Emerging Scholars

2022-2023 Job Descriptions

- Arts positions
- Business and Communications positions
- Engineering and Computer Science positions
- Humanities positions
- Natural Science positions
- Social Science positions

Arts

Position #1; *Joe Colistra*

Mentor name: Joe Colistra, Architecture

Job/project title: Project Coordinator

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: This research initiative involves the Scholarship of Engagement. This position will allow an emerging scholar to engage with faculty, researchers, industry partners, and community members in the creating new knowledge through The Downtown Lawrence Design Center and its community engagement activities. The Downtown Lawrence Design Center is a new initiative of the School of Architecture and Design that would embed students and researchers in downtown Lawrence on Mass Street working on specific downtown planning and design issues that can be developed, disseminated, applied to a scale that is global in its reach and impact. This initiative will engage faculty from both the Departments of Architecture and Design and will forge collaborations with community stakeholders and industry partners.

Potential student tasks and responsibilities: The student will need to be present in a downtown Lawrence location providing coordination and support for community collaborations and projects including background research, graphics, public meetings, design reviews, architectural critiques, and panel discussions. The student will be asked to assist in the coordination of events in the Center, engage with the public, explain the mission of the Center, provide information about the School of Architecture & Design. There may also be the need to assist with the design of displays of exhibits of faculty/student work including boards, drawings, models, publications, etc.

Student qualifications and characteristics: Outgoing, curious, friendly, takes initiative, detail oriented, responsible. It would be ideal that the student be present at the Center in Downtown Lawrence during their work hours, however, these hours can be flexible.

Additional comments: Center location is anticipated to be on Massachusetts street in downtown Lawrence.

Position #2; *María Velasco*

Mentor name: María Velasco, Visual Art

Job/project title: Reclaiming Home: Remembering the Topeka Bottoms

Remote or in-person: This position could be done remotely or in-person.

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 student tasks and 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.

This project will continue through the academic year 22-23.

Student qualifications and 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.

Additional comments:

Business and Communications

Position #3; *Kim Bruns*

Mentor name: Kim Bruns, School of Journalism and Mass Communications

Job/project title: Undergraduate Research Assistant

Remote or in-person: This position could be done remotely or in-person.

Project description: The Center for Digital Inclusion (CDI) is located at the University of Kansas School of Journalism and Mass Communications.   The focus of CDI is to enhance citizens' digital access and information literacy, especially among underserved populations, through community-based research and evidence-based technology education. An emerging scholar would be an important member of our team (faculty, graduate/undergraduate students and staff) and would gain experience in working on research projects and gain knowledge in the importance of access to digital technology and community-based research approaches.

Potential student tasks and responsibilities: Along with the opportunity to be involved in research activities related to CDI's National Science Foundation-funded project aimed at supporting marginalized women's technology learning, the Undergraduate Research 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 outreach and research activities

3. Involved in conducting literature review

4. Participate in research team meetings

5. Other tasks that spark the student's interest

Student qualifications and characteristics:

1. Interest and willingness to learn about digital inclusion

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

Position #4; *Joel Mendez*

Mentor name: Joel Mendez, School of Public Affairs and Administration

Job/project title: Developing an Equitable Transit System

Remote or in-person: This position could be done remotely or in-person.

Project description: The objective of this project is to explore ways in which transit service providers can better meet the needs of vulnerable and transit dependent persons. This project will focus on exploring ways in which transit service providers eliminate barriers which may discourage people from taking transit.

One common barrier which people experience is fare affordability. In an effort to address this issue several transit service providers (Kansas City area Transportation Authority, Denver Regional Transportation District, and Los Angeles County Metropolitan Transportation Authority) are considering eliminating bus fare. In this project we will explore the case of one major transit provider which has already eliminated bus fares. We explore how this policy has impacted the access which people have to essential destinations/services which can greatly enhance quality of life and the ability to escape poverty.

Another barrier which may discourage people from taking transit is centered around safety. Here we will explore how students perceive their personal safety while using transit and how that impacts their access to essential destinations/services. Findings will provide information to transit agencies which will allow them to gauge how they are serving the needs of vulnerable members of their ridership base. This can inform planning and policy decisions that may contribute to the delivery of services that more adequately serves the needs of the populace.

Potential student tasks and responsibilities: Students will be tasked 1) Searching for documents, such as reports and research articles, which can help develop this project, 2) Collect basic demographic information for cities from sources like the US Census, 3) Administrative duties such as organizing datasets and reports in a Microsoft Teams page. There will also be opportunities to help in the development of a survey which will collect the data needed to carry out this project.

Student qualifications and characteristics: Applicants should be interested in equity, curious, enjoy detective work, organized, an excellent reader, and detail oriented.

Additional comments: The working schedule is flexible based on a student's commitments.

Position #5; *Ashley Muddiman*

Mentor name: Ashley Muddiman, Communication Studies

Job/project title: Digital News and Politics

Remote or in-person: This position could be done remotely or in-person.

Project description: The Digital News and Politics team is working on several projects related to the messages politicians, news organizations, and members of the public post about politics in digital environments (e.g. social media, news websites). These projects study questions including: do clickbait news headlines help or hurt local news organizations? Do the social media pages of women (and women of color) running for political office include more incivility than the social media pages of white men running for political office? How do users' expectations of different social media platforms (e.g. Facebook, Twitter, Instagram) affect the types of political messages posted to these sites? The team uses social scientific methods, including content analysis and experiments, to answer these types of questions. The research assistant will work on tasks related to a variety of these projects during the academic year. The project is perfect for a student interested in politics, journalism, and/or digital communication.

Potential student tasks and responsibilities: The research assistant will meet weekly with the faculty mentor and engage in a variety of tasks as needed for projects like those described above. These tasks include (but are not limited to): finding relevant scholarly literature; managing and cleaning datasets (including the text and images of social media posts); transcribing recorded interviews; categorizing social media posts according to their content (that is, serving as a content analysis coder); developing experimental stimuli with the faculty mentor.

Student qualifications and characteristics: The research assistant should be: available for a two hour weekly (virtual or in-person) meeting with the faculty mentor during regular business hours (9am-5pm M-F); organized and attentive to detail; and interested in politics, journalism, digital communication, and/or social science research generally.

Position #6; *Cameron Piercy*

Mentor name: Cameron Piercy, Communication Studies & Human-Machine Communication Lab

Job/project title: Technology and the Modern Workplace

Remote or in-person: This position could be done remotely or in-person.

Project description: Are you interested in how people work with complex technologies (like algorithms, artificial intelligence, 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. You will also have the opportunity to review interviews with people who work with complex technology, learn how to code interview data, and even design new survey's and experiments for the future. The only requirement is an interest in technology and work.

Potential student tasks and responsibilities:

-Find and summarize new research on technology use at work.

-Help maintain a growing database of human-machine communication research (see https://hmc.ku.edu)

-Review and code interviews with people who work with complex technologies.

-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 and 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: Working with an Emerging Scholar this past year has been outstanding! We knew my Emerging Scholar was going to leave KU in November of last year, but I think she stayed the full year

here because she's enjoyed what we've been up to. She even created her own experiment in the process--I've been so proud of her!

Position #7; *Nagarajan Sethuraman*

Mentor name: Nagarajan Sethuraman, Analytics, Information, and Operations Management, School of Business

Job/project title: Analytics for Supply Chain Management and Innovation

Remote or in-person: This position could be done remotely or in-person.

Project description: In this project, we explore the link between firms' supply chain management abilities, innovation capabilities, and stock market performance. The project would utilize data from multiple sources and use analytics/ statistical methods to explore this link. For example, we will be collecting and analyzing data from patents filed in the united states, US stock market filings, and supply chain data from data sources such as COMPUSTAT. The undergraduate student researcher will work closely with me (Nagarajan Sethuraman) to understand the project scope, collect data, and eventually also help with analyze data.

Potential student tasks and responsibilities: - The student will learn the basics of supply chain management

- The student will learn data collection and organization methods that are at the core of many analytics careers.

- The student will learn the basics of patents and technological innovation

- The student will eventually also help me with data analysis, visualization

- If the student makes sufficient progress, they may also help me with writing.

Student qualifications and characteristics: 1) Ability to meet and work on Fridays (it can be through Zoom)

2) Desire to learn more about analytics, data collection, and management

3) Preferably students who are pursuing engineering/business majors

4) Students who want to pursue a career in supply chain management or analytics will benefit the most

5) An interest in graduate school (MBA/MS/Ph.D.) after your undergraduate degree would be a plus though certainly not a must

Position #8; *Karthik Srinivasan*

Mentor name: Karthik Srinivasan, Analytics, Information, and Operations Management

Job/project title: Developing model agnostic methods for machine learning interpretability

Remote or in-person: This position could be done remotely or in-person.

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 student tasks and 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 and 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 preferrable, 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 #9; *Emily Vietti*

Mentor name: Emily Vietti, Institute for Leadership Studies

Job/project title: Undergraduate Research Assistant

Remote or in-person: This position could be done remotely or in-person.

Project description: The Appointments Project & Ready to Run Kansas Women's Leadership Series is a collaborative partnership between the Institute for Leadership Studies and United WE in Kansas City that empowers Kansas women with the skills, knowledge, and confidence to run for public office and serve on civic boards and commissions. As a part of this partnership, we conduct a yearly data collection and research project to better understand how many women are serving on municipal boards and commissions in Kansas, as well as the broader gender parity trends in civic service across the state. Our 2021 report from the first cycle of this project found that women are underrepresented on municipal "power" boards that have a direct influence on policymaking and financial resources in Kansas cities/towns, holding only about 25% of seats on planning/zoning boards. Future research will continue to track representation trends and also examine issues of information access and transparency that may impede women's appointments to these boards/commissions. (The full 2021 report can be accessed here: https://womenlead.blog.ku.edu/wp-content/uploads/2022/04/Banwart_Vietti_Gender_Balance.pdf) We are looking for a research assistant who can help us collect and organize the data for the 2022-2023 cycle of this research project, as well as assisting with ideas and additional data collection to help us expand the scope of the project.

Potential student tasks and responsibilities: Our undergraduate research assistant primarily will be tasked with helping to collect and organize the data for the next iteration of our report on gender equality on municipal board and commissions in the state of Kansas. This will include (but is not limited to): collecting information from city/county websites; sending email requests; requesting information via phone; submitting records or Freedom of Information Act (FOIA) requests; organizing information using spreadsheets in Excel and/or web applications; assisting in data interpretation and visualization (making graphs and charts); assisting in report writing.

Student qualifications and characteristics: We hope that the student who wants to work with us recognizes the importance of women's civic leadership and having women represented in decision-making spaces, as that is the overriding theme of the work. Our undergraduate research assistant will be completely trained to do the work we are asking them to do, so they do not currently need to know how to do any of the tasks listed above, however we would love someone who is eager to learn and willing to take risks and experiment. We are able to be flexible with schedule and modality (in-person vs. Zoom), and we hope that the undergraduate research assistant will also be flexible as the project develops over

the course of the year, as job responsibilities may shift over time. Finally, as this is a relatively new project with a lot of room for expansion and change, we hope to find a research assistant who can bring creativity and new ideas to our team.

Engineering and Computer Science

Position *#10; Alan Allgeier*

Mentor name: Alan Allgeier, Chemical and Petroleum Engineering

Job/project title: Material Science: Porous Materials

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: In the field of material science, porous materials play many important roles. Separation of gas mixtures can be effected using porous materials with opening sizes similar to the diameter of the gas molecules, catalysts can be developed based on porous materials that enhance reaction rates and in biotechnology porous materials can be used as drug delivery agents or as tissue scaffolds. Our group has several tools for characterizing the size and volume of porous media.

Potential student tasks and responsibilities: Student will be responsible for learning about porous materials and conducting characterization of the materials using tools such as gas adsorption, nuclear magnetic resonance (NMR) and others. For these tests the students will weigh out the solids, and potentially do serial dilutions (for NMR) and operate the equipment. In doing gas adsorption the student will use vacuum ovens and measure weight loss on drying, install samples on a high vacuum line and operate the instrument which also uses liquid nitrogen. For NMR the student will make samples of a known polymer to water ratio and place them in the instrument, which uses magnetic fields to "look" at the water inside the pores. The work can easily be broken down into portions to facilitate student schedules during a day / week. After running the test the student will tabulate data in Excel and work with grad student collaborators to understand how the pore size affects things like gas separation and reaction or, in the other project, drug delivery.

Student qualifications and characteristics: 1) Majoring in Science or Engineering (engineering preferred).

2) High school chemistry and physics and 4 years high school math

3) Scheduling: minimum 4 h/ week of total work with at least one 2 hr block per week and one weekly 30 min work planning meeting with a graduate student supervisor

4) Familiarity with Microsoft Excel and Microsoft Operating System in general.

Position #11; Caroline Bennett

Mentor name: Caroline Bennett, Civil, Environmental, and Architectural Engineering

Job/project title: Fatigue & Fracture - Research in Structural Engineering

Remote or in-person: This position could be done remotely or in-person.

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 student tasks and 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 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 and 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.

Position *#12; Amy Hansen*

Mentor name: Amy Hansen, Civil, Environmental, and Architectural Engineering

Job/project title: Water Quality in Wetlands, Streams and Watersheds

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: In this position students will assist with projects that aim to water quality in wetlands, streams and rivers in rural landscapes. Interested students may develop an independent research question to explore once they are experienced with the lab equipment and protocols. Broadly, we measure water chemistry and velocity and investigate the interactions.

Potential student tasks and responsibilities: The student will be involved in a wide variety of activities all around the research focus of environmental water quality. These tasks may be in the lab, in the field or on a computer.

In the field, as part of a team, students will collect water samples from streams and wetlands and measure chemical or physical characteristics using sensors.

In the lab, students will filter water samples, dry and weigh sediment samples, wash lab dishes, collect velocity measurements, and run analytical equipment to measure water chemistry.

At a computer, students may download sensor data, upload field notes and create graphs of results.

As part of the research group, students will attend group meetings and learn about the research being done by other members of the group.

Student qualifications and characteristics: This student should have an interest and curiosity toward improving environmental sustainability especially related to wetlands, lakes and streams. Our research is both outdoors and in laboratories so the student should be willing to get their hands wet and enjoy learning new skills. Most of our work involves collaborating with other group members so clear and consistent communication to schedule work times, share concerns, discuss plans is required.

Position *#13*; *Justin Hutchison*

Mentor name: Justin Hutchison, Civil, Environmental, and Architectural Engineering

Job/project title: Characterization of contaminated soils

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: The research component of the proposed career-development plan seeks to prevent human exposure to emerging contaminants by adapting Thermal Proteome Profiling (TPP) techniques for environmental-engineering uses, specifically applied to contaminated soil. The student will assist a graduate student in characterizing soil cores taken in collaboration with the Kansas Geological Survey.

Potential student tasks and responsibilities: The student will be responsible for characterizing soil cores taken in collaboration with the Kansas Geological Survey. The characterization will include established protocols currently used in the lab including conductivity, pH, and texture.

Student qualifications and characteristics: Students should be willing to participate in in-person experimental activities that consist of three-hour blocks of time. Students should have familiarity with (or be willing to learn) Excel to manage data. Students interested in Environmental Engineering or Environmental Science may find the work better aligned with their professional interest.

Position #14; David Johnson

Mentor name: David Johnson, Electrical Engineering and Computer Science

Job/project title: Human Robot Interaction Studies

Remote or in-person: This would be an in-person position for the 2022-2023 year.

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 student tasks and 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 and characteristics: Currently enrolled in or have completed EECS 138, EECS 168, or equivalent high school or middle school programming course.

Position #15; *Masoud Kalantari*

Mentor name: Masoud Kalantari, Chemical and Petroleum Engg

Job/project title: Data Science Scholar for Energy and Environment

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Emerging scholars will join my research Center for Net Carbon Zero GeoEnergy Intelligence and Sustainability (https://C0GEiS.ku.edu/) to contribute to our multiple ongoing multidisciplinary research on Earth, Energy, and the Environment.

CⓄGEiS is established to provide integrated education and research platform to host undergraduate and graduate students, especially women and minorities, to conduct multidisciplinary research in sustainable renewables and net-zero energy, emphasizing data science and digital 4.0 technology development.

Potential student tasks and responsibilities: 1. Students will have an opportunity to get themselves exposed to real-life examples and transformational research projects.

2. They will learn some principles of data science

3. They work with my Ph.D. graduate students

4. Depending on their background knowledge and the passion for learning they will be assigned to different projects.

5. They will contribute to the scholarly publications (conference presentations and or journal publications)

Student qualifications and characteristics:

• We need passionate and hardworking students. Emerging scholars especially women and minorities are strongly encouraged to apply.

• Students should be available for a one-hour weekly meeting in addition to being physically present in the computational lab.

Position *#16; Remy Lequesne*

Mentor name: Remy Lequesne, Civil, Environmental, and Architectural Engineering

Job/project title: Engineering Research on Reinforced Concrete Structures

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: My research group is interested in how reinforced concrete (RC) structures respond to a variety of loads, such as traffic loads, wind loads, and earthquakes. We study ways to make RC structures safer and more efficient. Much of our work is experimental, which means we build structural components (pieces of buildings like beams and walls) and then load them until failure. By studying the deformations and failure modes, we learn a lot about how to improve the design.

After you get experience in our laboratory, and depending on your interests and the specific projects that are active at the time you join our group, I will aim to find some feature of ongoing projects that you can take ownership of. This is something we can decide together. For example, this could be analysis of data or testing of specific specimens we design together.

Potential student tasks and responsibilities: If you joined our group, you would start by working in our laboratory alongside graduate students and other undergraduate students building, testing, and disassembling specimens. Your responsibilities would include helping to build the formwork, tie reinforcement, and cast concrete, as well as setting up for and helping to test specimens. You can also attend our group meetings and help us to interpret results.

Student qualifications and characteristics: I seek students considering studying Civil or Architectural Engineering, especially those with an interest in structural engineering. Given the type of research we do, experience with construction or tools is great - but absolutely not required. We teach you what you need to know to contribute while also being safe.

You will need to be available to work in the lab during normal business hours - it is best if you have blocks of time (at least 3 hours long) that are open during the day.

Position #17; *Jian Li*

Mentor name: Jian Li, Civil, Environmental, and Architectural Engineering

Job/project title: Research in Smart Structures Technologies

Remote or in-person: This position could be done remotely or in-person.

Project description: 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 and bridges) 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 algorithms and data science and develop models 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 student tasks and responsibilities: Tasks include assisting with laboratory or field experiments such as setting up the tests, sensor installation, testing, data/image collection, supporting data analysis, and participating in group discussions. Laboratory tests involve applying dynamic loading to structures such as using shaking table to simulate earthquakes and magnetic shaker to mimic wind or traffic loading.

Student qualifications and characteristics: Show interest in structural engineering and would like to try new things from other disciplines (such as computer science and electrical engineering) to improve the civil infrastructure integrity and hence the well-being of society.

Position #18; *Jilu Li*

Mentor name: Jilu Li, The Center for Remote Sensing of Ice Sheets, Electrical Engineering and Computer Science

Job/project title: associate research professor

Remote or in-person: This position could be done remotely or in-person.

Project description: As the advancement of technology, the use of unmanned aircraft systems has tremendously expended from military applications to many non-military applications such as aerial photography, scientific survey, infrastructure inspection, forestry, agriculture, disaster relief, search and rescue, policing surveillance, product delivery, public and commercial formation show, sports and recreation; and more and more small and medium sized drones fly at low altitudes with various system and payload sensors that are highly integrated into limited avionics bay space and operate at different frequency bands. At the same time the regulatory authorities are squeezing frequency allocations closer and closer. As a result, the possibility of unpredictable performance and even loss of control of UAS duo to interferences from ubiquitous electromagnetic emissions increases. UAS electromagnet compatibility has therefore become a critical consideration in UAS design and operation in order to reduce any potential safety risks and an important subject of investigation.

I seek an EECS undergraduate student to participate in our ongoing research project funded by FAA to evaluate unmanned aircraft systems electromagnetic compatibility. In this project, we will simulate in computer and testing in anechoic chamber how radio frequency signals as interferences (RFI) will affect the safety and performance of a small drone.

Potential student tasks and responsibilities: The student will be trained to use MATLAB to generate radio signals in different frequency bands such as the signals from FM radio an cell phone transmit towers and airport surveillance radar , and the simulated signals will be input into a SDR (software defined radio) device to be transmitted in the anechoic chamber where the small drone is under test. More complex work includes using SDR with Simulink to assess RFI effects on drone's C2 (command and control) link. The student is also expected to assist in testing preparation in the chamber, performing some basic processing and analysis of test data, and writing test reports.

Student qualifications and characteristics: Required Qualifications:

Currently enrolled in Electrical Engineering and Computer Science

Ability to work 6 hours per week in 3 2-hour blocks

Position #19; Lin Liu

Mentor name: Lin Liu, Mechanical Engineering

Job/project title: Engineering Research on Next-generation Lithium-ion Batteries

Remote or in-person: This would be a remote position for the 2022-2023 year.

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 student tasks and 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 and 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 position through summer of 2020 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 #20; *Jennifer Lohoefener*

Mentor name: Jennifer Lohoefener, Electrical Engineering and Computer Science/Institute for Information Sciences (formerly ITTC)

Job/project title: Data Science in Education Exploration

Remote or in-person: This position could be done remotely or in-person.

Project description: The purpose of this work will be to determine new research avenues within the fields of education, data science, and formal methods. There are many ways in which these fields overlap. What exactly are they? What's worth pursuing? What's already been explored? These are questions I need help answering.

Have you ever wondered how artificial intelligence systems function or can be guaranteed correct? Do you ever wonder if there are gaps in our existing teaching and learning techniques? Is it possible to know whether students are being equipped with the information they need to be successful after graduation?

I'm proposing that the field of data science can help us understand and answer these types of questions. This project is to help get that effort started. Your work will have a direct impact on the future research efforts in these fields.

Potential student tasks and responsibilities: Students can expect to participate in the following activities as part of this project:

* Review existing research efforts in the data science, formal methods, and education spaces

* Identify and prepare datasets for exploratory analysis and modeling

* Suggest innovative ways for advancing research in the education industry

* Communicate research findings verbally and in written form (e.g. visualizations, papers, demos, participation in lab working sessions, etc.)

Student qualifications and characteristics: About You... You are a self-starter who wants to define high impact problems that need solving. You are curious and innovative and cringe at the saying "that's how we've always done it". You have a desire to make an impact, big or small, in the field of education. You LOVE a challenge, aren't afraid of failure, and thrive on data. You agree that a deep-rooted curiosity and desire to learn are more important than checking the technology skillset checkboxes. If these characteristics sound like You, I want to work with You!

Position #21; *John Paden*

Mentor name: John Paden, Center for Remote Sensing of Ice Sheets

Job/project title: Radar data analysis and programming

Remote or in-person: This position could be done remotely or in-person.

Project description: The Center for Remote Sensing of Ice Sheets (CReSIS) designs and develops radar systems and conducts ground based and airborne field experiments in the polar regions. The data (>1000 TB) 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 and analyze the radar data to produce data products for the international glaciology science community.

Potential student tasks and 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 and characteristics: We expect student to be

1. interested in learning about multi-disciplinary research (programming, geographic information systems, radar, 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 #22; *Elaina Sutley*

Mentor name: Elaina Sutley, Civil, Environmental, and Architectural Engineering

Job/project title: Equity-driven Infrastructure

Remote or in-person: This position could be done remotely or in-person.

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 student tasks and 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 and characteristics: Passion about social equity, interest in disasters like floods and tornadoes, and some competence in Microsoft Excel and online search.

Position #23; *Elaina Sutley*

Mentor name: Elaina Sutley, Civil, Environmental, and Architectural Engineering

Job/project title: Assessing the Role of Buildings and Organizations in Community Disaster Resilience

Remote or in-person: This position could be done remotely or in-person.

Project description: The goal of this research is to transform current understanding of prioritizing structural design levels of buildings in communities through consideration of social, economic, and environmental factors by placing measurable value on the services and goods offered from organizations in times of normal operation and crisis. Fall 2022 will start the fourth year of the project, and we will focus on survey-based data collection and subsequent data analyses.

Potential student tasks and responsibilities: The Emerging Scholar will assist with preparing and distributing mailed and phone surveys to businesses in the United States, as well as subsequent data cleaning and data analysis. The Emerging Scholar will work with the professor and graduate students on this research.

Student qualifications and characteristics: Passionate about helping communities prepare and recover from disasters, and some competence in Microsoft Excel, Word, and Powerpoint.

Humanities

Position #24; *Giselle Anatol*

Mentor name: Giselle Anatol, English

Job/project title: Research Assistant at the Gunn Center for the Study of Science Fiction (CSSF)

Remote or in-person: This position could be done remotely or in-person.

Project description: The Director of the Gunn Center for the Study of SF (science fiction, fantasy, horror, magical realism, and other speculative literature) seeks a research assistant to help create and build a digital database of materials housed in the CSSF office in Wescoe Hall. Developing the database will include assisting a graduate student with data entry, researching reviews, and an independent project, if the RA desires, such as reading and blogging about unusual discoveries in the CSSF holdings, or a specific area of interest, like Asian American fantasy novels, or African American vampire fiction, or representations of emergent technologies. The RA will also be asked to assist in organizing, promoting, and staffing Gunn Center events, such as the Sturgeon Symposium in late September. The position provides opportunities to develop professional, academic, and social skills that are often desired by employers.

Potential student tasks and responsibilities: Adding titles, authors, publication information, and other details to the CSSF digital database;

Designing and distributing flyers (hard copies and digital) for CSSF events and programs during the academic year;

Helping to organize the Sturgeon Symposium, Sept. 29-30, 2022 (reserving hotel rooms, making meal reservations, coordinating itineraries for campus visitors, attending events and staffing registration tables, etc.);

Student qualifications and characteristics: An ideal candidate does not need to be familiar with speculative traditions (e.g., sci fi, fantasy, horror, etc.), but should enjoy reading and have some curiosity about the subject.

Applicants must be organized, able to meet deadlines, attentive to details (for accurate data entry and proofreading flyers), and possess strong communication skills for working with the director, graduate student assistants, and the public (if staffing Center events).

Weekly check-in meetings can occur in person or by Zoom.

Position #25; *Sarah Arbuthnot Lendt*

Mentor name: Sarah Arbuthnot Lendt, English - History of Black Writing

Job/project title: HBW Project Assistant: Social Media

Remote or in-person: This position could be done remotely or in-person.

Project description: The History of Black Writing's (HBW) mission is to recover and promote writing by Black authors through a digital archive, scholarship, and public programming. HBW's work is student-driven with a team of undergraduate and graduate students who work closely with a faculty director and project manager. HBW's key goal is to educate and professionalize students within a collaborative environment working with advisers and mentors from inside and outside the university. Student involvement is crucial to every aspect of our project.

Potential student tasks and responsibilities: As the HBW Project Assistant: Social Media, you'll work as part of a team to implement HBW's communication strategy to increase our online visibility and audience across social media platforms like Twitter (@ProjectHBW), Instagram (ProjectHBW) and Facebook (ProjectHBW), as well as our website (http://hbw.ku.edu/). In this role you'll utilize research on Black writers and culture and build on your own experience with and consumption of social media to craft social media content and grow our audience. This is a great public-facing position if you are interested in one or more of the following: writing, research, social media, communications, journalism, media, literature, graphic design, popular culture, outreach, analytics, website design, audio/video production.

Student qualifications and characteristics: The HBW Project Assistant: Social Media should have:

• Effective written and verbal communication skills;

• A strong motivation to learn and be mentored;

• A proactive and focused attitude;

• The capability to prioritize tasks, manage time, and meet deadlines; and

• The ability to work collaboratively within a team.

The HBW Staff meets monthly and the Social Media Team meets regularly, as well, either weekly or biweekly.

Additional comments: Please note that these ES would be mentored by both Dr. Ayesha Hardison, HBW Director and Sarah Arbuthnot Lendt, HBW Research Project Manager.

Position #26; *Yi-Yang Chen*

Mentor name: Yi-Yang Chen, Music

Job/project title: Entrepreneurship in Music

Remote or in-person: This position could be done remotely or in-person.

Project description: The pandemic truly changed how we make music. Fortunately, the online platform has shortened the distance between us and provided opportunities to learn right at home. We want to showcase the students' achievements and celebrate all of the performances. This project will explore new formats, in-person and online, for young musicians to be involved and engaged through music festivals, competitions, conferences, and masterclasses. And we will build an "ideal" model based on the findings.

Potential student tasks and responsibilities: You will be asked to analyze and compare existing models of musical learning - this includes reading missions statements, reviewing brochures and websites, collecting information on the costs and tuition for the current festivals, competitions, conferences, and masterclasses. We will put up "ideal" events for festivals, competitions, conferences, and masterclasses based on our findings - this will require writing and designing a website and posters.

Student qualifications and characteristics: It is preferred if you have interested in music, and it is a bonus if you have been to music camps or music-related events. You should consider this position if you are eager to explore and would like to be a future leader at a non-profit organization. Writing skills are required.

Mentor name: Christopher Forth, History

Job/project title: Fight Club Culture and the Global Far Right

Remote or in-person: This position could be done remotely or in-person.

Project description: This project explores the legacy of the novel/film Fight Club as it functions in relation to contemporary anxieties about masculinity, specifically as they are articulated in far-right politics. A central theme of Fight Club is alienation in the midst of modern abundance and a sense that modern consumer lifestyles leave something "missing," especially in relation to the experience of masculinity. In the face of the perceived emptiness of modern life, fighting without anger promises a dramatic experiential transformation and a lived sense of "aliveness" that borders on the religious. This is evident in the ubiquity of Fight Club references in social media and the memes of the "manosphere" but also in the many "real-life" fight clubs it has inspired or which have appropriated the name. The "fight club" label has been applied to underground boxing/MMA clubs around the world, with many illegal fights boldly promoting themselves on social media platforms. And, most importantly, it is frequently evoked among those connected to the global far right as an indictment of modern life and inspiration for the regeneration of white masculinity. What we might call "fight club culture" may be viewed as a kind of "revolt against the modern world," a phrase borrowed from the fascist writer Julius Evola that many far-right groups and clothing brands have adopted as a slogan.

Potential student tasks and 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 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 and characteristics: While students considering a major in gender 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 #28; *John Gluckman*

Mentor name: John Gluckman, Linguistics

Job/project title: African Storybook Digital Illustrations

Remote or in-person: This position could be done remotely or in-person.

Project description: The purpose of this project is to document the various languages spoken in the community of resettled and immigrant Africans in and around Kansas City. Many of these languages are from minority communities in Africa and are at risk of being lost within a few generations. The project participants, which include both graduate and undergraduate students, are collaborating with speakers and families currently living in the Kansas region. A central component of the documentation process involves collecting oral narratives and stories from the different language communities. The hired student will help with this aspect of documentation, creating online "storybooks" to be used within the community. The finished products will be made publicly available via African Storybook (africanstorybook.org).

Potential student tasks and responsibilities: At the beginning, the student will be asked to create digital illustrations for narratives which have already been recorded and translated, working in collaboration with other team members. Over the course of the year, the student will participate in weekly meetings and elicitation sessions with native language speakers. During this time, the student will learn how to conduct an elicitation, record language data, and analyze the data. Eventually, the student will be asked to record and translate narratives and stories on their own.

Student qualifications and characteristics: The hired student should be available for two 1-hour weekly meetings (time/day TBD). Additionally, the student should expect to dedicate up to 2-3 additional hours/week to work independently on the digital illustrations. *No prior language or linguistic experience is required.* Students with a general interest in languages, language documentation, and/or African languages and cultures are encouraged to apply. Some experience creating and working with digital illustrations is requested.

Position #29; *Elizabeth MacGonagle*

Mentor name: Elizabeth MacGonagle, African & African-American Studies/History

Job/project title: Project Assistant for Coming to the Heartland

Remote or in-person: This position could be done remotely or in-person.

Project description: The "Coming to the Heartland" project collects and promotes stories from African populations living in communities throughout Kansas and the Kansas City region to share moving stories about individuals of African descent who contribute to America's diversity. In partnership with local African communities, you will help to create a multi-media forum for intergenerational conversations among African immigrants, with older generations telling the younger ones the stories of their journeys to the United States and their arrival in Kansas—stories that are often lost to the younger, more assimilated generations—while youth tell their parents and grandparents the stories of their lives today.

This public, digital humanities research project involves collaboration between KASC (Kansas African Studies Center) and CLACS (Center for Latin American and Caribbean Studies) on campus to engage with our local communities. By participating in this project, you will gain research experience, learn more about Africans in the Midwest, and teach others about their stories based on your research. This position provides an opportunity for research in the humanities and social sciences, and calls for creative thinking about how to present resources to the general public. You will gain a familiarity with current research and issues related to immigration, particularly to the Midwestern region, while working with your mentor, historian Prof. Elizabeth MacGonagle. There will also be some collaboration with an English professor in Latin American and Caribbean Studies (Dr. Marta Caminero) on our shared goal of enhancing our national narrative about immigration.

Drawing on the methodologies of oral history, narrative, and digital humanities, and in multi-media and multi-modal vignettes constructed via the storytelling methods most comfortable for each generation, this project will position generational narratives and methods of storytelling in conversation with each other. With a significant focus on youth, we ask: how does the new digital age affect the stories that immigrants and their children tell to each other, as well as the possibilities for their visibility in the wider community?

Potential student tasks and responsibilities:

1) Attend regular planning meetings of the project team, by zoom when necessary.

2) Research to determine key community stakeholders in the communities of Kansas City, Lawrence, Wichita, Dodge City, and Garden City, who can connect us to African (and/or Latin American) immigrant communities there.

3) Make contact (through telephone, email, zoom) with key stakeholders to discuss the project and to get community support / buy in.

4) Make arrangements for initial site visits to communities for focus groups. If COVID-19 restrictions and cautions arise, the focus groups may be conducted remotely.

5) Participate in content / data gathering (e.g. oral history interviews and filming, gathering of digital copies of ephemera such as photos, letters, and documents, gathering of social media storytelling (via collecting screenshots from participants).

6) Participate in tasks related to editing / design of final digital exhibit, under close supervision by and with assistance of project team members.

Student qualifications and characteristics: A student interested in the development of new perspectives through the power of stories would be a good fit for this position. This work requires organization, motivation, and creativity. Strong writing skills and the ability to produce relevant and polished written materials are necessary. Attention to detail is also important. Other skills such as knowledge of African languages (including French or Portuguese), website design, graphic design or creating and editing videos, podcasts or blogs are preferred, but not required.

Position #30; Utako Minai

Mentor name: Utako Minai, Linguistics

Job/project title: How do young children interpret the meaning of 'hard' words?

Remote or in-person: This position could be done remotely or in-person.

Project description: The Developmental Psycholinguistics Laboratory, 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 student tasks and responsibilities: If you join our project as an undergraduate research assistant, you will be expected to commit to the following duties:

1. Assisting in the recruitment of study participants, by contacting local preschools, community institutes and businesses, and making announcements via social media

2. Assisting in scheduling experiments

3. Assisting in data collection, either at off-campus research sites (e.g., local preschools) or at the lab

4. Assisting in data organization (e.g., entering data into a database)

5. Other general duties assisting in lab management/administration, such as printing, photocopying, checking email, and checking office supplies

Student qualifications and characteristics: We are seeking a student who is enthusiastic about this type of research. We are particularly looking for a student who:

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

2. Is able to work independently

3. Is responsible and reliable

4. Possesses the basic knowledge of Microsoft Word, Microsoft Excel and some Social Networking Systems (e.g., Facebook)

5. Has access to a car (preferred but not required)

Position #31; *Bushra Nayeem*

Mentor name: Bushra Nayeem, Architecture

Job/project title: Undergraduate Research Assistant

Remote or in-person: This position could be done remotely or in-person.

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

To be eligible to apply, you must be a degree-seeking, first year (freshman or transfer) student who is or will be enrolled full-time (12 credit hours) at KU for the Fall 2023 semester. Students apply for this program the summer before they start at KU.

Accept a $2,000 Federal Work-Study (FWS) Award for the upcoming academic year at KU: If you're not sure whether you've accepted an FWS award, you can check your financial aid in Enroll & Pay. If you would like to add Federal Work-Study to your financial aid package, please email Mandy Annas at acannas1@ku.edu to determine if you are eligible.

Potential student tasks and 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 and 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 engineering are welcome to apply

Position *#32*; *Akiko Takeyama*

Mentor name: Akiko Takeyama, Center for East Asian Studies

Job/project title: Asian Experience in the Midwest

Remote or in-person: This position could be done remotely or in-person.

Project description: Collecting oral history narratives of Asian experiences in the Midwest, this collaborative research project contributes to better understanding of racial and geographic diversity. A research team, which consists of faculty members and graduate students across different disciplines and schools (e.g., Education, Geography, American Studies, Music, and East Asian Studies), will collect oral histories and disseminate them digitally through a web-based interactive timeline and mapping (including migration routes), digital storytelling (e.g., animation, gamified listening, etc.). In so doing, we explore what it means to be Asian and/or Asian American in the U.S. Midwest. How do Asian and Asian American individuals' stories in the region complicate existing images of Asian presence mainly in the west and east coasts? Thus, this project will complicate current Black-and-White racial discourses and the coast-based Asian histories. It is an important subject as Asian presence in the Midwest is often invisible. It is also a timely topic as Asian Americans are the fast-growing racial or ethnic group in the U.S.

Potential student tasks and responsibilities:

- Assist faculty and graduate students to collect oral history narratives

- Transcribe collected narratives and codify them

- Create storyboard to outline narratives for storytelling

- Digitize sources and archive collected narratives (audio, video, and other materials)

- Share one's emerging scholar experience and assist Director to reach out to potential donors to support student research

Student qualifications and 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, twitter, etc.) or willing to take some online tutorials to acquire basis skills in creating, editing, and formatting collected data for analysis, presentation, and archiving

- Open to a student with any racial, ethnic, and cultural background as long as one understands the nature of the project and respects Asian people, history, and culture

Position *#33; Akiko Takeyama*

Mentor name: Akiko Takeyama, Center for East Asian Studies

Job/project title: Public Health in Global Asia

Remote or in-person: This position could be done remotely or in-person.

Project description: This interdisciplinary project on public health covers a wide range of health-related topics such as pandemic, mental health, aging, wellness, bioethics, and diseases caused by structural inequalities. Public health is our yearly theme (2022-23) among area studies centers at KU (Centers for East Asian Studies, Russian and East European Studies, Latin American and Caribbean Studies, and African Studies). The steering committee in the Center for East Asian Studies, consisting of 5 faculty across different units and schools (Communications, Philosophy, Psychological Education, Architecture, and East Asian Studies), organizes a series of films and speakers. The Center also hosts a symposium on the topic in Spring 2023. This project employs a "Global Asia" frame to situate public health issues in Asia within global contexts and cross-culturally understand Asian ways of coping with health-related issues. Thus, this project will engage in diverse conversations about public health across the globe and seek a holistic approach to medicine, culture, and wellness.

Potential student tasks and responsibilities:

- Assist the steering committee to plan events and implement them

- Promote events to student organizations on campus by regularly Tweet out events and post surveys on social media to spread them out there

- Spend an hour every now to look through social media for anecdotal data about public health

- Publish online blogs regularly to publicly engage in the topic and raise awareness

- Create, conduct, and analyze survey data collected from event attendees

- Share one's emerging scholar experience and assist Director to reach out to potential donors to make student mentorship sustainable

Student qualifications and 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, twitter, etc.) or willing to take some online tutorials to acquire basis skills in creating, editing, and formatting collected data for analysis, presentation, and archiving

- Open to a student with any disciplinary background as long as one is interested in public health issues and willing to interact with faculty, graduate students, and undergraduate students on the topic

Position #34; *Sherrie Tucker*

Mentor name: Sherrie Tucker, American Studies

Job/project title: Research Assistant, Improvising Across Abilities: The Adaptive Use Musical Instrument

Remote or in-person: This position could be done remotely or in-person.

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 student tasks and 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 and characteristics: 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.

Natural Sciences

Position #35; *Brian Ackley*

Mentor name: Brian Ackley, Molecular Biosciences

Job/project title: Genetic risk factors for tauopathies

Remote or in-person: This would be an in-person position for the 2022-2023 year.

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 student tasks and 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 and 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 #36; *Kristine Beaty*

Mentor name: Kristine Beaty, Anthropology

Job/project title: Undergraduate Research Assistant

Remote or in-person: This position could be done remotely or in-person.

Project description: The KU Anthropological Genetics Group is seeking an undergraduate student that is interested in learning about anthropology and how genomics can be used to answer questions about human population histories. Our group tries to answer questions about population history and migration patterns using both human and non-human genomic data, identifying the fauna recovered from archaeological sites, and examining sedimentary DNA for paleoecological construction. Undergraduate researchers become part of the research team and will learn how to effectively work with a team of researchers, basic molecular laboratory methods, as well as the ethical concerns when working in genomics.

Potential student tasks and responsibilities: Potential student tasks and responsibilities: The undergraduate research assistant (URA) will work with a group that has a diverse set of research needs. Student will be trained to properly document laboratory experiments, to extract DNA from a sample, make copies of DNA using polymerase chain reaction, and to make and run gels for gel electrophoresis. The URA may also be trained to sort and catalogue faunal remains, use a citation management software such as Zotero or Endnote, search and annotate research literature, or use a database software for managing laboratory samples or faunal remains. As a part of their training, student will learn about the research process through participation in weekly lab meetings/journal club. 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.

Student qualifications and characteristics: Interested student must be highly organized and motivated and have an interest in learning about anthropology and/or biology. Days and times for this position are flexible, but the student will need at least two 3-hour time blocks a week for laboratory training and tasks. A set schedule will be set up with the Lab Coordinator during their first meeting.

Position #37; *James Blakemore*

Mentor name: James Blakemore, Chemistry

Job/project title: Trainee Chemist in Clean Energy and Sustainability

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Our laboratory focuses on addressing challenges in development of clean energy sources. We use the tools of contemporary experimental inorganic chemistry and careful data analysis to carry out our projects. Broadly speaking, a student that joins our group will prepare inorganic compounds and materials that are pure--purity is important because we must understand what happens to our compounds during experiments--and analyze data arising from experiments with those compounds. Tools to accomplish this work include a solvent purification system, sublimators, and chromatography, augmented by training in use of select software programs and library resources.

Potential student tasks and responsibilities: Potential student tasks in the experimental laboratory include drying common solvents, preparing and purifying organic and inorganic compounds, preparing custom glassware for experimentation, and use of inert-atmosphere gloveboxes. Prior to beginning work, the student will undergo a thorough safety training and introduction to the work in our laboratory. Potential student tasks that can be done from anywhere include tabulation, curve-fitting analysis, and interpretation of experimental data, as well as reading of literature to help put our work in the right context.

Student qualifications and characteristics: A student will be qualified for this position if they are interested in experimental chemistry research, working in a chemical laboratory, and learning about analysis of chemical data. Our group values safety in the laboratory and therefore the student should be prepared to understand and follow all safety regulations--these include university, chemistry department, Blakemore laboratory, and project-specific procedures. In order to carry out the research tasks, the student should be ready to learn about new apparatus and data interpretation methods on a weekly-to-monthly basis and be detail oriented. Much of our equipment is custom-built and rather specialized, so care is needed when carrying out specific tasks, and significant time may be needed in reading prior literature to learn about how to analyze data appropriately. Presentations at our weekly group meetings (either in-person or remote via Zoom software) are generally a requirement of every member of our group, although this may be optional depending on schedule and student preference.

Position *#38*; *Zarko Boskovic*

Mentor name: Zarko Boskovic, Medicinal Chemistry

Job/project title: Synthetic chemistry assistant

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Our laboratory is engaged in creating synthetic sequences that may yield biologically active molecules.

Potential student tasks and responsibilities: The lab assistant will be trained in the basic techniques in chemistry laboratory. This includes the following:

1. Performing reactions by combining reactants in suitable proportions.

2. Monitoring the reactions analytically with several different techniques, for example, TLC, mass spectrometry, NMR, etc.

3. Separating mixtures and purification of organic and organometallic compounds.

4. Maintaining the lab notebook, registration of chemicals

5. "Hands-on" on instruments, for example, UV-Vis, Fluorescence spectrophotometer, HPLC

6. Washing glassware, NMR tubes, picking up the chemicals from Chemstore.1. Performing reactions by combining reactants in suitable proportions.

2. Monitoring the reactions analytically with several different techniques, for example, TLC, mass spectrometry, NMR, etc.

3. Separating mixtures and purification of organic and organometallic compounds.

4. Maintaining the lab notebook, registration of chemicals

5. "Hands-on" on instruments, for example, UV-Vis, Fluorescence spectrophotometer, HPLC

6. Washing glassware, NMR tubes, picking up the chemicals from Chemstore.

Student qualifications and characteristics: Commitment of longer uninterrupted periods of time in the lab is critical for successful execution of these duties. Applicants should show aptitude for laboratory work and be attentive and focused.

Position *#39; Paulyn Cartwright*

Mentor name: Paulyn Cartwright, Ecology and Evolutionary Biology

Job/project title: Laboratory Research Assistant

Remote or in-person: This would be an in-person position for the 2022-2023 year.

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 student tasks and 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 and 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 #40; *Wai-Lun Chan*

Mentor name: Wai-Lun Chan, Physics and Astronomy

Job/project title: Research Assistant on Nano-material Research

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Atomically thin two-dimensional (2D) crystals have received much attention recently because their properties can be tailored by stacking different crystals together without the constraint of lattice matching found in 3D materials. This unique property provides a new way to "program" the material property to fit the particular need of different applications. However, current 2D materials fabrication methods can only produce micron-sized single crystals, which limits the potential applications of these 2D crystals. This project aim to develop methods to transfer centimeter-sized, but atomically thin (< 1 nm) 2D single crystals, on various material substrates. These 2D single crystals will be further combined with other materials such as organic semiconductors (semiconductors made with organic molecules) to produce nano-structures with novel properties.

Potential student tasks and responsibilities: The student will combine 2D crystals with organic crystals to produce a wide range of nano-scale patterns known as the moiré pattern. The student will design procedures to obtain and transfer 2D crystals onto different material surfaces. The student will perform basic lab works such as preparing/using chemical solution, coating materials onto different substrates, and using optical microscope. Depending on the progress and the academic preparation of the student, they may also perform basic optical experiments and electrical measurements to study the crystal. The project will allow the student to learn and develop advanced nano-material fabrication techniques. The student will also have chance to operate basic optic and laser setups, and ultra-high vacuum systems. Before the beginning of the lab work, the student will be given the required lab safety training.

Student qualifications and characteristics: We are looking for students who have interests in research at the intersection of physics, chemistry and engineering; are self-motivated; can pay attention to details; have patience to perform lab works that can last for 3 – 4 consecutive hours; and can cooperate with other students in the research group. We will provide the required lab training for the student.

Position *#41*; *Josephine Chandler*

Mentor name: Josephine Chandler, Molecular Biosciences

Job/project title: Research assistant

Remote or in-person: This would be an in-person position for the 2022-2023 year.

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 student tasks and 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 and 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 hrs 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. Is a good communicator and team player

Position *#42; Jocelyn Colella*

Mentor name: Jocelyn Colella, Ecology and Evolutionary Biology

Job/project title: Mammal Evolution Researcher

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Our lab studies how mammals change (or evolve) over time by examining their DNA. This project uses the computer program SLiM (https://messerlab.org/slim/) to simulate genetic evolution under different scenarios: What happens when a population is isolated? How quickly can a population evolve into different a new species? What happens when two species come into contact or interbreed? Does the same thing happen each time? Why or why not?

The results of these simulations will guide our understanding of evolution in the 'real world', by comparing simulation results against patterns found in DNA sequences from real mammal populations.

Potential student tasks and responsibilities: The student will work with graduate students in the lab to learn how to use the SLiM program. The student will then set up and run a series of evolutionary simulations. The student will work with graduate students and the PI to interpret and understand simulation results.

The student will learn basic molecular laboratory techniques, such as DNA extraction, PCR, and genetic sequencing, and use computers to look at and analyze genetic data.

As part of the Mammal Division at the Biodiversity Institute, the student will also work hands-on in the mammal research collections, which consist of mammal skin and skeletal materials as well as cryogenically frozen tissues (for use in genetic research). This involves specimen preparation, creating labels, data entry, and basic physical tasks, like rearranging specimens or drawers, as part of a team of students.

Student qualifications and characteristics: The ideal student researcher will be detail oriented, patient, organized, and not squeamish, as the Mammal Collection often works with dead animals or bones. The student researcher must work well with others as part of a team. The student researcher should have a flexible schedule and be able to connect with graduate students and faculty in Dyche Hall at least three times a week. As part of the Biodiversity Institute, the student researcher is expected to join weekly 'Mammal Coffee' hour meetings. Students interested in attending graduate school in Biology, Genetics, or Molecular Biology, or pursuing careers as a research scientist or conservation geneticist, preferred.

No computational experience is required, but an interest in and openness to learning computational biology skills is a must!

Position #43; Ian Crossfield

Mentor name: Ian Crossfield, Physics and Astronomy

Job/project title: Exploring Lava Worlds in Other Solar Systems

Remote or in-person: This position could be done remotely or in-person.

Project description: Surveys for new planets beyond our solar system reveal a small population of "lava worlds," planets to close to their stars that part of their surface is melted rock. Space telescopes have begun to characterize these planets, but a unified and homogeneous analysis is needed to properly compare the measurements and prepare for the next phase of exploration with NASA's new James Webb Space Telescope. The student researcher will run a series of computer calculations to infer the surface temperatures, albedos, and the presence of any substantial atmosphere on these planets based on the measurements published in the scientific literature.

Potential student tasks and responsibilities: The student researcher will begin by learning a suitable scientific programming language (e.g. Python, MatLab, etc.) and by familiarizing themselves with the basic theoretical framework for estimating planetary properties from other data. They will then run a series of calculations for each 'lava world' with existing infrared measurements in order to estimate their global albedo (reflectivity), level of day-to-night energy recirculation (indicative of the presence of an atmosphere). Once these data are in hand, the student will investigate potential correlations with other known data to explain any trends discovered, as well as use these results to try to predict what other, as-yet-unexplored planets would be ideal for such observations.

Student qualifications and characteristics: A strong determination to succeed in both 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 *#44; Nichole Ginnan*

Mentor name: Nichole Ginnan, Ecology and Evolutionary Biology

Job/project title: Microbiome Evolution and Plant-Microbe Interactions

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Broadly, the Wagner Lab investigates plant-microbe interactions and microbial evolution using experimental evolution, ecological surveying, molecular techniques, and advanced sequencing technologies. Millions of microbes live in the soil and in/on plants. Collectively, these microbes are called microbiomes. Microbiome members interact with each other, their host (i.e. plant), and their environment. Microbial communities can even support plant health by increasing host tolerance to stress, such as drought. It is expected that drought frequency and intensity will increase in many major crop growing regions around the world. In this specific project, we aim to gain a basic understanding of how soil- and plant-associated microbes evolve under drought stress and what mechanisms they use to confer drought tolerance to plants. Our findings will contribute to the development of microbe-based solutions for sustainable agriculture, particularly under the pressures of climate change.

Potential student tasks and responsibilities: Our student research assistant will help with growth chamber or greenhouse plant experiments, data collection, DNA extractions, bacteria isolations, data analyses, microbial growth media preparation, and more. By the end of the program the student will have gained basic lab skills and an understanding of microbiome research that is applicable to medical, agricultural, and bioengineering fields.

Student qualifications and characteristics: The ideal student would have an interest in microbiology/microbiomes, be detail oriented, and excited to learn. While the scheduling is flexible, being available to work larger time slots (3+ hours at a time) is preferred. The Wagner lab is a diverse and motivated community. It is our hope that student assistants will take advantage of this network and contribute to maintaining a positive and fun work environment. We encourage students from all backgrounds to apply!

Position #45; *Jennifer Gleason*

Mentor name: Jennifer Gleason, Ecology and Evolutionary Biology

Job/project title: Social behavior in a small insect

Remote or in-person: This position could be done remotely or in-person.

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 started to piece together the behavior of a species of fruit fly that is very different from the behavior in other species. For example, in studying male remating behavior, we observed that females fight. We are now examining the conditions that induce fighting. The results will have implications for both the evolution of the species and control of this species, which is an agricultural pest.

Potential student tasks and 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, there will be opportunities for the student 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 and 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.

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 *#46; Richard Glor*

Mentor name: Richard Glor, Ecology and Evolutionary Biology

Job/project title: Research Assistant

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Many potential projects can be considered, all involving hands-on research with specimens housed in the KU Herpetology collections. Potential projects could include everything from assisting with systematic or taxonomic research on Asian frogs to studying adaptation and natural selection in lizards. Students will typically work with their mentor to develop a project during the course of their appointment.

Potential student tasks and responsibilities: Entry level students are expected to assist with biodiversity collections and associated research while receiving basic training in specimen and database maintenance. Students who are successfully trained in these areas will receive training in more advanced methods, potentially including acquisition of morphological data from physical specimens, molecular genetics, and other areas.

Student qualifications and characteristics: Students must be available to work for at least two significant (3+ hour) blocks of time during business hours (M-F, 9AM-5PM) each week. This position will involve work in a laboratory environment, and therefore requires attention to detail and the ability to learn and follow laboratory safety protocols and other basic procedures. Students should also have a strong interest in biology or biodiversity science, and a potential desire to pursue a career in these fields.

Additional comments: The University of Kansas is an internationally recognized leader in research on reptiles an amphibians. The KU Herpetology Division is home to the 4th largest collection of reptile and amphibian specimens in the United States and a diverse group of more t

Position #47; *Lynn Hancock*

Mentor name: Lynn Hancock, Molecular Biosciences

Job/project title: Laboratory Research Assistant

Remote or in-person: This would be an in-person position for the 2022-2023 year.

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 student tasks and 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 and 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 work days); 3) Ability to receive and follow instructions from senior laboratory members; 4) Be a contributing member of an interactive team of laboratory scientists.

Position *#48; Meredith Hartley*

Mentor name: Meredith Hartley, Chemistry

Job/project title: Lipids in neurological diseases

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Our lab studies myelin sheaths in the brain. Myelin is an essential component of the brain that protects and insulates nerve cells. Damage to healthy myelin is involved in several neurological diseases, including multiple sclerosis. Myelin is made from cells called oligodendrocytes. We are interested in learning how oligodendrocytes develop and function in healthy individuals, so that we can also understand what goes wrong in individuals affected by multiple sclerosis. Another aspect of our research is to determine the role of lipids in healthy brain myelination. Lipids, a class of nonpolar biological molecules, are highly abundant in the brain and in myelin. Studying changes in lipids profiles during myelin damage and repair allows us to identify lipid signaling pathways that may be important for the future development of new drugs. More information can be accessed on our lab website: https://hartleygroup.blog.ku.edu/.

Potential student tasks and responsibilities: Tasks and responsibilities associated with studying the oligodendrocyte cells are:

- Making solutions required for experiments and making media to feed the cells

- Assisting with growing oligodendrocyte cells

- Assisting with using fluorescent dyes to stain and analyze oligodendrocyte cells

Tasks and responsibilities associated with studying lipid pathways are:

- Making solutions required for lipid extraction

- Making buffers required for Western-blot experiments

- Assisting with Western-blot experiments

Student qualifications and characteristics:

- Attending weekly 1-hour group meeting

- Be available for multiple 2-hour blocks each week. Fewer, longer blocks of times are good as well. The exact schedule is flexible

- Students do not need any previous knowledge of these topics, but should be curious and excited to learn about brain biology and lipid chemistry

- Some of these experiments involve growing cells over several weeks, so care and attention to detail are vital in order to conduct successful experiments

Position *#49; Lena Hileman*

Mentor name: Lena Hileman, Ecology and Evolutionary Biology

Job/project title: Flower evolution in response to pollinators

Remote or in-person: This would be an in-person position for the 2022-2023 year.

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 the relationship between nectar reward and pollinator. The long-term outcomes of the project will help us understand the genes that are important for determining how nectar reward changes when species are adapted to bees as pollinators compared to hummingbirds as pollinators.

Potential student tasks and 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 microscopy techniques to measure nectary characteristics. This 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 and 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.

Additional comments: Students starting on this project do not need any prior experience or advanced biology courses. Students will work some with Dr. Hileman, but mostly with graduate students and undergraduate students in the lab.

Position #50; *Erik Holmstrom*

Mentor name: Erik Holmstrom, Molecular Biosciences

Job/project title: Laboratory Research Assistant

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: The goal of our research program is to better understand how the structural and dynamic properties of proteins and nucleic acids allow them to perform their biological function. To accomplish this, we use fluorescent probes to "visualize" these biomolecules in action. The systems that we study are involved in a range of processes from viral replication to gene expression.

Potential student tasks and responsibilities: Students will actively contribute in scientific research by learning how to perform the following experimental tasks:

Preparation of solutions and buffers required for the experiments

Measure the absorbance and fluorescence properties of samples

Document all of the steps associated with each experiment

Analyze and interpret their experimental results

Student qualifications and characteristics: Students should be:

Available during normal working hours for 2-3 hour blocks of time

Familiar with the scientific method

Interested in the chemical nature of biological macromolecules

Comfortable finding creative solutions to challenging problems

Able to learn from experience (i.e., trial and error)

Position #51; *Kristi Neufeld*

Mentor name: Kristi Neufeld, Molecular Biosciences

Job/project title: Study of Tumor Suppressor Proteins

Remote or in-person: This would be an in-person position for the 2022-2023 year.

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 student tasks and 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 and characteristics: 1. Excellent communication skills.

2. Dependable, reliable, with a strong work ethic.

3. Attention to detail and careful record-keeping.

4. Ability to work as part of a research team.

5. Curiosity about research system and eagerness to expand molecular and cancer biology knowledge.

Position #52; *Diana Ortega-Ariza*

Mentor name: Diana Ortega-Ariza, Energy Research Section, Kansas Geological Survey

Job/project title: Study of ancient tropical Mississippian (~345 million years old) environments in continental United States with emphasis on Kansas using carbonate rocks

Remote or in-person: This position could be done remotely or in-person.

Project description: The overall goals of this project are to study Mississippian (~345 million years old) carbonate rocks (limestones and dolostones) from available cores stored at the Kansas Geological Survey and review literature from continental United States to determine controls on the distribution of ancient tropical marine environments. Research questions include; Why different ancient shallow-marine deposits developed in certain areas? What are the rock characteristics that indicate normal versus adverse marine conditions in these ancient tropical environments? How did environments change throughout the geologic time interval of study in response to these controls. Controls on environments likely include sea-level changes, movement of tectonic plates, sea currents, and climate. One way scientists can see back into the geologic past is by drilling a deep borehole and capturing a core of the rocks encountered during drilling… A core is a cylinder of rock about two to four inches in diameter and hundreds or thousands of feet long (although it comes out in segments, not one continuous tube)." Drilling | GeoKansas (ku.edu)

During the geologic time period called the Mississippian, most of the continental United States was in a tropical setting and much of the area, including Kansas, were covered by a shallow sea. Organisms different from what we see today swam in this sea and were fossilized in rocks we study in cores. These organisms and other features in the rocks provide the evidence for understanding the environments in which they formed.

In Kansas (and around the world), Mississippian rocks form important petroleum reservoirs (underground accumulations), understanding how these rocks formed, their compositions, and under what environmental conditions could help to improve our understanding of Mississippian time and provide predictive capabilities for petroleum studies.

The student(s) will assist in describing rocks from KGS cores. They will describe characteristics in rocks such as type of rock, fossils, and physical and biological structures preserved in the rocks. I will train the student(s) in identifying all these characteristics and to fill in a Core Template. No previous experience is needed. If in person, covid permitting, rock description will take placed at the Kansas Geological Survey core lab. Alternatively, virtually, student(s) would create a database from literature for locations around the United States that have Mississippian rock data. I will provide the students with the manuscripts, train them for finding additional manuscripts and the type of data to collect from them, and create a database in excel and place locations (e.g., state, latitude and longitude) on a map in Illustrator and Google Earth.

Potential student tasks and responsibilities: For rock description from KGS cores, covid permitting, the student(s) will physically be in the lab and identifying and describing rock characteristics and recording that information on a template. Characteristics include type of rock, fossils, physical and biological characteristics. The student(s) will start the rock description at the base (or deepest depth) of the core and will work their way up to the top (shallowest depth) of the core. The student(s) will use a pencil to write down the rock characteristics identified in the core and will make simple drawings on the template. The student(s) will use push pins to identify relevant/important areas on cores (for example: color changes, different shapes) and will take photographs. The student(s) will use an optical hand lens to identify rock characteristic at a higher resolution. Spray bottles filled with water will be available in the lab to make cores wet, so rocks characteristics are easier to see. Diluted hydrochloric acid (HCl) at 10% (safe, can be used without gloves) will also be available to help determining different rock mineralogies. All materials and training will be provided.

Overall procedure is shown below

1) training, explaining characteristics to identify in rocks, I will show them what to identify and how to do it, getting familiar with the KGS core lab and materials (spray water bottles, HCl, microscopes, cores).

2) student(s) will identify some large scale "big picture" rock characteristics in cores. For example: rock color changes, sizes of grains, minerals, and fossils. Students will mark the cores using push pins and record information on the templates. We will discuss findings and questions.

3) student(s) will identify rock characteristics on cores in higher resolution using an optical hand lens and microscopes. Students will mark the cores using push pins and record information on the templates. We will discuss findings and questions.

4) student(s) will describe cores in more detail from base (deepest depth) to top (shallowest depth) and will record information and make simple drawings on templates regarding rock characteristics: composition, fossils, physical and biological structures, and crystals. Students will take photographs of relevant core areas. They will also mark potential areas for further sampling by drawing rectangles with a pencil on the cores. Students will also identify relevant characteristics on the cores by placing push pins along the sides of the cores and will write down these characteristics on the templates. We will discuss findings and questions.

For assistance creating an Excel database and location map in an Illustrator program, if virtual because of covid, the student(s) will collect detailed information from manuscripts from numerous locations in the United States regarding Mississippian carbonate rocks.

From the manuscripts, student(s) will find data such as author, year of publication, location (for example: state, latitude and longitude), characteristics of the rocks (for example: type of fossils, type of rocks), interpretations made by the authors regarding environments, ancient geography, etc. The student(s) will collect this information in Excel. Each location will be placed on a map using Illustrator program and Google Earth. No experience on either of these programs is required.

Student qualifications and characteristics:

1) Attention to detail, organized, patience

2) Must be available for ~2 hour blocks of time

3) Be ok with getting slightly dirty from working with rocks or wet from the bottle of water, using diluted HCl

4) An interest in fossils, rocks, and geology is a plus

Position #53; *Hartwin Peelaers*

Mentor name: Hartwin Peelaers, Physics and Astronomy

Job/project title: Computational design of novel battery materials

Remote or in-person: This position could be done remotely or in-person.

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 student tasks and 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 and 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 #54; *Bing Pu*

Mentor name: Bing Pu, Geography and Atmospheric Science

Job/project title: Characterizing dust storms in the United States

Remote or in-person: This position could be done remotely or in-person.

Project description: Mineral dust is one of the most abundant aerosols in mass in the atmosphere. It can be lifted from the dry and bare land surface to the atmosphere by strong winds. Severe dust storms reduce visibility and cause respiratory and cardiopulmonary diseases, affecting public transport and health. Dust storms are reported over the southwest and central U.S., corresponding to two major dust sources in the States. The mechanisms associated with the development of dust storms are not fully understood.

This project is designed to characterize the spatial and temporal features of dust storms in the U.S. using satellite products and observations. We will examine land surface and meteorological conditions associated with individual dust storms to better understand features of different types of dust storms.

Potential student tasks and responsibilities: The job entails programming and data analysis. The student will learn how to use Python or NCL (https://www.ncl.ucar.edu/) to process datasets in different formats (e.g., .NetCDF, .csv, .txt). You will also develop skills to plot figures of meteorological and land surface fields, such as precipitation and surface winds, and conduct simple analysis with guidance. Reading related papers is another example of potential tasks that will help you better understand the project and conduct analysis.

Student qualifications and characteristics: Students interested in Earth and environmental sciences are encouraged to apply. It is expected that the student will commit at least four hours per week (work time are flexible) on the project. Ability to communicate clearly and follow instructions and attention to detail are desired. The student will meet with the mentor each week to discuss progress (in person or virtually). An ideal student should be self-motivated and willing to work hard.

Position #55; *Eduardo Rosa-Molinar*

Mentor name: Eduardo Rosa-Molinar, Microscopy and Analytical Imaging Research Resource Core Laboratory

Job/project title: Image Data Visualization Scholar

Remote or in-person: This position could be done remotely or in-person.

Project description: The overall goals and purpose of this project is to develop and apply cutting edge gaming technology methods for rigorous analyses of biological imaging data generated throughout my research group, the Biological Imaging Group (BIG) and imaging core that I direct, Microscopy and Analytical Imaging (MAI) core.

Drawing upon established foundation in gaming technology, image processing, signal processing, and machine learning, the undergraduate image annotator is the human-powered task of annotating an image with labels. The labels will be predetermined by the principal investigator of this project, Dr. Rosa-Molinar, to give the computer vision/machine learning model information about what is shown in the image and what it must learn.

The undergraduate image annotator will be working amidst an enthusiastic diverse and inclusive team of neuroscientist, microscopist, computer vision, cell biologist, and material scientists.

Potential student tasks and responsibilities: My research group, BIG, the MAI core, and MICROSCAPE, our industry collaborator, are seeking an undergraduate image annotator with a passion for science and learning.

The ideal candidate for this job is a visual learner, has great attention to detail, and is comfortable working with minimal supervision conducting repetitive work annotating (e.g., drawing circles) image data of the central nervous system.

Excellent verbal, and written communication skills and a positive demeanor and ability to learn new things are also required.

Student qualifications and characteristics: A student studying biology, photography, art, graphic design and has experience utilizing computers and graphics editing tools (e.g., Adobe Illustrator, Visual Annotation Software), spread sheets (e.g., excel); detail oriented, quality-focused, meticulous, and is accustomed to deadlines (e.g. bi-weekly) is preferred.

The ideal candidate must be available for 2 hour blocks of time for a total of 4-6 hours per week.

A student studying photography, art, graphic design and has experience utilizing graphics editing tools (e.g., Adobe Illustrator, Visual Annotation Software), spread sheets (e.g., excel), detail oriented, quality-focused, meticulous, and is accustomed to meeting deadlines (e.g. bi-weekly) is preferred. Must be able to work 4 hours per week.

Position #56; *Shyam Sathyamoorthi*

Mentor name: Shyam Sathyamoorthi, Medicinal Chemistry

Job/project title: Development of New Organic Reactions

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Our laboratory develops new organic reactions for complex molecule synthesis. The student would work in this area. Here's my google scholar page which lists recent publications: https://scholar.google.com/citations?user=LQui9XkAAAAJ&hl=en

Potential student tasks and responsibilities: Students will be working in a chemistry lab in partnership with a graduate student or a postdoctoral fellow, synthesizing and characterizing compounds.

Student qualifications and characteristics:

1. Students should be interested in learning about organic chemistry.

2. They should be responsible, detail oriented, and attentive to lab safety rules.

3. They should be prepared to invest around 4-7 hours a week.

Position #57; *Erin Seybold*

Mentor name: Erin Seybold, Kansas Geological Survey

Job/project title: Water Quality Lab Assistant

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: The Seybold Lab studies how aquatic ecosystems respond to environmental change. We conduct research to understand how water quality in streams and rivers is impacted by human disturbances, like land use change and climate change. We use a variety of approaches that include field and lab-based methods, with an emphasis on field data and high-frequency environmental sensor networks. We have projects occurring in a number of watersheds across Kansas, and students would assist with sample analysis across these various projects. To learn more about projects in the lab, please visit www.erinseybold.com.

Potential student tasks and responsibilities: Students will assist with a number of lab and field prep tasks. They will assist with analyzing water samples in the lab for various chemical analyses, and will learn how to use a number of different analytical instruments. They will help conduct maintenance and lab tests on environmental sensors for measuring water quality in the field. If the student is available for longer periods of time, they can also assist with field sampling from nearby streams and helping maintain sensors in the field.

Student qualifications and characteristics: An interest in learning more about environmental science and water-related research. Attention to detail, strong communication skills, and ability to work independently when given instructions. Interest in spending time outside in the field is also helpful, but not required. Students must be available for a 3 hour window during the work week (M-F 8-5pm).

Position *#58*; *Ben Sikes*

Mentor name: Ben Sikes, Ecology and Evolutionary Biology/Kansas Biological Survey

Job/project title: Space biology with fungal communities

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Background: Outer space poses multiple unique stresses to life, including intense radiation, anoxia (indeed no air), microgravity, huge temperature swings, and desiccation. Understanding these stresses is fundamental to the discipline of "space biology", biology focused on how life and humans deal with space. This research is tightly coupled to "astrobiology" the study of biology on other worlds. We now know some microbial life can persist despite space stresses. Understanding how organisms survive these challenges is vital to understand the limits of human space exploration and planetary protection. Nearly all research, both in space and on Earth, tests the stress tolerance of species or strains in isolation, yet nearly all known microorganisms survive in communities (i.e., microbiomes). Dynamical responses within these microbiomes help them respond to environmental stresses and are key for technological applications. Research over the next year will test the resistance and resilience of stress-tolerant microbiomes on Earth to combined space-stresses in the lab. We plan to collect microbiomes from field samples this summer in environments with recurrent stresses: desert cryptobiotic crusts (UV/desiccation/heat), high altitude soil/snowpack (cold/UV), and interiors of dentist/hospital X-ray machines (repeated radiation). In the lab we will 1) characterize microbiomes via DNA sequencing, 2) expose them to individual and combined stresses in the lab (temperature, ionizing radiation, desiccation), and 3) map community responses directly after exposure (resistance) and after 1 month (resilience).

Core project goals: Show how communities shift to each stress, whether resistant/resilience differs in microbiomes with similar "home" stresses, and identify taxa whose abundance is unchanged or increases with combined stresses. Additional work to try to culture (live isolate) resistant/resilient taxa will help 1) establish methods to isolate stress-tolerant fungi and 2) initiate a "living library" of stress-tolerant fungi and 3) pilot experiments including high altitude balloon flights with KU Physics, Aerospace Engineering, and NASA collaborators.

Core learning goals for students: students will advance skills on 4 key areas – 1) Develop sterile lab techniques, including DNA analysis and culturing. These tools require attention to detail and are directly applicable to microbiome analysis for environmental, experimental, and medical research. 2) Utilize experimental stresses in experiments, including the use of desiccation chambers, centrifuges, X-rays, and gamma radiation (use at KU Med). These tools require severe health and safety precautions. They are used across STEM, particular in biology, physics and engineering for ionizing radiation. 3) Learn to use coding for data processing and analysis, including Linux/python for bioinformatics and the R program for statistical analyses. These tools require patience, perseverance, and are widely applicable to programming across STEM and beyond. 4) Build collaborative research, including interdisciplinary

projects that require expertise of multiple disciplines. This is by far the hardest to learn but the most important given our current global and interstellar challenges.

Connections to other lab research: This work directly expands on past work in my lab exploring microbiome community responses to stress, traits of stress-adapted fungi, and functional consequences of stress responses. Our research tests ecological theories with fungi (and other microbes) then seeks to use these microbes to enhance human management of both agricultural and natural systems. A key aspect of our work shows that certain fungi can endure extreme environmental stresses and often thrive following them. For example, we've found fungi adapted to survive repeated fires, drought, and complete conversion of their soil habitats as a result of human land use. The traits that support fungal survival differ widely among these systems but understanding them is critical to improve our management of ecosystems here on Earth. We plan to apply this same approach to identify community properties and microbial traits that can help fungi survive in space; an understanding we can then use to both expand space biology research and hone strategies for human space travel.

Potential student tasks and responsibilities: Tasks are related to the 4 key learning goals above and progress from simple with oversight to independent and more complex:

For sterile techniques: initial tasks will include standard culturing, media preparation (autoclaving and making plates), and DNA extractions (kit-based and beyond) with DNA checks. With increased independence, tasks would be on field/exposed samples and could include developing new techniques needed for resistance fungi in culture.

For machine use: initial tasks include oversight of machine use on test samples. Will start with simple ones (desiccation/temperature) then move up to radiation. Over time student use of all machines would be more independent and used on field-collected samples and/or cultures with more independent. Set up and/or adaptation of equipment to apply stresses may also be future tasks.

For coding: First must learn basics of tool use. Weekly check-ins on step-wise learning tasks and pre-existing datasets. Over time apply these tools to newly microbial data from the experiments. Depending on student expertise, this may involve the use of multiple statistical analyses paths and functions within the R program.

For interdisciplinary collaboration: Initial will include Zoom/in-person meetings with collaborating labs, including professors, postdocs, grad students, and other undergrads. Later in project might include side projects or collaborative work with students in other areas. Presentations and visits are also an important communication element of these.

Student qualifications and characteristics: These are outlined in relation to each core student goal in the project description. We would meet weekly or biweekly, depending on specific tasks and need. The labs are on W campus and many would require a 3hr block of time. There are small student conference rooms in our building if you need to attend a virtual class or need to study/work while waiting for an incubation of the like. Professional interests in space, microbes, and their interactions are always helpful. We are focused on creating tractable research to utilize microbes to get us to "the Martian", but we have a long way to go. Attention to detail, personal responsibility, and a willingness to change the plan as needed are essential. Combining the 1st and the 3rd are often challenging for many people. We

overcome this with continuous tracking of information, flexibility, and respect for others (including their intent) throughout the research group.

An important warning, this is a novel project about space biology: creativity and adaptability will be key to successful students. It is likely that some of the experimental methods will need refinement and might fail. This is not a canned lab like you've done in classes but novel research in the field of space biology. Don't let that intimidate you if you are feel imposter syndrome. I feel it all the time as well. It's simply a warning that science, particularly in new areas, rarely develops in a straight line.

Position #59; Marina Suarez

Mentor name: Marina Suarez, Geology

Job/project title: Stable Isotope lab assistant

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: The Keck-NSF Paleoenvironmental and Environmental Stable Isotope lab utilizes the stable isotope of common light isotopes to elucidate climates and environments of the past and present. One specific project the student worker may contribute to is the study of the climate during the Cretaceous Period. The student will assist in sample preparation of different materials such as soils, rock and fossils.

Potential student tasks and responsibilities: The student assistant will be responsible to assist with sample preparation. This may include crushing rock samples with a mortar and pestle, drilling samples with a small handheld microdrill, decarbonating samples with hydrochloric acid, and/or weighing samples and standards into weigh boats.

Student qualifications and characteristics: The student should be interested in the natural sciences (geology, chemistry, or biology) and be enthusiastic about science. The students should be well organized, have the ability to follow directions easily, take notes and be detailed oriented, and work and communicate well with others. Many samples are very small so a steady hand is also very helpful.

Position #60; *Shuai Sun*

Mentor name: Shuai Sun, Chemistry

Job/project title: Student Assistant in Chemistry Education and Curriculum Development

Remote or in-person: This position could be done remotely or in-person.

Project description: This chemistry education project aims to achieve the following two goals: (1) investigating the knowledge gap of students transiting from general chemistry to organic chemistry and (2) developing a better strategy for resources for organic chemistry preparation.

Students take General Chemistry in their first year at the college level before taking Organic Chemistry. Although general chemistry covers many prerequisites to organic chemistry, students often feel under-prepared and intimidated at the beginning of their organic chemistry courses. Therefore, students commonly struggle to adjust to a new "learning style" during their general chemistry-organic chemistry transition.

Some chemistry instructors and education researchers attribute the transition difficulties to the significant time gap between first-semester general chemistry and organic chemistry.

My team will conduct interviews and surveys with students and instructors in general and organic chemistry to find the knowledge gaps between the two courses. In addition, we will design innovative teaching strategies and learning materials to address this challenge.

Potential student tasks and responsibilities: Assist instructors and graduate student assistants in conducting surveys and organizing focus groups.

Collect, analyze, and keep a record of data.

Assist instructors and graduate student assistants in preparing the education materials.

Student qualifications and characteristics: Knowledge of General Chemistry and Organic Chemistry is not required. However, students who took at least one semester of chemistry at the high-school level are preferred.

Preferred characteristics: Punctual, professional, and detail-oriented. Passionate at learning and helping people.

We expect to have a meeting once every two weeks. Students are expected to dedicate one hour each week (on average) to this project.

Position *#61; Lisa Timmons*

Mentor name: Lisa Timmons, Molecular Biosciences

Job/project title: Genetic and molecular analysis of RNA silencing mechanisms

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: How genes are expressed and how DNA and chromosomes are protected from environmental assault are ongoing research interests of the lab. The laboratory utilizes the genetically tractable organism Caenorhabditis elegans as a vehicle of discovery to identify and analyze cellular components that are involved in RNA-directed gene silencing mechanisms. 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 student tasks and responsibilities: The level of responsibility and involvement will depend on the interests/goals of the student, from roles as a research assistant all the way up to performing experiments independently and testing hypotheses as part of a research project that could lead to Honors in Biology. Short, introductory training sessions will focus on media preparation, sterile technique, and preparation of laboratory supplies and reagents. Students should progress and master tasks and scientific techniques of increasing complexity, such as PCR, plasmid cloning and molecular biology techniques, DNA sequence analysis and related techniques associated with DNA and RNA analysis, genetics and genotyping, microscopy, protein expression and analysis, transgenesis, and/or immunofluorescence techniques.

Student qualifications and 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 #62; Rob Unckless

Mentor name: Rob Unckless, Molecular Biosciences

Job/project title: Genomes in conflict

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Organisms are constantly adapting to challenges in their environment. Less appreciated is the fact that organisms also must constantly adapt to intragenomic parasites that bias their own transmission without regard to the fitness of the host. Transposable elements are probably the best studied intragenomic parasites, but meiotic drive elements that break Mendelian laws of segregation are also ubiquitous and have the potential for catastrophic consequences to their hosts. A better understanding of the genetic mechanisms involved in meiotic drive systems would inform how they evolve, what aspects of gametogenesis they target, how the genome fights back, and how they contribute to important evolutionary processes including reproductive isolation, chromosome evolution and even extinction. Furthermore, our understanding of natural meiotic drive systems will inform the use of synthetic gene drives for pest control.

Our goal is to gain an understanding of the genes and mechanisms involved in both sex-ratio meiotic drive and resistance to drive in Drosophila affinis and to understand the genomic consequences of meiotic drive. Meiotic drive is loosely defined as any process that selfishly cheats during gametogenesis to produce a non-Mendelian distribution of gametes. In males, this often occurs after meiosis during spermiogenesis and is particularly striking when the driving machinery resides on a sex chromosome. This sex-ratio meiotic drive usually occurs on the X chromosome and results in males that sire mostly daughters. Sex-ratio meiotic drive is found in plants and animals. We study sex-ratio meiotic drive in D. affinis and previously identified an excellent candidate meiotic drive locus as well as Y chromosomes that are resistant to meiotic drive. An intriguing aspect of the D. affinis system is that males without a Y chromosome are fertile, and in such males, the sex-ratio X chromosome kills itself resulting in all male offspring.

Potential student tasks and responsibilities: They will learn to identify Drosophila species morphologically and learn about how distinguishing characteristics have important biological function. Through a series of crosses to in the lab, Scholars will identify deviations from the strongly female-biased sex ratio consistent with resistance. Scholars will then perform several crosses to determine whether resistance is Y-linked or autosomal. The level of sophistication of this project can grow with the Scholar. For example, Scholars could begin to map autosomal resistance genes.

Student qualifications and characteristics: Students should be interested in genetics and evolutionary biology, but need not have taken either class. Some ability to get around (drive a car) would be helpful, but not absolutely necessary. This project has the potential to involve field collections from Minnesota down to Texas, but that would be optional and probably in spring/summer 2022.

Additional comments: These are transfer scholar positions specifically

Position #63; *Malgorzata (Maggie) Witek*

Mentor name: Malgorzata (Maggie) Witek, Chemistry

Job/project title: Biological Cells Immuno-phenotyping and Analysis in Cancer Diagnostics.

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Our laboratory is evaluating the process of rare biological cell isolation using microfluidic devices and the identification of cancer cells via immunostaining. The work aims at the development of assays for detecting cancer cells in blood for disease diagnostics. The work will involve the characterization of the process of transferring released cells from a microfluidic chip to a glass slide, utilizing different architecture transfer devices.

Potential student tasks and responsibilities: The candidate will learn how to (i) grow mammalian cell cultures in the lab, (ii) isolate cancer cells in microfluidics, (iii) stain and (iv) count biological cells using tools frequently used in biology, pathology, and bioengineering laboratories. These tools will include manual and automated staining systems and fluorescence microscopy. The student is encouraged (if time permits) to attend research group meetings and help analyze and interpret the results. Successful completion of the project may result in publication.

Student qualifications and characteristics: Experience is welcomed but not necessary; however, this position requires attention to detail, good organization, and the ability to follow instructions with great care. This position will involve work in a laboratory environment and requires ability to learn and follow laboratory safety protocols. The student must be available for at least a 3-4 hour block once per week (preferentially twice a week) within the 8 am-6 pm window.

Position #64; *Ward Thompson*

Mentor name: Ward Thompson, Chemistry

Job/project title: Research Assistant

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: Our group uses computer modeling to study the timescales for chemical reactions and other processes. A key aspect of our work is the development of new methods for predicting how the timescales change with temperature, one of the simplest ways chemists control reactions. However, chemistry classes often do not talk about how long reactions take or how the timescales are controlled by temperature (or at least not clearly). This project will involve developing media for use in courses and outreach efforts that illustrate the effects of temperature on chemical timescales. Potential products of this project could include videos, demonstrations, computer visualizations, or laboratory experiments for use in chemistry courses and/or in presentations or hands-on interactions for school-age children.

Potential student tasks and responsibilities: This work will involve collaborating with graduate students on the design and creation of the media in addition to background computational research for the selected reactions. The student will thus be responsible for creative input as well as planning and execution of the project. This may involve working with computer visualization programs and/or chemical demonstrations under the direction of a chemistry graduate student.

Student qualifications and characteristics: This project is well-suited for a student who is self-motivated and has some interest in the communication of scientific ideas. Some experience with chemistry, e.g., enrollment in general chemistry, would be helpful, but is not essential.

Position #65; *Laura Martin*

Mentor name: Laura Martin, Population Health

Job/project title: Neuroimaging and Addictive Behaviors

Remote or in-person: This position could be done remotely or in-person.

Project description: The overall goals are to understand the relationship between brain and behavior. Specifically, how the brain influences the health behaviors people engage in (i.e., smoking, vaping, eating, exercise) and how the brain changes with behavior change. In general, addictive behaviors are associated with an increased response in reward related brain regions and a decreased response in self-regulation related brain regions. Thus, we examine the relationship between reward and regulation brain regions and individuals' health or addictive behaviors and how an intervention that may increase self-regulation skills may change health behaviors. Students' work will contribute to analysis of neuroimaging data that are essential for publication and grant writing. There are a few different projects that the student would be able to work with and we can align the projects to student interests to some extent.

Potential student tasks and responsibilities: Tasks include: 1) summarizing data in terms of descriptive statistics (e.g., average cigarettes smoked per day, susceptibility to vaping, nicotine dependence, impulsivity), 2) performing data quality checks on neuroimaging (e.g., how much did the participant move in the MRI scanner, does the brain data align with other brain data collected during the same MRI scan)., 3) building spreadsheets and reports of the data; 4) creating figures for manuscripts and grant applications; 5) searching for scientific papers that are applicable to the research project; 5) observing study procedures; 6) recruiting participants to participate in research studies; 6) if desired - opportunities to develop a research question and perform secondary data analyses

Student qualifications and characteristics: 1) ability to work remotely or in person - schedule is flexible; 2) interests in public health, psychology, medicine, and/or neuroscience; 3) curiosity and desire to learn more; 4) computer skills are preferred - however this can also be learned on the job

Additional comments: Travel to lab in at KUMC (Kansas City) a few times during each semester (not required - but could add to the experience)

Position #66; Rebecca Lepping

Mentor name: Rebecca Lepping, KU Alzheimer's Disease Research Center; Hoglund Biomedical Imaging Center

Job/project title: Brain Imaging Undergraduate Research Assistant

Remote or in-person: This would be a remote position for the 2022-2023 year.

Project description: The Alzheimer's Disease Research Center measures cognition, disease progression, and a variety of blood and brain biomarkers every year on a group of nearly 400 older adults in order to understand and identify early markers of Alzheimer's disease and dementia. By doing this, we hope to one day prevent future disability. This project focuses on analyzing the magnetic resonance imaging (MRI) and positron emission tomography (PET) brain images we get from those older adults. We are measuring changes in brain structure, function, and pathology known to be related to dementia. Your work as an undergraduate research assistant would be to help with imaging data entry, data analysis, and data management for the project.

Potential student tasks and responsibilities: Potential tasks include:

 - 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

 - project progress meetings with the supervisor

Student qualifications and 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 *#67; Terry Loecke*

Mentor name: Terry Loecke, Kansas Biological Survey and Environmental Studies

Job/project title: Student Research Assistant

Remote or in-person: This position could be done remotely or in-person.

Project description: The Loecke Lab focuses on understanding how current environmental issues affect soil, air and water quality. Students working in the lab gain exposure to a wide variety of projects, while developing skills on a particular area of interest. We rely on field sample collection and lab analysis, but also emphasize technologically advanced monitoring options, including sensors (to measure soil oxygen and temperature or water quality), micro-computers and remote sensing. Current projects in the lab range from studying soil carbon cycling processes that help to mitigate climate change to greenhouse gas emissions from nearby restored wetlands. We have a current the project that aims to understand how variation in weather and climate change interact with land management changes (e.g., agricultural fields, restored wetlands and prairies, and native ecosystems) to affect greenhouse gas emissions. This work can involve a combination of field work, lab analyses, or remote data entry and literature review.

Potential student tasks and responsibilities: We seek highly motivated students to contribute to a soil greenhouse gas emissions project. At first, the student would assist upper-level undergraduate students or graduate students in conducting experiments and field work or literature reviews (especially if social distancing is required) and then gradually take on more responsibility as they gain comfort. The student may partly work at a nearby field site collecting air, water, and soil samples for chemical analysis.

Student qualifications and characteristics: Curiosity in the environment and interest in learning cutting-edge analytical skills. Ability to communicate clearly and follow instructions; attention to detail, particularly for keeping lab and field notes. Interest in spending time outdoors collecting water and soil samples. Must be available for at least one 3 hour block per week within the 8am-5pm window.

Social Sciences

Position #68; Glenn Adams

Mentor name: Glenn Adams, Psychology

Job/project title: Cultural Psychology Research Group

Remote or in-person: This position could be done remotely or in-person.

Project description: Generally speaking, the Cultural Psychology Research Group studies the relationship between sociocultural systems and psychological experience. During the next academic year, we are seeking assistance for 3 projects.

1. One project considers Cultural-Ecological Variation in Conceptions of Well-being. We asked participants in a variety of Ghanaian and US settings to provide definitions of well-being and to describe situations that would increase or decrease their well-being. We are now analyzing those situations to test hypotheses about cultural-ecological variation in experience of well-being.

2. A second project considers the implications of racial identification for conception and perception of racism. We asked participants in the US to respond to questions that assess their beliefs about racism.

3. A third project examines cultural psychological foundations of environmentalism and understandings of ecological engagement in the subfield of environmental psychology.

Potential student tasks and responsibilities: Work on all of the projects can happen remotely, off campus or in person, on campus

1. Assistants for the well-being and conception/perception of racism projects will code participant responses along a number of theoretically relevant dimensions using a framework that we have developed for the project.

2. Assistants for the environmentalism project will code journal articles using a framework that we have developed for the project.

Initially, assistants will learn skills in an apprenticeship capacity. Eventually, we anticipate that students will be able to administer the procedure on their own, without direct supervision. We will train the student to perform some basic analytic procedures. We will then encourage the student to prepare a poster reporting results of these analyses for presentation in the annual KU undergraduate research symposium or the annual KU Symposium for Undergraduate Psychology Engagement and Research.

Student qualifications and characteristics: The position requires no specific qualifications or characteristics beyond intellectual curiosity and a passion for learning how to do social science research. It would be ideal, but not absolutely a requirement, if students were available for (virtual or IRL) meetings of the Cultural Psychology Research Group.

Position #69; *Jill Becker*

Mentor name: Jill Becker, Libraries

Job/project title: Student Perceptions of Plagiarism

Remote or in-person: This position could be done remotely or in-person.

Project description: The purpose of this project is to categorize, code, and begin to interpret undergraduate student responses to open-ended questions pertaining to academic integrity, plagiarism, self-plagiarism, and ethical communication. The open ended questions were included in a learning module meant to prepare students for an in-class discussion about academic integrity. Results of this study will help improve the learning module for future courses, and will also tell us how students interpret the value of information. The emerging scholar will be introduced to qualitative research methods including how to code and analyze open ended-responses, and assist with the interpretation of these responses from a student perspective.

Potential student tasks and responsibilities: •   Become familiar with the literature on information literacy, and student perceptions of academic integrity/plagiarism. This will include a small number of assigned readings pertinent to this study, as well as conducting additional literature searches as needed.

•   Become familiar with qualitative research methods used to categorize and code open-ended responses.

•   Meet with mentor to discuss readings to ensure a shared understanding of the theoretical framework for this study.

•   Clean up data (open-ended responses) from Excel files exported from learning module platform.

•   Assist with categorizing and coding open-ended responses.

•   Assist with interpretation of open-ended responses.

•   Help generate ideas to improve the learning module for future courses.

Student qualifications and characteristics: 1) Availability for 2-3 hour blocks of time between 9am-5pm, M-F. Exact days/times are flexible, but consistency is preferred. Some work (such as reading) can occur outside of work days.

2) Curious, organized, and interested in qualitative research. Experience and comfort with using Excel is preferred, but training can be provided.

3) Students who are interested in qualitative research methods in any field, and/or students who are interested in librarianship, teaching, and/or student success.

Additional comments: I prefer for this position to be in-person if it is safe to do so.

Position *#70; Shradha Bindal*

Mentor name: Shradha Bindal, Finance

Job/project title: CEO political affiliations and firm political contributions

Remote or in-person: This position could be done remotely or in-person.

Project description: The objective of this study is to test the impact of CEO's political affiliation on firms. A CEO is responsible for making key decisions for a firm. In doing so, it affects firm value. We test whether a CEO's political preferences affect a firm's political leanings and actions.

Potential student tasks and responsibilities: The student will be provided with two data sets in excel. The first data set will contain a list of companies and their employees including CEOs. The second data set will contain company names with a unique key and CEO names with a unique key. The students will match the names of the firm in the first dataset with the second dataset. Once the companies are matched, the student will then match the name of the CEO from the first dataset with the second dataset.

Student qualifications and characteristics: 1. Attention to detail and diligence is a must. The students will have to be careful in matching names between two datasets. Sometimes two names might look similar but might not be so. The student would have to carefully examine each name before deciding to match the names.

2. Curiosity about finance and politics is a plus.

3. Programming skills and the ability to work with large datasets is desirable, but not necessary.

Additional comments: The student must have access to a laptop and internet.

Position #71; *Brian Cole*

Mentor name: Brian Cole, Educational Psychology

Job/project title: KU Positive Psychotherapy Clinic

Remote or in-person: This position could be done remotely or in-person.

Project description: Although most approaches to therapy focus primarily on symptoms and client distress, there is growing evidence that a focus on client strengths and positive traits can effectively treat depression and anxiety. The Applied Masculinities and Positive Psychology (AMPP) Lab in the Counseling Psychology Program has developed a 9-session positive psychotherapy treatment that will be free to KU students and members of the community. This project will explore the effectiveness of positive psychotherapy treatment. Clients will complete weekly assessments about depression, anxiety, therapy effectiveness, hope, and well-being. Undergraduate research assistants will be involved in our clinic, which is housed in the lobby of the Center for Psychoeducational Services in Joseph R. Pearson Hall, with services provided via telehealth. To date, the KU Positive Psychotherapy Clinic has provided over 800 hours of free therapy to adults in Kansas.

Potential student tasks and responsibilities: Potential tasks and responsibilities:

Collecting weekly symptom distress and positive functioning measures

Entering client data into an SPSS database (training will be provided)

Assisting with clinic tasks (e.g., scheduling appointments)

Assisting with literature reviews and proposals for conferences

Student qualifications and characteristics:

- The ideal research assistant will be detail oriented, responsible, and reliable.

- Although not required, this is a great position for students with an interest in applied psychology (therapy and counseling)

- The research assistant must be available during the hours of 9 and 5. Although the schedule for data entry will be flexible, the ability to work in two- or three-hour blocks is ideal.

- This project does not require any field specific knowledge or experience.

Position #72; *Cindy Colwell*

Mentor name: Cindy Colwell, School of Music-Music Therapy

Job/project title: Music Therapy in Medical Settings

Remote or in-person: This position could be done remotely or in-person.

Project description: The researcher does clinical and research at the University of Kansas Cancer Center. Currently her research team (two faculty members, one medical student, one research assistant) are in the initial stages of two research studies: 1) Medical students' knowledge, understanding, and perception of music therapy as a CAM in medical settings, and 2) Role of verbal processing of emotions within music-based interventions as supportive cancer care: A scoping review. The Emerging Scholar will have the opportunity to work on each of these studies in conjunction with the team. The first study, was initiated by a medical student at KUMC who feels passionate about the impact of music therapy on patients and from that passion is interested in determining her med school colleagues knowledge, understanding, and perception of music therapy. The Emerging Scholar will help gather necessary research literature, assist in survey development, and data entry. The second study, was initiated as a follow up to a recently published study in the Journal of Music Therapy where the two faculty on the research team are interested in examining an aspect (verbal processing of emotions) of music-based interventions to further ascertain their function in the therapeutic process. As part of the process to create a follow-up music-based intervention study, the faculty researchers feel it is imperative to examine already existing literature in psychosocial oncology.

Potential student tasks and responsibilities: The research assistant will have the opportunity to help with two or more research studies focused within one of the research agendas of the faculty member as outlined in the project description. The Emerging Scholar does not have to have a music background or any prior knowledge of music therapy. Tasks are varied and will depend upon the current project but may include gathering literature support through database searches, helping create a survey through Qualtrics, gathering, reading and coding literature based on a defined process as outlined by the research team, and entering data for analysis. The faculty member requests a weekly meeting such that tasks can be assigned and explanations and training provided. Information regarding these studies will reside within a shared folder of OneDrive and the faculty member will provide access and information on how to manage information within that platform.

Student qualifications and 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.

Position #73; *Florence DiGennaro Reed*

Mentor name: Florence DiGennaro Reed, Applied Behavioral Science

Job/project title: Training Advanced Professionalism Skills to Young Professionals

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: The mission of the Performance Management Laboratory is to conduct both real-world and laboratory research to train and support employees who work with vulnerable populations (e.g., people with disabilities). Because staff turnover is so high in those workplaces, identifying ways to enhance skills and ensure young professionals can perform relevant job duties is an important area of study. The overall project will target three research studies whose goals are to teach relevant professionalism skills to young professionals. The three research studies will focus on the following areas: (1) training new managers/supervisors how to navigate high-stakes, emotionally charged conversations with employees; (2) training professionals how to advocate for their workplace needs in situations where there is a power differential; and (3) training professionals public speaking skills using virtual reality.

Potential student tasks and responsibilities: Tasks will include the following:

1. Assist with running a research session (e.g., act as a supervisor or employee in a role-play scenario, set up virtual reality equipment).

2. Collect data during a research session.

3. Enter data into graphing software.

4. Help prepare training materials.

Student qualifications and characteristics: Research sessions will likely occur in 2- to 3-hour blocks of time at KU or at a community agency in Lawrence or Kansas City. Students do not need their own transportation as they could ride with a member of the research team for off-campus sessions. When sessions are not taking place, students are expected to work during business hours at agreed-upon times. Students who are interested in business, industrial-organizational psychology, organizational behavior management, or improving quality of services to people with disabilities would likely enjoy this experience.

Additional comments: The Performance Management Laboratory is a fun, energetic team comprised of undergraduate and graduate students and a faculty member. We provide lots of training and support and are eager to mentor someone who has an interest in this area of research.

Position #74; *Meghan Ecker-Lyster*

Mentor name: Meghan Ecker-Lyster, Center for Educational Opportunity Programs

Job/project title: Undergraduate Student Research Assistant

Remote or in-person: This position could be done remotely or in-person.

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 student tasks and 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 and 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 #75; *Omri Gillath*

Mentor name: Omri Gillath, Psychology

Job/project title: Research assistant

Remote or in-person: This position could be done remotely or in-person.

Project description: The overall goal of the project is to collect data for research projects in the Gillath lab. Specifically we have two projects in mind, one focusing on changes in cortisol following attachment security priming, and the second focusing on attachment security and trust in Artificial Intelligence.

Potential student tasks and responsibilities: As a research assistant (RA) in the lab, students 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 and writing-up the data for presentation and publication.

Student qualifications and characteristics: Students 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 *#76*; *Deanna Hanson-Abromeit*

Mentor name: Deanna Hanson-Abromeit, Music Education & Music Therapy, School of Music

Job/project title: baby-Music Intervention Research (MIR) Lab Assistant

Remote or in-person: This position could be done remotely or in-person.

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 connect 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 large-scale literature review, development of a new intervention for newborns exposed to drugs in utero, and other music intervention studies. Several new studies are evolving. We collaborate with researchers at KU-Lawrence, KU Medical Center and Hospitals, including the Baby Lab and the Hoglund Biomedical Imaging Center, and Children's Mercy Research Institute. Learning opportunities extend into working with and learning from other researchers and disciplines involved in our projects.

Potential student tasks and 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, drafting manuscript and grant application sections, coding of video and/or audio recordings of clinical music therapy services, and attending weekly lab and mentor meetings. Other responsibilities may include making copies, organizing materials and other administrative tasks. Many tasks can be done off campus as we use collaborative workspaces (e.g. Dropbox, Microsoft Teams). There may also be opportunities to work directly with collaborators affiliated with our lab but in different locations.

Student qualifications and characteristics: Curiosity, attention to detail, reliability, and the ability to work independently 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. Interests in music, music therapy, medicine, psychology or other related fields are helpful. 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 team.

Additional comments: Past Emerging Scholars have enjoyed the variety of tasks, opportunities to provide input and actively contribute to projects at various stages and be involved with researchers at various levels (undergraduates, masters, PhD and faculty). The Emerging Scho

Position #77; *Tracey LaPierre*

Mentor name: Tracey LaPierre, Sociology

Job/project title: Care and Safety Practices During COVID-19 in Home Based Care

Remote or in-person: This position could be done remotely or in-person.

Project description: This mixed methods study examines the system response to the COVID-19 pandemic in home-based care in Kansas. Home- and community-based services (HCBS) provide an alternative to institutionalization. Home care involves hands-on personal care tasks that cannot be replaced with telehealth and is less regulated compared to congregate care settings, thus posing many important questions. How did the pandemic impact the delivery of home care? How were new safety practices identified, negotiated, and enforced by home care teams? How did the pandemic impact the wellbeing of those who receive and provide this care? Did the COVID-19 policy response adequately meet the needs of home-care clients and their workers? In this community-engaged study, perspectives are gathered from those who receive and provide Medicaid-funded home care services in order to learn what worked and what didn't work, through quantitative surveys and qualitative interviews. This research is being conducted by an interdisciplinary research team of scholars from the fields of social work, sociology, gerontology, and nursing. The project is guided by a Stakeholder Advisory Board consisting of client, caregiver, worker, provider, and advocate representatives who help ensure the project is responsive to the realities of the field and delivery of HCBS on the ground. The end goal is to identify policies and practices that can improve the home-based services and supports for consumers, caregivers, and workers. The study is funded by the Agency for Healthcare Research and Quality.

Potential student tasks and responsibilities: Under the guidance of a faculty mentor and the project PI, and as appropriate for the student's skill set, the Emerging Scholar can assist with:

Literature and policy reviews

Citation management

Data entry and cleaning

Deidentify interview transcripts

Stakeholder engagement

Team based qualitative data coding, as appropriate

Basic data analysis, as appropriate

Assisting with reviewing and disseminating research findings, as appropriate

Student qualifications and characteristics: We are looking for a student with the following characteristics and qualifications:

The student must be available to attend a 1-2 hour weekly team meeting via Zoom, which will be scheduled to accommodate all team members' availability. The majority of the work can be completed remotely if the student has internet access; a secure university laptop will be loaned to the student.

Willingness to complete required human subjects training, including the HIPAA module, as this project includes human subjects and protected health information data.

Ability to work both as a team and independently.

Personal or professional interest in social policy, social services, or long-term care is desirable but not required.

Additional comments: We will adapt work tasks to build on the student's strengths and areas of interests. We have worked with volunteer undergraduate research assistants this past year who reached out to us because they heard about our project and wanted health and social ser

Position #78; *Sarah LeGresley Rush*

Mentor name: Sarah LeGresley Rush, Physics and Astronomy

Job/project title: Redesigning physics courses: how do we improve student learning?

Remote or in-person: This position could be done remotely or in-person.

Project description: Recently there has been a push to redesign courses and the focus has primarily been on the delivery of the curriculum (course content). Students are increasingly being required to take a more active role in their learning. For example, in our introductory physics courses, instead of sitting and watching (or in many cases not watching) a lecture during class, students are required to read or watch videos before class. This allows the class time to be focused on solving problems (typically in a group environment) which is where students tend to struggle the most. Having already redesigned the delivery in many of our introductory courses, this project will focus on how redesigning the curriculum (specifically the reordering of the topics covered in courses) will impact student learning.

Potential student tasks and responsibilities:

a. reading relevant articles related to the research (some articles will be provided and additional articles of interest can be chosen by the scholar)

b. after reading the articles, try and determine what changes have been applied to the ordering of the physics topics

c. determine if the changes have improved the grades, and/or attitudes and if so how was that measured (pre and post tests, student surveys, grades in courses, etc.)

d. look at and analyze the data that we are collecting and work to find ways to present the data (presentation style might be similar to that found in the research articles)

Student qualifications and characteristics: Most important qualifications and characteristics are a willingness to work and a desire to learn! You don't necessarily need to be good in physics or interested in education. That would likely make the job more interesting and fun but is not required and training of the skills required will be provided. There will be a mandatory 1 hour meeting each week.

Position #79; Brittany Melton

Mentor name: Brittany Melton, Pharmacy Practice

Job/project title: Use of Technology in Healthcare

Remote or in-person: This position could be done remotely or in-person.

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 student tasks and 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 and 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 *#80*; *Sheida Raley*

Mentor name: Sheida Raley, Kansas University Center on Developmental Disabilities

Job/project title: Self-Determination Research Emerging Scholar

Remote or in-person: This position could be done remotely or in-person.

Project description: The Kansas University Center on Developmental Disabilities (KUCDD) seeks a motivated KU emerging scholar with strong work ethic and superior attention to details to assist with administrative research tasks and projects in support of research to enhance the quality of life, self-determination, and inclusion of people with disabilities and their families. For more information about KUCDD, see https://kucdd.ku.edu/.

Potential student tasks and responsibilities: Responsibilities for this position would include tasks such as: performing data entry and data management tasks, including meeting quality assurance standards of data entered; editing study video or audio materials; preparing documents and other materials used in research activities to support people with disabilities; organizing project information and files; and completing other duties as requested (e.g., photocopying, scanning, meeting support). All research activities require strict maintenance of study participant confidentiality in accordance will all KU policies and procedures.

Student qualifications and characteristics: Required Qualifications

1. KU undergraduate student enrolled in a minimum of 6 credit hours each semester per academic year

2. 1 year of proficiency with Microsoft Office software: Word, PowerPoint, Excel, and Outlook

3. Strong oral and written communication skills

4. Strong attention to detail

Preferred Qualifications

1. KU undergraduate student pursuing a major in the School of Psychology or Education

2. Experience with data entry, data management, or data reporting tasks using Excel, SPSS, or similar software

3. Experience with video filming equipment or editing software such as Final Cut Pro or other similar software

4. Interest in research related to people with disabilities and their families

Position #81; Amber Watts

Mentor name: Amber Watts, Psychology

Job/project title: Online Media Coordinator

Remote or in-person: This position could be done remotely or in-person.

Project description: Our lab conducts research on lifestyle habits (like exercise, sleep, and nutrition) that promote good health in middle-aged and older adults. Many of our research projects explore ways to prevent Alzheimer's disease and mental declines that can occur in older adulthood. Newer projects are focused on women's health in midlife and the stigma around menopause and its treatment. The lab has several social media sites, a website, and an online newsletter that need to be updated regularly with new research in this area. The student who is hired for this position would join a lab group with 4 doctoral students and 2 undergraduate students who meet weekly to discuss progress on research, scientific conferences, and professional research skills. For more information, see our current lab website and social media sites on women's health

Website: https://aginglab.ku.edu/

Instagram: instagram.com/amberwatts_phd (Women's Midlife Adventure)

Facebook: www.facebook.com/AmberWattsPhD (Women's Midlife Adventure Network)

Potential student tasks and responsibilities:

Create weekly social media posts with information about our healthy lifestyles research

Update content on research lab website, and professional profiles (like LinkedIn)

Contribute to a quarterly newsletter about research updates

Attend and participate in weekly research lab meetings

Give a presentation about your projects at one lab meeting per semester

Maintain a Zotero database of research articles (using Google Scholar)

Student qualifications and characteristics:

 Reliable attendance at weekly meetings

Weekly communication about progress on projects

Familiar with posting on social media including Facebook and Instagram

A good eye for visual details that catch attention online

Interest in research on healthy lifestyles, older adults, or women's health

Position *#82; Erin Yosai*

Mentor name: Erin Yosai, Educational Psychology

Job/project title: Introduction to Psychological Clinic Research

Remote or in-person: This would be an in-person position for the 2022-2023 year.

Project description: The Center for Psychoeducational Services is a graduate training clinic on campus housed within the Department of Educational Psychology. The training clinic is used by counseling and school psychology graduate students and their supervisors to see community and campus-based clients for therapy, psychological assessment, and other activities. A lot of the clients that we work with are kids and families that have suspected learning disabilities, Autism, or ADHD.

The current research projects we are working on include creating a database of the historical testing data we've collected since the year 2000, as well as tracking new clients' data to better understand outcomes of treatment. We want to understand how the assessments we use to diagnose people correlate and predict certain diagnoses. Projects and research questions are always evolving, and if you have an interest in or question about the data yourself, we can create a study to investigate!

If you have an interest in clinical or counseling psychology graduate programs, this would be a great initial experience for you to understand how applied psychological research works!

Potential student tasks and responsibilities: Learning how to input, sort, and analyze quantitative and qualitative data into RedCap - a database used for research

Opportunity to gain a deeper understanding of psychological assessment

Researching current articles and writing research summaries (this could lead to contributing to writing research articles for publication or proposal for research presentations).

Understanding the basic methodology followed in psychological research and how to form research questions.

Professional development and mentoring by research advisor and graduate students

Student qualifications and characteristics: Organized, attention to detail, interest in psychology or working with people, collaborative, ability to meet for in-person work at least half of the hours (we work with confidential data, so you must be able to be on site for some of the work).

Position *#83; Jiakun Zhang*

Mentor name: Jiakun Zhang, Political Science

Job/project title: KU Trade War Lab

Remote or in-person: This position could be done remotely or in-person.

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.

Potential student tasks and responsibilities: Specific responsibilities include:

1) Coding industry-issues from government reports and data entry

2) Researching industry associations and Congressional communications

3) Tracking headlines about the US-China trade war

4) Emailing and calling businesses for survey work

5) Populating spreadsheet on firm attributes using databases such as Dun & Bradstreet

6) Web-scrapping tariff exclusions data from government websites

Student qualifications and characteristics: Student qualifications and characteristics: No prior research experience required, but interest in international economics, business, law, & politics preferred. TWL Research assistants are expected to work 4-7 hrs/week (more available during the summer) and be available for a weekly lab meeting (45-60mins).

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

Position #84; *Kathleen Zimmerman*

Mentor name: Kathleen Zimmerman, Special Education

Job/project title: Effective Interventions in Special Education

Remote or in-person: This position could be done remotely or in-person.

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 student tasks and 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 and 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 #85; *Kathleen Zimmerman*

Mentor name: Kathleen Zimmerman, Special Education

Job/project title: Center for Innovation, Design, and Digital Learning

Remote or in-person: This position could be done remotely or in-person.

Project description: The students will support organization and creation of online content for the digital center to support the use of educational technology in institutions of higher education that train future special education teachers, occupational therapists, speech-language therapists, and occupational therapists. CIDDL creates blogs, podcasts, video tutorials, and online learning communities to highlight innovations in digital technologies. For example, we highlight how to create Google classrooms, how to utilize artificial intelligence, how to create virtual reality experiences in your teaching, and how to utilize mobile phone apps to increase productivity. Institutions of higher education across the world are targeted by the Center directors and staff to support innovation in digital technologies across the world.

Potential student tasks and responsibilities: Student tasks and responsibilities include:

- Creating content for the CIDDL website (blogs; web-design; video editing and design; podcast creation, editing, and design)

- Organizing data from users of the CIDDL website

- Formatting documents, videos, and podcasts for publication

- Attending team meetings with your supervisor

- Researching digital technologies to be highlighted by the center

- Managing data collected by CIDDL

Student qualifications and characteristics: Student qualifications and characteristics include:

- Consistent and clear communicator

- Checks and responds to email daily during the workweek

- Familiar with web-design, podcast creation, video editing preferred

- Excels with time management skills and organization