, and surgical site infections. The growing emergence of antibiotic-resistance exacerbates the challenge of treating patients with an enterococcal infection. The laboratory investigates how enterococci establish infection and we study cell-cell communication in the context of biofilm formation. We are also interested in identifying bacterial factors that assist in nutrient acquisition during infection. **Potential Job Tasks & Responsibilities:** We are looking for a student with an interest in Microbiology, Molecular Biology or Biochemistry. As the scholar joins our research team they will initially assist with general lab duties and maintenance, including preparing growth media for growing bacteria in the laboratory, making chemicals used by laboratory scientists and assisting with a variety of ongoing projects in the lab. Lab maintenance involves washing glassware (loading and unloading dishwasher), restocking disposable consumables, handling lab waste disposal by autoclaving and assisting senior laboratory personnel in day to day operations. As the scholar develops proficiency in performing routine laboratory duties, they will transition to an independent research project.

Student Qualifications & Characteristics: 1) Desire to learn about the scientific enterprise; 2) Highly dependable and willingness to commit to a consistent work schedule (ideally, we are looking for a student that can commit to a minimum of 2 hour blocks on workdays); 3) Ability to receive and follow instructions from senior laboratory members; 4) Be a contributing member of an interactive team of laboratory scientists.

Position #41 Microbiology Research Assistant

Mentor Name: Scott Hefty

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1

Project Description: The Hefty Laboratory (<http://hefty.faculty.ku.edu/>) investigates the obligate intracellular bacteria, *Chlamydia trachomatis*. Infections by these bacteria inflict an immense impact on public health as the most common cause of preventable blindness worldwide and sexually transmitted bacterial infections. Despite this immense public health impact, there is much about the basic biology and pathogenesis that is poorly understood. The Hefty Lab incorporates aspects of Microbiology, Biochemistry, and Cell Biology to gain a better understanding of this unique and critical bacteria.

Potential Job Tasks & Responsibilities: The position is for a student to assist with general research activities in the Hefty laboratory. In learning and assisting in these activities, it is expected the student will develop essential skill sets that will enable their future desire to perform independent research. Additionally, it is expected that they will also learn about the scientific projects that are ongoing in the Hefty laboratory so that the student transitions into performing research on a project of interest. The position would help support general lab activities that includes reagents and media preparation, glassware, aseptic technique, and autoclaving. As students demonstrate proficiency with general laboratory activities, molecular biology techniques (protein isolation and detection, PCR/cloning, bacterial genetics, etc.) will be taught with a progression towards an independent research project.

Student Qualifications & Characteristics: 1) Great work ethic, 2) desire to learn research techniques and activities, 3) interest in molecular biology and/or microbiology, and 4) considerate and constructive interactions within a team/group setting.

Position #42 Flower evolution in response to pollinators

Mentor Name: Lena Hileman

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1

Project Description: The amazing diversity in flower shape and color that we see in the natural world is largely the result of evolutionary interactions between flowers and pollinators. In this project, we are studying how complex hummingbird-adapted flowers evolve from equally complex bee-adapted flowers. Evolution of hummingbird-adapted flowers requires many changes to flower shape, color, and nectar reward. The long-term outcomes of the project will help us understand the genes that are important for differences in flower form and function when species are adapted to bees as pollinators compared to hummingbirds as pollinators.

Potential Job Tasks & Responsibilities: Emerging scholars working on this project will work at the greenhouse in Haworth Hall helping to maintain our research plant collection. In addition, they will be trained on basic flower trait

analysis, which will include learning to use the open-source software package, ImageJ which is distributed by the National Institutes of Health and widely used for biological image analysis.

Student Qualifications & Characteristics: The ideal student for this project is excited to learn about evolutionary biology, genetics, microscopy, and flower-pollinator interactions. They will need to have a set schedule with availability during regular working hours, though the exact schedule is flexible. The ideal student is organized and detail oriented. They are also expected to have good communication skills, especially a very strong willingness to ask questions to ensure that tasks are carried out correctly.

Position #43 Development of chemical probes

Mentor Name: Iredia Iyamu

Job Location: The job requires the student to work in-person only. **Number of Positions:** 2

Project Description: Our laboratory develops chemical probes to elucidate complex cellular processes that drive cancer and other diseases. We use an integrative approach that includes organic chemistry, chemistry-informatics, biochemical assays, and cell-based assays to validate our probes.

Potential Job Tasks & Responsibilities:

- Performing chemical reactions to synthesize new bioactive compounds.
- Purifying and characterizing synthesized compounds by flash chromatography, HPLC, LCMS, NMR etc.
- Preparing buffers for biochemical assays.
- Maintaining lab notebook.
- Maintaining mammalian cell cultures.

Student Qualifications & Characteristics: The student should be interested in learning new skills, detail oriented, and responsible. Ability to spend long and sustained period in the lab is essential.

Position #44 Binary classification with machine learning

Mentor Name: KC Kong

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 1-2

Project Description: We apply machine learning algorithm for various classification problem with focus on binary classification. We will use several datasets but focus on monarch butterfly to identify if it is a male or a female.

Potential Job Tasks & Responsibilities:

1. Students will study basics of machine learning algorithms (deep neural networks and convolutional neural networks etc.). We will start with several existing datasets such as handwritten digits etc. This may take one semester or more.
2. While reviewing basic materials students will prepare the datasets.
3. Photos will be provided but they need to be processed properly to be able to use them for the project. This may take a few weeks.
4. Apply machine learning algorithms to the butterfly dataset to automatically distinguish male and female.

Student Qualifications & Characteristics:

1. Students must be familiar with python programming.
2. Students must be willing to learn basics of machine learning algorithms.
3. Work (studying algorithms and preparing datasets) can be done remotely.

Position #45 Brain Imaging Undergraduate Research Assistant

Mentor Name: Rebecca Lepping

Job Location: The job will done remotely.

Number of Positions: 2

Project Description: Your work as an undergraduate research assistant would be to help with data entry, data analysis, and data management for one of the ongoing projects in the PROMUS Lab.

In the PROMUS Lab, we study affective neuroscience and how music, emotion and decision-making intersect. We study how music impacts the brain and the body and how that is affected by mood disorders, fibromyalgia and pain, Alzheimer's disease, and other chronic conditions. We use neuroscience tools including brain imaging to understand why people engage with music and how they use music to regulate their mood, experience of pain and other psychological and physiological symptoms.

Our research examines the links between:

- music and lung health,
- music and pain,
- music and emotion,
- music and Alzheimer's disease and
- the interaction of kidney and brain health with a body/mind/brain approach.

Potential Job Tasks & Responsibilities:

- data entry, transferring information accurately into computer-based forms and Excel spreadsheets
- data management, organizing new data into proper folders, making sure data file names are correct, making sure data are complete
- data analysis, viewing imaging data, checking for good data quality, running analysis scripts
- documentation, keeping detailed and accurate notes about the tasks you complete,
- summarizing methods and results, helping with reports and manuscripts, making tables and figures
- attending regular lab meetings
- project progress meetings with the supervisor

Student Qualifications & Characteristics: We're looking for someone who is interested in the brain and how it works, or someone who is interested in computer-based image analysis. You don't have to be a science major to qualify. You will be great for this position if you have good attention to detail and like to work on your own. It's best if you like working with numbers, computers, and learning new software. Don't worry if you haven't done anything like this before. We can teach you everything you need to know. But if you really don't like working with computers, this might not be the right position for you.

You will need to be able to work remotely. If you have access to a computer, we can help you set that up. We will have weekly virtual meetings to talk about the progress you are making on the project, plan for the next week's tasks, and to troubleshoot any problems that come up. We can schedule these to fit into your class schedule, but

you should expect to meet every week. The rest of your hours will be on your own, although I will be available if questions come up. We will come up with a schedule together for when you will complete the rest of your hours to make time management easier.

Position #46 Health Neuroscience: Understanding the Brain to Understand Health Behaviors

Mentor Name: Laura Martin

Job Location: The job will done remotely. **Number of Positions:** 1-2

Project Description: The research focuses on understanding the relationships between brain function and health behaviors (e.g., exercise, eating, smoking, vaping). The primary project will include helping with recruitment, data management, and data quality for a study examining ways to increase physical activity among mid-life adults. In addition, the student may work with existing brain and behavior data from previous studies examining eating behaviors, smoking, and vaping.

Potential Job Tasks & Responsibilities: Activities include searching for and reviewing existing scientific papers, learning functional magnetic resonance imaging (fMRI) analysis methods, contacting potential participants to enroll in a research study. All activities can be done remotely. If the student is available to come to the KUMC campus there may also be opportunities to observe and assist with MRI data collection (this is not required). In addition, the student is encouraged to join lab meetings if times work with the student's schedule.

Student Qualifications & Characteristics: Requirements include meeting weekly (scheduled based on availability), ability to work independently and remotely.

Position #47 Ornithology Research Assistant

Mentor Name: Rob Moyle

Job Location: The job requires the student to work in-person only. **Number of Positions:** 2

Project Description: The research assistant works with curators and staff in the Natural History Museum on all aspects of collection management and research. We maintain a research collection of bird specimens from all over the world, and the collection assistant would help with the maintenance, growth, and organization of this collection and assist with a variety of research projects.

Potential Job Tasks & Responsibilities: This position provides the opportunity to gain experience in some or all of the following areas: DNA sequencing, molecular lab work, data analysis, specimen preparation, collection organization, database management, and field surveys. No prior experience is required in any of these areas.

Student Qualifications & Characteristics: We seek students with curiosity and an interest in the natural world. Organizational skills and attention to detail will be especially helpful in this position and will be developed on the job. Because of the nature of the responsibilities, the ability to work in 2-3 hours blocks is preferable.

Position #48 Study of Tumor Suppressor Proteins

Mentor Name: Kristi Neufeld

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1

Project Description: Our long-term goal is to determine the underlying mechanisms for growth control of normal intestinal tissue and explain how disruption of this normal state leads to tumor formation. In particular, the lab is focused on the tumor suppressor gene Adenomatous Polyposis Coli (APC), which is mutated early in the progression of most colon cancers. Our analysis of APC protein localization and function implicates APC protein as a central player in signaling pathways that control colonic epithelial cell proliferation and differentiation. Research in the lab utilizes a variety of systems: biochemistry of purified proteins, manipulation of cultured colon cells, and genetic mouse models. Students will contribute to these studies by performing general lab maintenance, while also learning molecular biology skills required to perform research.

Potential Job Tasks & Responsibilities: The emerging scholar will assist with general lab duties and maintenance including tissue culture incubator and hood upkeep and monitoring, liquid nitrogen tank filling, glassware/labware cleaning and autoclaving, pipet rack filling, preparation of buffers, lab stock solutions and liquid and solid growth media for growing bacteria. Once the scholar demonstrates proficiency in performing routine laboratory maintenance, they will incorporate more research-oriented activities into their job. These include DNA isolation and PCR for genotyping, basic molecular cloning, and tissue culture.

Student Qualifications & Characteristics:

- Dependable, reliable, with a strong work ethic.
- Attention to detail and careful record-keeping.
- Ability to work as part of a research team/ good communicator.
- Available for multiple 2-hour blocks each week.
- Curiosity about research system and eagerness to expand molecular and cancer biology knowledge.

Position #49 Computational design of novel battery materials

Mentor Name: Hartwin Peelaers

Job Location: This position could be done remotely or in-person. **Number of Positions:** 2

Project Description: We are looking for motivated undergraduate students to use advanced computational tools to simulate material properties (<http://dft.ku.edu>). The specific project aims to understand how battery electrodes work at an atomic level. We will study materials for the next-generation of batteries, with the goal of replacing Li ions with other ions. To do so, we will investigate how ions move through, and incorporate in, novel electrode materials. The obtained insights will allow to optimize battery performance. **Potential Job Tasks & Responsibilities:**

The student will learn to use computational tools to simulate the ions and the electrodes. Since the actual simulations will be done on a high-performance computing cluster, the students will need to learn basic interactions with the Linux shell, and some programming in the Python language. The necessary science background will be learned on-the-fly. Tasks and responsibilities will increase with experience.

Student Qualifications & Characteristics: Students should be self-motivated and willing to work hard to learn programming as well as new concepts in physics, chemistry, and potentially programming. An interest in these areas is required. There is no need to have advanced computing skills, but some background in computing or at

least a willingness to learn how to program is necessary. Work times are flexible and can be split in smaller time blocks over multiple days.

Position #50 Diet, stress, and gene expression

Mentor Name: Lisa Timmons

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1-2

Project Description: How genes are expressed and how DNA and chromosomes are protected from environmental assault are ongoing research interests of the lab. We are also interested in how essential dietary components are involved in regulating gene expression. The laboratory utilizes the organism *Caenorhabditis elegans* as a vehicle of discovery because we are able to study trafficking of molecules, derived from the diet, from cell-to-cell and organ-to-organ. Students may assist in a number of ongoing projects, some examples include genetic analysis of RNAi mechanisms, protein over-expression and biochemical assay development, or cell biological analysis of protein localization and function.

Potential Job Tasks & Responsibilities: The student's interests and schedule will help determine the nature of the experiments performed and the level of independence of the student. An Emerging Scholar might perform experiments involving genetic crosses, tests for the effects of dietary components (vitamins, iron) on gene expression, biochemical purification, and assays of protein function, or may be involved in genetic screens. The Emerging Scholar might assist more experienced lab members with experiments, or with additional training and oversight, may perform their own hypothesis-driven experiments.

Student Qualifications & Characteristics: Previous experience is not required as students will receive extensive on-the-job training. We can accommodate students who lack advanced courses in biology and may not be able to comprehend our research goals at the outset. A successful student will be responsible, careful, dependable, communicative, will learn quickly, and will get along well with the rest of the group. The work schedule can be flexible; however, at the outset, the student will not be allowed to work alone; work hours must coincide with those of other lab members.

Additional Comments: We have mentored freshmen and work study students, including non-biologists, and can mentor students with programming expertise.

Position #51 The genetic basis of species differences in immune defense [cross-listed with Transfer Scholars Program]

Mentor Name: RobertUnckless

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1

Project Description: All organisms get sick, but some get sicker than others. This is true within a species (some humans are more susceptible to certain infections than other humans), but it is also true between species (apes are not susceptible to infections that humans suffer from). These differences are likely to be genetic. In fact, we know that genes involved in the ability to fight infection are fast evolving between species - sometimes the fastest evolving genes across the entire genome. What we mostly lack, however, is a clear understanding of the genes that allow some species to fight infection better than others. This research aims to study how immune defense differs among closely related species using *Drosophila* as a model. This research is important for both basic scientific and applied reasons. Since immune genes are rapidly evolving, the approach allows for the study of evolutionary divergence between species at the genetic and molecular level. At the applied level, such rapid evolution to fight

new infections might have other consequences such as an increased risk of autoimmune disease. So, understanding how different species evolve to fight infection will help elucidate how humans and other organisms must carefully tune their immune responses to fight infection, but also do as little harm to themselves as possible.

The project utilizes several *Drosophila* species to study how immune defense diverges between species. These species are closely related to *Drosophila melanogaster*, where much of the basic tenants of innate immunity were discovered. This allows the researchers to address several questions: Are some species generally better at fighting infection than their related species? Or is immune defense more pathogen-specific and the result of the history of host exposure? What are the genes involved in the divergence in immune defense against pathogens? Are these genes shared for different pathogens or specific for specific pathogens? Are the genes involved in immune divergence evolving under positive selection as is predicted by the genomic data? The first goal is to understand how related species differ in their ability to fight bacterial, fungal and viral infections. With that knowledge, researchers will dissect the genetic underpinnings of those differences using two complementary genetic approaches: quantitative trait locus mapping and allele specific gene expression analysis. Finally, researchers will confirm findings by genetically manipulating the different species using CRISPR/Cas9 editing to move genes between species to determine whether those genes rescue a robust immune response.

Potential Job Tasks & Responsibilities: Students will learn care and maintenance of the model organism, *Drosophila*. Then they will learn how we infect and monitor survival post infection. The first project will be to determine whether different species are differentially susceptible to a particular pathogen. As the research project grows, we will work to determine the genetic basis of these differences through genetic crosses and genomic analysis.

Student Qualifications & Characteristics:

1. This requires 8-12 hours per week in person
2. Attention to detail is a must
3. The student will need to read papers about the project independently
4. The student will need to attend lab meetings

Position #52 Nanomaterial fabrication and optical spectroscopy

Mentor Name: Hui Zhao

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1-2

Project Description: In this project, emerging scholars will work with graduate students other researchers to fabricated nanometer-scale artificial semiconductors by exfoliating one or a few layers of atoms from crystal solids and stacking them on top of each other. Laser spectroscopy measurements will be performed on these materials to assess their suitability for next-generation electronic and optoelectronic technologies.

Potential Job Tasks & Responsibilities: Emerging scholars will be responsible for atomically-thin material fabrication, optical microscope measurements, laser spectroscopy measurements, and fabrication of artificial multilayer materials.

Student Qualifications & Characteristics: Interests in natural science and engineering. Attention to details. Must be available for 2 hour blocks of times. Physics major or engineering physics major preferred.

Additional Comments:

- Basic knowledge on linear algebra and calculus may be useful.
- Main outcome (for students) will be that students will learn practical knowledge on machine learning.
- One student is enough, but 2 students are preferred since they can talk to and learn from each other.

Position #53 Accelerating materials research and discovery by artificial intelligence**Mentor Name:** QunfeiZhou**Job Location:** The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: This project focuses on automating the extraction and processing of data and images from research papers, using a newly developed powerful artificial intelligence (AI) tool based on a large language model. The data and images to be explored in this project are the self-assembled pattern and structures of molecules on two-dimensional (2D) surfaces from atomic-resolution microscopy.

This project leverages AI to convert atomic resolution images to easy-access datasets, which can be used to facilitate further interpretation and training of machine learning models for the discovery of new molecule/2D materials. Those materials are advantageous platform for next-generation optoelectronic applications.

Potential Job Tasks & Responsibilities: The student will learn to use a recently developed AI package based on Python to search for and extract data related to molecule/2D heterostructures. Specifically, the student will (1) learn about some fundamental properties of molecule/2D heterostructures, and the importance of the surface patterns and structures on their applications, (2) learn and conduct automated search of texts and images from published research papers by using AI, (3) learn to extract information from images and store them in datasets, (4) analyze the data using Python.

Student Qualifications & Characteristics: Although coding from scratch is not required, the AI tool is based on Python. Students comfortable with Python, as well as interested in, and motivated to learn AI and materials research related to their physics and applications, are preferred. Any specific knowledge or experience is not required.

SOCIAL SCIENCES

Position #54 Engagement Coordinator for Creative Placemaking

Job 2. Implementation Coordinator for Creative Placemaking

Mentor Name: Thom Allen

Job Location: The job requires the student to work in-person only. **Number of Positions:** 2

Project Description:

Goal and Purpose: This project aims to revitalize and engage key areas within the University Honors Program Nunemaker Center through creative placemaking. The primary goal is to gather public opinion and feedback on the implementation of tactical urbanism efforts, transitioning them into more permanent and inclusive design changes within the Nunemaker Center. This initiative seeks to understand how design decisions impact public perception and engagement, ultimately enhancing the university campus's sense of community and belonging.

Background: Building on the ideas generated in the Honors 190 course, "Creative Placemaking and Design," students explored how to apply creative placemaking and tactical urbanism knowledge to our college campus. Initial tactical urbanism efforts have led to preliminary changes in the Nunemaker Center, with more research needed to finalize permanent design changes. This project emphasizes community engagement and public research to create more welcoming and engaging spaces within the center and across the campus.

Research Methods:

- Conducting surveys and interviews to gather feedback from the university community.
- Applying principles of architecture, urban planning, and design to draft and test modifications in the Nunemaker Center.
- Utilizing digital tools for visualizing design changes and assessing their impacts.

Student Role: Students will actively participate in all stages of the project, from conceptualizing design changes based on public feedback to implementing and evaluating those changes. This hands-on experience will enhance their understanding of creative placemaking and its impact on community engagement.

Potential Job Tasks & Responsibilities:

Initial Phase:

- Participate in workshops and training sessions on creative placemaking and tactical urbanism.
- Assist in developing and distributing surveys to collect feedback from the honors campus community.
- Help in organizing and documenting public feedback sessions.

Intermediate Phase:

- Engage in the design and planning process under guidance, using tools like Adobe Suite for visualization.
- Support the implementation of temporary design interventions in the Nunemaker Center.
- Collect and analyze data on the impact of these interventions on community engagement.

Advanced Phase:

- Lead smaller projects or components of the project, under supervision, to apply tactical urbanism concepts.
- Present findings and proposals to stakeholders and at conferences.
- Participate in the evaluation of the project's impact, contributing to reports and publications.

Student Qualifications & Characteristics:

Scheduling Requirements:

- Must be available for weekly meetings (specific day/time to be determined based on team availability).
- Able to commit to at least 3-hour blocks of time for project work, with flexibility for more involvement in specific phases.

Characteristics:

- Attention to detail and organized approach to tasks.
- Curiosity and openness to learning new concepts and tools.
- Ability to work collaboratively in a diverse team environment.

Interests or Professional Goals:

- An interest in creative placemaking, urban design, architecture, or community engagement.
- Aspires to contribute positively to campus and community environments.
- Seeks to develop a professional skill set in research, design, and project implementation.

Position #55 Undergraduate Research Assistant

Mentor Name: Kristine Beaty

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: The KU Anthropological Genetics Group is seeking an undergraduate student who is interested in learning about anthropology and how human and non-human genomic data can be used to understand patterns of migrations, adaptations, and past environments. Undergraduate researchers become part of the research team and will develop skills that help them tackle their own future projects, effectively work with a team of collaborators, learn basic molecular laboratory methods, and understand the myriad of ethical concerns when working with underserved communities.

Potential Job Tasks & Responsibilities: The undergraduate research assistant (URA) will work with a group that has a diverse set of research needs. The URA will be trained in basic research skills, such as how to effectively use search tools to identify relevant literature or how to use a citation manager such as Zotero or Endnote, to search and annotate research literature. They will also be trained in various molecular laboratory methods including DNA extraction, polymerase chain reaction, and gel electrophoresis. The undergraduate researcher may also be trained to sort and catalogue faunal remains (zooarchaeology) or use database software for managing laboratory samples. As a part of their training, students will participate in weekly lab meetings or journal clubs. As the student becomes more familiar with the lab group and type of research involved, the assignment of weekly tasks will be influenced by their interests and can develop into an independent research project.

Student Qualifications & Characteristics: Interested students must be highly organized and motivated and have an interest in building research skills in anthropology and/or biology. Days and times for this position are flexible, and some work can be done remotely, but the student will need at least two 3-hour time blocks a week for laboratory training and tasks.

Position #56 Emotional-Approach Coping through Music Therapy, Art Therapy, & Drama Therapy Interventions

Mentor Name: Cindy Colwell

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2-3

Project Description: This project will consist of a variety of projects within the research agenda of the faculty mentor's research team. The team consists of a faculty member from Western Michigan University, three undergraduate research assistants and two graduate research assistant from both KU and WMU. Following up on two previous research studies, the Emerging Scholar(s) will work to create intervention manuals for two interventions (from the first study) integrating knowledge obtained regarding emotional-approach coping (EAC) (from the second study). The two interventions are 1) patient-created chant using the Orff process and 2) patient-selected singing with accompaniment. EAC is defined as “coping with adverse circumstances through intentionally processing and expressing emotions” (Stanton, 2011, p. 370), and as “the expression, awareness, acknowledgment, and understanding of emotions as a means of coping with stress” (Ghetti, 2013, p. 95-96). As part of the intervention manual, a detailed description with supporting literature of the therapeutic function of diverse and appropriately related music elements will be completed. Additional research studies will be focused on the integration of music therapy, art therapy, and drama therapy in oncology interventions from the perspective of those expressive arts therapists in preparation for an Arts in Medicine team project. This will be followed by a scoping review examining interventions for emotional-approach coping within those three previously listed expressive arts therapies with the intention of designing collaborative interventions for oncology patients.

Potential Job Tasks & Responsibilities: Potential tasks as related to the described research projects (emerging scholar will be trained in all aspects by the research team members):

1. providing operational definitions for diverse terminology
2. editing manuscript components
3. creating video models of the two primary interventions
4. performing literature searches in diverse databases to support rationale for two primary interventions related to emotional-approach coping
5. facilitating interviews of music, art and drama therapists regarding collaborative interventions in particular for oncology patients
6. performing literature search, screening, and data extraction as part of scoping review

Student Qualifications & Characteristics: Reliable, punctual, organized, open to learn new skill sets and willing to work on more than one research project of different methodologies concurrently are preferred skill sets and characteristics. An interest in music or music research is not mandatory but beneficial for engagement in the various projects and tasks. Time available is 4 to 7 hours per week but can be divided at the convenience of the Emerging Scholar except we will meet once/week for an hour. Additional Comments:

Position #57 Special Education Research Media Manager

Mentor Name: Lisa Didion

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: The purpose of this position is to promote evidence-based practices in special education research and teacher professional development. The scholar will receive mentorship in special education research and assist with social media, website, preparing materials to support teacher professional development, and coding research data.

Potential Job Tasks & Responsibilities: The project will include the following job responsibilities (1) take photos, create visual abstracts, and support promotion of current research on social media accounts and websites; (2) code data related to professional development; and (3) prepare materials for professional development. Students will be trained to complete one task at a time and will receive consistent support from the researcher to answer questions and problem solve.

Students will be required to complete work tasks for 1-3 hour blocks of work time in an office on campus at a time scheduled with the researcher between 8 am-4 pm (exact times will be created based on the student's schedule). Students will also be asked to attend a weekly meeting with the researcher (during the 1-3 hour work time). Students will be asked to schedule work times for 2 days a week that work best for the students' schedule and preferences.

Student Qualifications & Characteristics: The following student characteristics are required to successfully complete these work tasks:

1. timeliness,
2. open communication,
3. attention to detail,
4. professionalism,
5. organization, and
6. willingness to learn new skills.

Many tasks will be routine. No previous experience with research, understanding of research, or understanding of teaching is required. No math skills are required, and students will not be asked to perform any calculations. Students who are interested in working as an elementary school teacher or special education teacher, working with persons with disabilities, or broadly interested in education may find this work meaningful.

Position #58 Undergraduate Research Assistant

Mentor Name: William Duncan

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 5

Project Description: Students who work with the Kansas Data Science Consortium (KDSC) would work on data-related projects sponsored by community partners. These projects range from statistical analysis to dashboard development. The sponsors include government agencies, non-profit organizations, and for-profit companies. These projects span the data lifecycle, with some projects working to collect and scrape data and other projects focused on already integrated datasets.

Students who work as an undergraduate research assistant with the KDSC join a data science research lab of other terrific students working on interesting projects. This lab includes both graduate students and undergraduate students from a range of disciplines.

Potential Job Tasks & Responsibilities: Undergraduate research assistants with the KDSC can work up to 10 hours per week and their tasks can include any or all of the following:

- Data Collection
- Data Cleaning
- Statistical Analysis
- Visualization
- Web development
- Dashboard development
- Technical report writing
- Attend weekly KDSC research lab meetings

Student Qualifications & Characteristics:

Required skills include:

- At least one statistics-focused course
- At least one coding-related course
- Willingness to learn

Position #59 Undergraduate Student Research Assistant

Mentor Name: Meghan Ecker-Lyster

Job Location: This position could be done remotely or in-person. **Number of Positions:** 1

Project Description: The Center for Educational Opportunity Programs’ Research, Evaluation and Dissemination Team (RED Team) holds program evaluation contracts for multiple Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) in the Topeka, Kansas City, and Wichita areas. This federal grant program is designed to increase the number of low-income students who are prepared to enter and succeed in postsecondary education. GEAR UP provides services at high-poverty middle and high schools. GEAR UP grantees serve an entire cohort of students beginning no later than seventh grade and follow the cohort through high school. The RED Team closely collaborates with GEAR UP staff to oversee the evaluation of these programs. The team evaluates student outcomes using large data sets that include academic, behavior, and activity participation data. The Undergraduate Student Research Assistant would have the opportunity to assist with data management task, including data entry, cleaning, and basic descriptive statistics with large, complex datasets.

Potential Job Tasks & Responsibilities: The student hired for this position will help with the entry of large sets of data as well as the maintenance of the online data management platform. This will include both manual entry of student participation data, as well as the upload and archival processes associated with large sets of educational data. The student will also be asked to work with entry-level descriptive statistics to inform program practice through monthly audits and reporting of data. The student would have the opportunity to assist with literature reviews and manuscript development.

Student Qualifications & Characteristics: Student must be proficient in Microsoft Suite programs (e.g., Word, PowerPoint, Excel). Scheduling for this position is flexible, working around student’s class schedule. This position requires attention to detail, willingness to ask questions, and a high level of organizational skills. This position is ideal for students interested in research in education, social work, psychology, sociology, or other related social sciences.

Position #60 Research Assistant in the Gillath Close Relationships Lab

Mentor Name: Omri Gillath

Job Location: The job requires the student to work in-person only. **Number of Positions:** 1

Project Description: The goal of the project is to collect data for research projects in the Gillath lab. There are several studies for emerging scholars to work on, which include (a) interactions with virtual reality/artificial intelligence and impact on loneliness, and (b) cognitive performance following attachment security priming.

Potential Job Tasks & Responsibilities: As a research assistant (RA) in the lab, emerging scholars will be in charge of preparing literature reviews, help search and create measures, run participants, pre-process data, and some would also engage in analyzing the writing-up the data.

Student Qualifications & Characteristics: Research Assistants should plan on attending weekly lab meetings and be available for 1-hour blocks during the time students are around (9-5); Successful applicants will have attention to detail, organized, highly motivated, and interested in close relationships and their underlying mechanisms.

Position #61 Baby-Music Intervention Research (MIR) Lab Assistant

Mentor Name: Deanna Hanson-Abromeit

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 1-2

Project Description: The vision of the Baby-Music Intervention Research (MIR) lab is to represent stronger scientific inquiry for how music facilitates responsive change and builds universal health for infants and families. The mission of the Baby-MIR lab is to build music intervention science by developing and strengthening theory, design, research, and practice of music interventions and more deeply understand the therapeutic role of music to promote developmental capacity, health and well-being for infants and their families. As a member of the Baby-MIR lab, the Emerging Scholars research assistant will contribute to a variety of related projects at various stages in the research cycle. Current projects include a community-based parent and infant music intervention, large-scale literature review, development of a music intervention for newborns exposed to opioids in utero. We are also involved in other music intervention studies including maternal health during pregnancy and adult respiratory health outcomes. We collaborate with researchers at KU-Lawrence, KU Medical Center and Hospitals, including the Baby Lab, Pulmonology, Neurology, Population Health, and the Kansas Birth Equity Network, and other institutions across the region. Learning opportunities extend into working with and learning from other researchers and disciplines involved in our projects.

Potential Job Tasks & Responsibilities: Students will have the opportunity to be a contributing member of the lab team, one that involves several undergraduate and graduate research assistants, and work on a variety of projects focused on music interventions, primarily early intervention for infants and families. Tasks are varied based on the needs of a project but may include conducting library data base searches of relevant literature, reading and summarizing content of articles, reporting summaries to the project team, coding of video and/or audio recordings of clinical music therapy services, drafting manuscript and grant application sections, and attending weekly lab and mentor meetings. Other responsibilities may include making copies, organizing materials and other administrative tasks. This is a hybrid position. Many tasks can be done off campus as we use collaborative workspaces (e.g., Dropbox, Microsoft Teams), but other tasks will require you to be in the lab setting (e.g., coding

video or audio data). There may also be opportunities to work directly with collaborators affiliated with our lab but in different locations.

Past Emerging Scholars have been active contributors to the project team, taken lead on several projects, conducted independent studies, and functioned as assistant project managers. Emerging Scholars are encouraged to participate in the spring Center for Undergraduate Research Symposium. Students will be required to complete human subjects training prior to involvement with clinical data. Research assistants should be able to attend and participate in weekly research lab meetings throughout the academic year, currently scheduled for 4:00 p.m. on Wednesdays.

Student Qualifications & Characteristics: Curiosity, attention to detail, reliability, and the ability to work both independently and collaboratively are essential characteristics for research assistants in the baby-MIR lab. In addition, the student should be trustworthy, have strong communication skills, and maintain confidentiality of sensitive information. We value initiative and innovation, so those with a willingness to ask questions, and explore and contribute ideas are encouraged to apply. Basic knowledge of music (e.g., playing an instrument, participation in choir, band or orchestra, music theory) is helpful but not required. The ability to commit to 4-7 hours per week with the lab is desired; work hours can be flexible and tucked between classes and on evenings and weekends. Project tasks can be individualized to your availability and scheduled work hours; however, students must be available for the weekly research lab meetings (currently Wednesdays at 4:00), mentor meetings, and occasional project team meetings scheduled at mutually convenient times for the lab project specific team. This position is hybrid as some tasks require the research assistant to be in the lab, while others can be done from a remote location.

Additional Comments: Past Emerging Scholars have enjoyed the variety of tasks, opportunities to provide input and actively contribute to projects at various stages and to be involved with researchers at various levels (undergraduates, masters, PhD and faculty). Degrees have spanned, and other related fields. The Emerging Scholars work closely with the faculty mentor and doctoral student mentor(s) and have some type of involvement in all projects within the lab. The lab has had Emerging Scholars and research assistants from diverse backgrounds and areas of study, including music, music therapy, medicine, and psychology. We have benefited from and value a variety of perspectives.

Position #62 Team Hug Media Manager

Mentor Name: Maria Hugh

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: The "Team Hug" (Maria Hugh's) Lab works on improving services for children with autism by supporting educators and families in using effective instructional approaches and practices. A very important aspect of this work is ensuring our research and science gets communicated to the community! We need a media manager to connect our research to the community and improve services for autistic children and students.

Potential Job Tasks & Responsibilities: The student can co-develop innovative ways to get research into practice and improve the public's understanding of research! The student(s) will create social media and online content on instructional supports and strategies for children with autism and developmental disabilities. They will help record, edit, and develop blogs, podcasts, video tutorials, and online learning communities. For example, we will have weekly social media posts about the lab's work, videos of classrooms that can be used in courses to demonstrate

effective instructional approaches, media releases, visual abstracts, and other knowledge communication opportunities.

Student Qualifications & Characteristics: The following student characteristics will support a person's success in this: 1) familiarity with social media, Microsoft Office, and web-based communications and technology. 2) timeliness, 3) open communication, 4) attention to detail, 5) professionalism (e.g., ability to keep information confidential), 6) organization, and 7) willingness to learn new skills.

Additional Comments: Many tasks will be repetitive. No previous experience with research, understanding of research, or understanding of teaching is required.

Interests: Students who are interested in working in the fields of special education, psychology, mental health may be interested. If a student is interested in learning how to teach and support children with autism, this could be a good fit!

Position #63 Pardee AAC Lab Assistant

Mentor Name: Elizabeth Leatherman

Number of Positions: 1-2

Job Location: Some in-person work time is required. Option for some remote work, if interested.

Project Description: More than 5 million people in the United States use augmentative and alternative communication (AAC). AAC includes all forms of communication (other than oral speech) that are used to express thoughts, needs, wants, and ideas. In the Pardee AAC Resource and Research Laboratory, we have speech-generating devices for people who cannot use their voice to communicate because they are autistic, have cerebral palsy, have had a stroke, ALS, or any other diagnosis that impacts their ability to use their voice. We are a regional resource for students, professionals, and people who need AAC and their families. Our current research focuses on how individuals (including students preparing to be speech-language pathologists, teachers, etc.) learn about AAC systems. The Lab assistant's work will help us understand how students feel about their learning process and what they do during their learning time. They may also help develop guides and learning supports that constituents of our lab can use when learning about AAC systems.

Potential Job Tasks & Responsibilities:

1. Become familiar with a variety of AAC systems using the supports and guides available in the lab.
2. Complete Human Subjects Training.
3. Support general maintenance of AAC systems (e.g., software updates) and organization of the lab.
4. Assist with updating spreadsheets of AAC system inventory and loans.
5. Research activities can be selected based on student assistant interests, but could include:
 - a. Transcription of interviews
 - b. Coding video data of participants learning to use an AAC system
 - c. Supporting analysis of survey data about how graduate students perceive their learning experiences with AAC systems.
 - d. Data entry into spreadsheets
 - e. Development of recruitment databases (e.g., collection of email addresses from SLP program websites)
 - f. Literature searches and review of relevant articles related to AAC.
 - g. Developing glossaries and learning supports for students who visit the AAC lab
 - h. Development of surveys (to support existing projects or a related interest of the student assistant's)

Student Qualifications & Characteristics: The student assistant needs to have some availability between 8-5 on Monday, Wednesday, or Friday for at least some work hours. Remaining hours can be flexible and be on-campus or remote. Our student assistant should have basic familiarity with Microsoft Word, Excel, and PowerPoint (or the Google equivalents). Experience with iOS and/or Windows-based devices will be helpful. Attention to detail and organization are a plus. Areas of interest may include working with people with disabilities, technology, speech-language pathology, occupational therapy, physical therapy, music therapy, general or special education, or nursing.

Additional Comments: Some in-person work time is required. Option for some remote work, if interested.

Position #64 Sustainable and Equitable Energy Research Assistant

Mentor Name: Ward Lyles

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:**1-2

Project Description: Through KU's Center for Compassionate and Sustainable Communities, Professor Uma Outka (Law) and I are leading a Sloan Foundation-funded project investing state and local actions to promote a just and green energy future in Kansas. Kansas plays a pivot role in the US, as we have a long relationship with coal, oil, and gas that must end and emerging relationships with wind, solar, and perhaps even hydrogen; by times Kansas has been a top ten state for fossil fuel production and we're currently a top ten wind state, getting 44% of our electricity from air movements. In this project, our team of undergraduate and graduate students are looking at if and how Kansas communities - especially those often left out of prosperity and decision making - are experiencing the global transition away from fossil fuels. This project offers opportunities to be at the regional forefront of understanding and impacting how communities are pursuing (and blocking) a more equitable and sustainable future.

Potential Job Tasks & Responsibilities: Students should expect to be part of our twice-monthly research team meeting of undergraduate and graduate students, which allows for multi-level mentoring. They should also anticipate working close with graduate students in urban planning and law, as well as the professors, to collect and analyze data. This work can involve everything from web searches, to reading and coding documents to assisting with interviews. A large aspect of the work is focused on tools of use to communities, so there will be opportunities to help develop and test mapping websites, public engagement tools, and more.

Student Qualifications & Characteristics: Our teamwork centers on mutual respect and the desire to foster growth in all team members - from the newest undergraduate to the graying professors. As such, ability to communicate honestly and regularly is essential; that is, we expect our team members to reply to emails within a day or two and be as open as possible about what they need to do their job - and be a whole human being. We expect regular attendance at our meetings (usually 2x month, scheduled to fit everyone's constraints). Otherwise, the main desires are to be motivated and kind.

Additional Comments: Over the last decade, this network of students and faculty has had tremendous success in working together on diverse projects, helping mentor each other with school and life, and assisting students as they pursue their own journeys, including to the workforce (e.g. jobs in the federal, state, and local government, as well as an industry, and non-profits) or more education (master's and PhD programs).

Position #65 Use of Technology in Healthcare

Mentor Name: Brittany Melton

Job Location: This position could be done remotely or in-person. **Number of Positions:** 1-2

Project Description: This program involves a set of independent research projects that examine the use of technology in healthcare, such as electronic health records and medication alerts, and how these technologies impact patient care both from a patient and provider perspective, and how healthcare providers approach patient care when using new technologies. A student would be a welcomed study member, assisting in all aspects of research, including data collection/analysis, literature synthesis, and scholarly writing.

Potential Job Tasks & Responsibilities: A student would have a multitude of administrative and scholarly responsibilities that include data collection and chart reviews, data collection and analysis, literature review and synthesis, and development of new grants and publications. The student is not required to have prior experience with any of the listed activities and has the possibility of being included as an author on presentations and publications produced, if interested.

Student Qualifications & Characteristics: The student needs to have Microsoft Office (primarily Word and Excel) and organizational skills, be responsible and accountable with data and equipment, be self-motivated to complete tasks, be detail-oriented, able to work independently when given clear instructions, and able to maintain confidentiality. The student will be required to complete training on ethical conduct of research and protection of patient data upon joining the study team. While unlikely, a trip to the University of Kansas Medical Center is possible. Some exposure to healthcare is desirable but not required. This project would be a good experience for someone interested in or curious about healthcare professions, the role of technology in healthcare, or data management.

Position #66 Undergraduate Student Research Assistant

Mentor Name: Ludwin Molina

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 1

Project Description: Two concurrent projects:

1. One project examines Asian-American subgroups. The project uses the National Asian American Survey (2016) that includes measures of racial/ethnic identity, national identity, wellbeing, community engagement, voting behavior, political affiliations, and attitudes. Analyses include comparisons between and within Asian American subgroups.
2. The other project considers the implications of compulsory sexuality on conceptions of sexual identity, experiences, and perceptions thereof.

Potential Job Tasks & Responsibilities:

- Preparing literature reviews --reading and gathering relevant articles
- Meeting with mentor to discuss readings
- Searching and creating measures
- Pre-processing data—cleaning up data (open-ended responses) and assisting with categorization, coding, and interpretation of open-ended responses

Student Qualifications & Characteristics: The position requires no specific qualifications or characteristics beyond a desire for knowledge and willingness to learn.

Position #67 Intervention Research in Special Education

Mentor Name: Elizabeth Stevens

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 4

Project Description: Students will have the opportunity to learn about improving the education of elementary students facing challenges in reading and math. Students will work on one of two projects related to effective intervention: (1) creating an intervention to support students with mathematics difficulty and (2) testing a reading intervention for students with reading difficulty.

Potential Job Tasks & Responsibilities:

- Create intervention materials
- Create exciting visual displays to share research findings
- Use your social media expertise to share project information on social media sites
- Prepare materials for professional development and intervention work in schools
- Listen to audio-recordings of classroom instruction to code for the presence or absence of specific instructional practices (coding)

Students will be trained to complete one task at a time and will receive consistent support from the researcher to answer questions, problem solve, and celebrate when tasks are completed. Some tasks will need to be done in person at the Lawrence campus; other tasks can be done remotely. Students will be asked to attend a weekly check-in meeting with the project team. The student and researcher will work together to create a work schedule that works best for the student's preferences and schedule.

Interests: If you are interested in working as a teacher, working with students with disabilities, or learning about how we improve classrooms, this position might be for you! Also, if you are interested in learning about educational research, this may be a meaningful opportunity.

Student Qualifications & Characteristics:

- Consistent and clear communicator
- Completes tasks on time or communicates when additional time is needed
- Checks and responds to email daily during the workweek
- Familiar with social media and Microsoft Office applications (e.g., Microsoft Word, PowerPoint, Microsoft Excel)
- Excels with time management skills and organization
- Willingness to learn new skills and receive feedback

No previous experience with research, understanding of research, or understanding of teaching is required. No math skills are required, and students will not be asked to perform any calculations.

Additional Comments: This is a fun, collaborative team working to improve the reading and math performance of students with or at risk for disabilities. If you're passionate about helping others and improving the lives of children, this is your chance to dive deep into the action and level up education for everyone!

Position #68 Consent in Sexual Violence: Cross-cultural Perspectives in Japan and the US

Mentor Name: Akiko Takeyama

Job Location: The job requires the student to work in-person only. **Number of Positions:** 2

Project Description: The social and legal construction of consent lies at the heart of key debates about sexual violence in Japan and the US. Nonetheless, legal systems trace only validation of consent to determine whether a sexual act is permissible to both parties. Neither the content of consented acts nor structural inequalities is taken into consideration. This research project fills the gap between the legal construction of consent and the social practice of it in cross-culturally comparative ways.

This project is part of a collaborative research group, consisting of Japan-based and US-based anthropologists, sociologists, legal scholars, and media specialists. Research includes survey creation and analysis, focus group interviews, media analysis of the so-called rape myth, and historical construction and transformation of rape laws in these two countries.

The research finding will be disseminated through online workshops, online modules, and journal publication.

Potential Job Tasks & Responsibilities:

- Assist the faculty and the collaborative research group to set up meetings
- Assist to conduct research, analyze data, and organize materials for workshop/publication
- Transcribe collected interview data and codify them

Student Qualifications & Characteristics:

- Open-minded, non-judgmental attitudes
- Good communication skills and work ethics
- Excellence in working in a team
- Familiarity with basic software and digital technologies (Word, Excel, PDF, etc.)
- Willingness to study the proposed research area
- Basic knowledge about Japan and the US, as well as gender and sexual power dynamics

Position #69 Effective Interventions in Special Education

Mentor Name: Kathleen Tuck

Job Location: This position could be done remotely or in-person. **Number of Positions:** 2

Project Description: The purpose of this project is to identify interventions that are effective in supporting students with disabilities in preschool and elementary classrooms. Students will have an opportunity to work on two projects: (1) looking at what we know about interventions right now and (2) testing new interventions.

Potential Job Tasks & Responsibilities: Students will be asked to complete the following tasks: (1) looking at current articles about interventions and recording information (e.g., grade level of students, age of students, gender of students, intervention names), (2) gathering information from graphs in current articles, and (3) watching videos of classrooms. Students will be trained to complete one task at a time and will receive consistent support from the researcher to answer questions, problem solve, and celebrate when tasks are completed. Students will be asked to complete all of these tasks in an office on the Lawrence campus.

Student Qualifications & Characteristics:

Students will be required to complete work tasks for 1.5-3 hour blocks of time in an office on campus at a time scheduled with the researcher between 8am-5pm (exact times will be created based on the student's schedule).

Students will also be asked to attend a weekly meeting with the researcher (during the 1.5-3 hour work blocks). Students will be asked to schedule work times for at least 2 days a week. For example, a student may choose to work 2 hours on Tuesdays from 11am-1pm and 3 hours on Thursdays from 8-11am. Students will select work times with the researcher that work best for the student's preferences and schedule.

Qualifications: The following student characteristics are required to successfully complete these work tasks:

1. timeliness,
2. open communication,
3. attention to detail,
4. professionalism (e.g., ability to keep information confidential),
5. organization, and
6. willingness to learn new skills.

Many tasks will be repetitive. No previous experience with research, understanding of research, or understanding of teaching is required. No math skills are required, and students will not be asked to perform any calculations.

Interests: Students who are interested in working as an elementary school teacher, preschool or daycare teacher, job teaching children, or job working with young students with disabilities may be interested. If a student is interested in learning more about how we improve classrooms, this may also be a meaningful opportunity.

Position #70 Language Networks

Mentor Name: Michael Vitevitch

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 2

Project Description: We are trying to understand how people understand and produce spoken language. We do so by studying naturally occurring speech errors and by doing laboratory-based experiments (or simple tasks that tell us how the language system is built). We then use mathematical techniques from network science to map out how the words you know might be organized in memory such that they can be quickly and easily retrieved from memory (or not).

Potential Job Tasks & Responsibilities: Students will: read related research articles that will be discussed at regular lab meetings, be trained in the ethical treatment of human subjects, prepare materials for experiments and other research projects, assist in collecting and analyzing data, and assist in the presentation of the findings.

Student Qualifications & Characteristics: Students should have: a 2–3-hour block of time available at least once a week, careful attention to detail, good organizational skills, good interpersonal skills, basic experience with computers and various software packages (e.g., Word, Excel, calendars), and an interest in language.

Position #71 Research Assistant, KU Trade War Lab

Mentor Name: Jack Zhang

Job Location: The student can work either in person or remotely (hybrid). **Number of Positions:** 1-2

Project Description: The KU Trade War Lab (TWL) invites highly motivated and team-oriented undergraduate students to work on several projects studying the political economy of the US-China Trade War. Our lab provides a strong foundation for students interested in data science or graduate school in economics, political science, and/or business. The TWL is a social science lab dedicated to dual-mission:

- 1) Understand the US-China Trade War and its impact on heartland communities through a bottom up, data-driven, firm-centric approach.
- 2) Empower policy-relevant academic research by teams of undergraduate and graduate students through collaboration and mentoring.

The TWL has participated in the Emerging Scholars Program since 2020 and developed a strong record of undergraduate research mentorship. Dr. Zhang is winner of the 2021 Schowen Undergraduate Research Mentor Award, the 2022 J. Michael Young Academic Advisor Award, the 2023 Grant Goodman Undergraduate Mentor Award, and the 2024 KUJA International Teaching Award for his work with students in the lab. Many TWL research assistants have won KU's Undergraduate Research Award (UGRA).

Potential student tasks and responsibilities: Specific responsibilities include:

1. Coding industry-issues from government reports and data entry
2. Researching industry associations and Congressional legislation
3. Tracking headlines about the US-China trade war
4. Writing short reports on episodes of economic sanctions
5. Emailing and calling businesses for survey work
6. Populating spreadsheet on firm attributes using databases such as Dun & Bradstreet
7. Web-scraping tariff exclusions data from government websites

Student Qualifications & Characteristics: No prior research experience required, but interest in international economics, business, law, & politics preferred. The ideal candidate is a self-motivated, detail oriented, friendly, and responsible team player with good time management skills.

TWL Research assistants are expected to work 5-8 hrs./week (more available during the summer) and be available for a weekly lab meeting (60mins).

Other preferred qualifications:

1. Course work in economics or statistics
2. Familiarity with Excel/google spreadsheets
3. Proficiency with statistical software such as STATA or R
4. Course work in an East Asian language (Chinese, Japanese, or Korean)

Additional Comments: For more information about the KU Trade War Lab or the PI (Dr. Jiakun Jack Zhang):

<https://sites.google.com/view/jackzhang/twl?authuser=0>