Office of Undergraduate
Research & Creative Activities
UNIVERSITY OF COLORADO **DENVER**

Example EURēCA! Fellowship Applications

EURēCA! Fellowship Applications include the Following:
- Past Research Experience (limit 250 words)
- Career Goals (limit 250 words)
- Project Abstract (limit 250 words)
- Uploaded Project Proposal:
  - Project Description and Objectives (500-700 words)
  - Bibliography (3-10 sources cited in proposal)
  - Detailed Project Timeline

Find Details and Examples Below:

View excerpts from recently funded applications written by CU Denver undergrads just like you! Contact undergrad.research@ucdenver.edu for additional guidance as you prepare your application.

Project Abstract

Broadly describe the project you will be working on this summer (limit 250 words). Please make the description comprehensible to a non-expert reader. For abstract writing tips click HERE.

Abstract Example 1:

This project will explore the way women built empowering spaces between 1967 and the late 1980s through the production and distribution of transformative fanworks related to the science fiction series Star Trek, which first aired in 1966 and saw its first fanzine published in 1967. Over the next twenty years, Star Trek would see the cancellation of its original television series but also the production and release of five film sequels. At the same time, the feminist movement in the west was experiencing a resurgence in which activists redefined the focus and goals of feminism as an ideology, a period that would later be referred to as feminism's second wave. Though science fiction fandom has long been regarded as a male space, the most prolific producers of transformative Star Trek fanworks during this period were women. Participatory fandom, once something of a niche subculture, has become more widespread than ever within the last decade. Much of the previous research on this topic has approached fandom as a cultural phenomenon through a modern lens. My project aims to approach the subject from a historical standpoint by chronicling the development of these female fandom spaces within the Star Trek fandom and placing them within their historical context. My research will pay particular focus to fanzines and fanfiction as examples of transformative works. During this period, the production and distribution of these transformative works allowed women to safely challenge social norms through creative expression outside of the confines of their expected gender roles.

Abstract Example 2:

Pronunciation is a vital aspect of learning a second language (L2). However, learning to pronounce in an L2 can be difficult. There may be sounds in the new language that do not exist in the learner's first language(s) (L1), or exist in different contexts. Additionally, learners have a tendency to transfer features from their L1 into their L2, which can cause miscommunications and confusion. For native English speakers learning Spanish as a second language, the rule is no different. For example, English vowels tend to be long, and a single vowel phoneme in English will many times be pronounced as a diphthong, which means the pronunciation glides between two vowel sounds in a single syllable (e.g., the word "I" is pronounced [ai]). On the other hand, Spanish vowels are short, and a single vowel phoneme almost always maps to a single vowel sound (e.g., the word "o" in the word "yo" is pronounced [o]). Yet many native English speakers learning Spanish have a tendency to carry these longer and/or diphthongized vowel variations into Spanish. This creates an accent that is more difficult for speakers to understand, and sometimes it can cause confusion between two words. The use of explicit phonetics instruction in classes has been shown to be effective in improving student pronunciation, however the majority of the research has focused on intermediate-to-advanced students. This project will explore the role and efficacy of explicit phonetics instruction for beginner Spanish L2 students' pronunciation (CU Denver SPAN 1010).

Abstract Example 3:

1,4-dioxane has been classified by the Environmental Protection Agency (EPA) as a probable carcinogen, with the effects of exposure ranging from nausea and irritation to cancerous tumors and teratogenic effects. Traces of 1,4-dioxane have been detected in aquifers underneath the once active Lowry Landfill site from wastes like degreasers, paint, pesticides, hospital waste, petroleum, sewage sludge, and tires that seeped through the unlined landfill into the ground beneath it. The landfill has since shut down operations and has been declared a Superfund site by the EPA to enact decontamination through bioremediation of the contaminated groundwater to have no associated health risks with contact. The bioremediation and degradation of 1,4-dioxane in the groundwater is completed by communities of bacteria from the aquifers. The bioremediation is effective by the EPA's standards, however, no knowledge of (1) how many and what bacteria are living in these communities, (2) what bacteria are degrading the 1,4-dioxane and how they are doing so, and (3) what can be done to improve their bioremediation currently exists. Preliminary experiments with culturing the bacterial communities revealed that some species were able to grow in nutrient broth, reactor media, and nutrient agar to address objective (3) and supported the hypothesis that multiple organisms were living in these cultures for objective (1). Future work will involve further culturing in more conditions for objective (3) and analysis of the samples to determine the species involved and how they are degrading the dioxane to further address objectives (1) and (2).

Project Description and Objectives

In a single essay (500-750 words), describe your research, creative project, or other scholarly activity, including specific objectives, significance, method of inquiry, and analysis & interpretation. Include the following elements:

- **Objective:** Describe the precise importance or goal(s) of the project. Clearly state the purpose of your project. What research question/hypothesis, problem statement, or concept will you investigate?

- **Significance:** Discuss relevant scholarly literature to describe current knowledge in your field (include citations in bibliography). Describe how your project will contribute to or advance this current knowledge.

- **Method of Inquiry:** Explain discipline-based methods or creative techniques you will use to conduct your investigation or exploration. Provide enough detail to allow non-experts to understand the function and purpose of this approach.

- **Analysis & Interpretation:** Discuss how you will be able to use the information gathered via your method of inquiry to address the objective(s) you described above.

Proposal Example 1:

For this project I will administer a survey that will capture Asian-American views of law enforcement. I will be responsible for writing and distributing the survey, collecting the data, and conducting interviews, with Dr. MENTOR's guidance. The survey captures demographic data such as age, level of education, race/ethnicity, and income level. It also asks a series of questions about past experiences with law enforcement, their opinions of law enforcement, and those of their friends/family. Finally, the survey asks a series of questions about hate crime victimization during the COVID-19 pandemic, and experiences with the police if they attempted to report a hate crime. The survey has IRB approval, and survey distribution has begun to promote the survey across the campus, local community, and nationwide. I will continue to contact student organizations, ask professors to share the survey with their students, and reach out to local and national organizations asking them to distribute it to their members. I will also be posting the survey in online forums. We will also utilize the University's access to ResearchMatch. While most of the project will be collecting data through a survey, I will also conduct interviews with volunteers to allow for more in-depth discussions.

Over the last decade, police-community relations have been strained. A review of multiple studies regarding these topics indicates that perception of effectiveness of the police, as well as perceptions about crime and safety were strong predictors of how satisfied citizens were with the police, and how common they thought misconduct was in their neighborhoods. In general, respondents who had contact with the police, whether initiated by themselves or the police, expressed less satisfaction with the police (Dowler & Sparks, 2008; Jefferis et al., 1997). However, many studies of police perceptions were done before the year 2020 and primarily address Black, White, and Hispanic/Latino populations, failing to include Asian-American/Pacific Islander views. This is even more relevant to study considering the increase in hate crimes towards the Asian-American/Pacific Islander community because of COVID-19, and how that may have affected police perceptions (Gover et al., 2020). Moreover, the concept of prosecuting a hate crime is also something relatively new to the criminal justice system. The first federal statutes were not passed until the 1980s, and corresponding state laws followed in the 1990s. In the wake of unprecedented situations as the COVID-19 pandemic, it is necessary to continue these studies and explore new aspects of how police-community relations have been shaped. The data from this research can also be used to influence policy surrounding hate crimes.

Proposal Example 2:

The objective of this project is to explore and test existing, traditional techniques in bending wood in order to discover new processes in the bending of wood leading to the development of methods that which will contribute to advancements in the applications and fabrication of bent wood in the built environment. The project will result in a built sculptural and functional piece

using the newly developed techniques. In their book titled Bent Ply, Dung NGO and Eric Pfeiffer describe the beginnings of wood bending in design:

> "Plywood evolved as part of a larger narrative in the transformation of natural resources into the building blocks of the modern world. Modern plywood's origins date back to the Industrial Revolution and the development of design as a modern discipline based in technical innovation." (14).

I argue that not only does the material need to be treated in the context of it's timeline, but it is becoming critical that these be re-explored using new modern technological processes now more widely available to us such as Computer Numerical Control (CNC) milling. Through this project, I will be combining advanced CNC machining process combined with traditional wood bending processes to create a new way to make beautiful and efficient wood forms.

The ability to bend plywood greatly reduces wood waste and increases it's strength (NGO and Pfeiffer 16). This is due to the cross-lamination of very thin veneers of wood that possess enough malleability under various processes to take on most any form, despite its smaller wood cellular density compared to using traditional thick timbers as a means to create strength. The ultimate goal of bending wood is to maximize material strength and efficiency without sacrificing the aesthetic appeal provided by bent plywood.

> "Industrial-era technology considered raw resources to be cheap and endlessly renewable, with little thought given to the ill-effects generated by the by-products of industrial processes. In our current postindustrial age, however, we understand the interdependency of global systems and have become keenly aware of the earth's dwindling raw materials" (Brownell 7).

I believe this project can contribute to this quest of reproducing existing materials and processes into new forms through use of hylomorphic design principles. The basic concept of hylomorphic design is ever-changing form and matter as a resultant of one another. Specifically with this project, the role of hylomorphism will be to change form without changing material mass. This is described more specifically below as:

> "Formation is foremost an expression of the intensive, rather than merely extensive, properties of architecture. Extensive properties depend on the amount of matter present and are proportional to the amount of material in the system, such as mass, volume, weight and length. These are the traditional variables of hylomorphic design methodologies" (Beorkrem 8).

Proceeding the industrial revolution, there was a boom of successful experimental plywood design. However, two centuries later, the production technology including manufacturing scales and user accessibility have gone through extreme advancements, at the same time, the produced bent plywood artifacts themselves have seen virtually no change since the 19th century.

> "But even in the most sophisticated transformation of extensive properties, the resulting physical state of the system remains extensively the same. This lack of state change is one of the primary epistemological limitations of hylomorphic models of design: it occludes the possibility of other states. A fully immanent expression of architecture's intensive possibilities in its formation remains largely dormant in design discourse today" (Beorkrem 8).

The three traditional methods of wood bending I will study and experiment with in the early stages are moisture bending, kerfing, and lamination molding. These 3 methods can be broken down into three procedural categories of subtractive, additive, and hylomorphic.

These studies will result in a series of small multiples that display each of the three techniques tested in a series of twelve different forms. Through this experiment, procedural and material efficiency will be evaluated in a list along with recordings of strength limitations and possibilities of achievable form based on resultant moldability of shape. The resultant iterations will all be done using 17-layer birch plywood cut to 2-inch by 24-inch strips. Each piece will be placed into twelve pre-made molds of different 2-dimensional curved profiles. A second series of experiments will follow focusing on 3-dimensional moldable forms which combines multiple profiles from the 2-dimensional profile molds.

Following these studies, I will develop new processes and methods of bending wood based on recorded findings on strength and material efficiency from the iterated small multiple models. Aggregating the traditional processes and experimenting with CNC technologies will lead to the development of new methods for bending wood that will then be applied in the creation of an end installation or furniture piece to be displayed at the UCDenver College of Architecture and Planning in the CU Building with informational boards to teach designers about the possibilities of these processes.

Proposal Example 3:

My research project examines predictors of exacerbated self-image in those with rheumatoid arthritis (RA). The project increases awareness of clinical outcomes for those with RA. We hypothesized that RA severity, unpredictability, limited functionality, ability to work, canceling plans, ability to have intimate and sexual relationships, and participation in physical activity would significantly predict lower self-image in those with RA. A research abstract based on results from the study was submitted and accepted for poster presentation at the 2023 annual Society of Behavioral Medicine (SBM) conference. Receiving travel funds will allow me to attend the conference to disseminate the results, attend conference talks on topics of interest in health psychology, and network with professionals and experts in the field toward my goal of becoming a psychologist.

Significance

In 2014, it was reported that 0.24% of the global population had RA and RA was found to be 42nd of 291 contributors to global disability (Cross et al., 2014). Regarding clinical outcomes for those with RA, a 2013 study found over 60% of respondents reported a significant decrease in self-image following RA diagnosis (Kurt et al., 2013). A recent meta-analysis found that many living with RA have a treatment outcome desire of regaining healthy self-image and functional living (Landgren et al., 2020). Our study directly identifies contributors of negative self-image in those with RA. That identification is vital to have well-rounded perspective of the condition and understanding of biopsychosocial treatment outcomes.

Method and Inquiry

Data was collected from 3856 respondents to a national survey of those with rheumatoid arthritis in the United States (M_{age} = 60.15 years, 94.3% female, 91.1% Caucasian). Predictors of exacerbated self-perception were analyzed via hierarchical linear regression with SPSS version 28. This model of analysis estimates the percentage of variance accounted for by

included predictor variables. For example, we were able to see how much variance in negative self-image scores was predicted by participant ratings of RA severity and other variables. In our specific case, we examined six predictors.

Analysis and Interpretation

Ratings for RA severity, unpredictability, limited functionality, ability to work, canceling plans, ability to have intimate and sexual relationships, and participation in physical activity were entered in a hierarchical linear regression. Although significant when entered in a model alone ($\beta\beta$=.811, p<.001), RA severity was no longer significant when entered in the full model ($\beta\beta$=.044, p=.354). The full model showed limited functionality due to RA ($\beta\beta$=.114, p<.001), decreased ability to work ($\beta\beta$=.115, p<.001), often needing to change or cancel plans (β=.197, p<.001), difficulty having intimate or sexual relationships (β=.165, p<.001) and trouble participating in physical activities (β=.157, p=<.001) as significant predictors over and above RA unpredictability (β=.127, p<.001), (R^2=.390, $F_{7,3848}$=352.994, p<.001).

This is intriguing as our results point toward decreased quality of life and functionality as strong drivers of exacerbated self-perception, beyond RA severity alone. Discussing the results with a broader audience is the first step in disseminating the findings and advocating for further research. It will be important for future studies to continue examination of biopsychosocial outcomes in those with RA and particularly those related to exacerbated self-image.

Project Timeline

In list format, provide a detailed timeline, including approximate dates of when project milestones will be reached. This Fellowship is only 8 weeks and goes by quickly- describe how you will allocate this time.

Timeline Example 1:

- **Week 1** - Literature Review: Collecting relevant articles and ideas from past publications to help inform the direction of the project.
- **Week 2** - Preparation of input: Performing small calculations to generate Argon atomic structure used in the production run calculations.
- **Week 3** - Test Calculations: Checking the quality of the input data generated, optimizing the calculations to make best use of our computational resources.
- **Week 4** - Production Calculations: Generate and submit an initial set of 50 calculations which will occupy 500 cores for 5 hours on a national tier supercomputer.
- **Week 5** - Production Calculations: Manage calculation submission, check for failures, redo calculations when appropriate, refresh fundamental knowledge of physics by referencing back to the literature review, text, and previous notes.
- **Week 6** - Data Analysis: Write analysis scripts in Python. Evaluate the quality of the result, compare the given result with values from the literature review and physics knowledge.
- **Week 7** - Data Analysis: Assess correctness using physics knowledge, correct calculations if appropriate.
- **Week 8** - Technical write-ups, graphs: - Make the plots in Python. - Providing detailed manuscripts for the input, production calculations and data analysis. Ensure the experiment is of high quality for reproducibility.

Timeline Example 2:

- **Weeks 1 and 2**: Background research specific to voting, government policy, company decisions, and disaster or shock insurance. This includes both identifying and quantifying likely deterministic features of each event.
- **Week 3**: Statistical training related to probability distributions and sampling.
- **Week 4**: Computational training related to Monte Carlo simulation.
- **Week 5**: Code and test simulation models individually for each of the three events (voting, government intervention, insurance claims)
- **Week 6**: Code and test the simulation model for the linked series of the three events (full model)
- **Week 7**: Run the full range of simulations and compile results with a focus on data visualization
- **Week 8**: Complete related report and presentation.

Timeline Example 3:

May
- Write body image interview questions focused on young women and adults
- Analyze research of articles, essays, and collected studies
- Develop photographic concept

June
- Perform and record interviews
- Work with mentor to establish lighting plans
- Work with mentor to stage and execute photographs

July
- Write up final report
- Work with mentor to complete project submission

Present RaCAS