

RESEARCH & SCHOLARSHIP MATTERS

A PUBLICATION OF THE SENIOR VICE PROVOST FOR RESEARCH & GRADUATE EDUCATION,
DR. CORINNE LENGSELD

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PROFESSIONAL RESEARCH OPPORTUNITIES FOR FACULTY (PROF)

In the Fiscal Year 2022 cycle, the University of Denver internal funding mechanism entitled Professional Research Opportunities for Faculty (PROF) received nearly 50 proposals dispersed throughout the four categories: creative works, scientific methods, social science methods, and synthesis writing projects. Though the caliber of the submissions was high, the committee funded 51% of the proposals.

In this edition of *Research & Scholarship Matters*, we feature one funded proposal from each category. A list of all funded proposals can also be found inside.

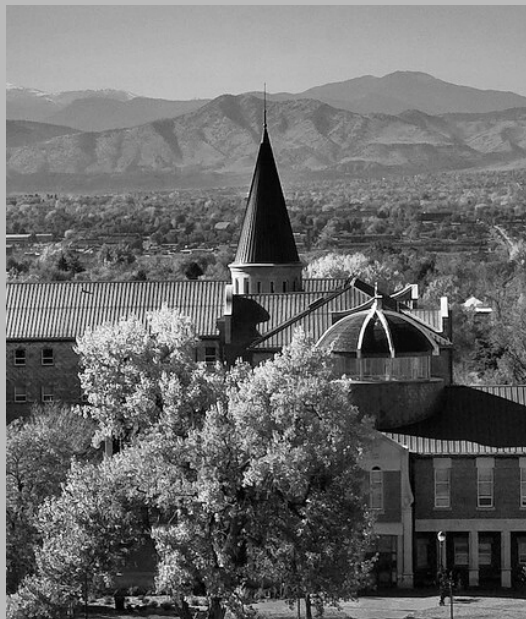
Unfamiliar with PROF?

The PROF fund is a collaborative enterprise between the Faculty Senate, the faculty, and the Senior Vice Provost for Research and Graduate Education. The goal of the fund is to support scholarly research and creative work among the faculty which enriches DU's vision of One DU, enhances the University's reputation and supports increased external funding for research, scholarship, and creative work.

The selection process is grounded in a commitment to peer review as the strongest mechanism for assessing the merit of proposals across the diverse academic areas of the University. Applications from single investigators for up to \$27,000 are welcomed. Multidisciplinary applications from two or more eligible investigators representing different departments and disciplines may request up to \$45,000 in support of DU IMPACT 2025 and the university commitment to developing Knowledge Bridges.

The next round of submissions are due January 2023. More information can be found [here](#).

For more information, contact: facultygrantedu.edu



PROF AWARDEES

CREATIVE WORKS

Lindsay Turner, CAHSS

Elevation: On Living With Mountains

Linda Wang, Lamont

Love Song: Celebrating Diverse Violin Works from Across the Globe

SCIENTIFIC METHODS

Alvaro Arias, NSM

Evaluating MPower, a Platform Designed to Support School mathematics

Scott Barbee, NSM

Exploring the Role of EDC3 the Control of Neurodevelopment

Rui Fan, RSECS

AI-Based Online Control for Resilient Smart Grids Operation

Joe Hoffman, RSECS

Facilitating Structural Health Monitoring using FBG Sensors

Amin Khodaei, RSECS

Quantum Computing for Unit Commitment (QC4UC)

Mohammad Mahoor & Timothy Sweeney, RSECS

Generating an Unbiased Facial Expression Database for Research on Machine Learning and Psychology

Brian Michel, NSM

Controlled Release of Alkenes via Retro Diels-Alder Reaction

Scott Nichols, NSM

Host-Pathogen Interactions in the Sponge Ephydatia Muelleri

Christopher Reardon, RSECS

Towards Intelligent Robotic Understanding of Adversarial Change

Siavash Rezazadeh, RSECS

A Hierarchical Structure for Modeling the Closed-Loop Control of Human Walking

Jonathan Paul Velotta, NSM

Attenuation of Maladaptive Physiological Responses to Hypoxia and the Mechanisms of High-Altitude Adaptation

Mei Yin, NSM

Collaboration on Problems at the Interface of Combinatorics and Probability

LOVE SONG: CELEBRATING DIVERSE VIOLIN WORKS FROM ACROSS THE GLOBE



LINDA WANG

Through this PROF grant, Linda Wang will record and produce an album entitled "Love Song: Celebrating Diverse Violin Works from Across the Globe," which will explore a largely overlooked diversity of classical composers and give voice to a wide variety of beautiful, lesser-known concert works.

In the album, a collection of pieces explore the full expressive and lyric range of composers from around the world: celebrating composers who identify as female, black, South American, Asian, Middle Eastern, and contemporary -- many beautiful works not yet widely known to the general listening public.

As a musician, Linda has always been committed to both standard repertoire and hidden gems -- and believes that eclectic programming combining both well-known and less standard works is critical to building audiences and community for classical music. This recording will introduce an unknown breath of the violin repertoire, giving voice to the beautiful romance of the violin, exploring color, timbre,

nuance of tone, and the artistry of melody through the international language of love, in exciting collaborations with guitar, piano, strings, percussion, and organ. Additionally, it will help expand the range and diversity of violin repertoire taught at Lamont, pieces students can both study and perform.

This fundamentally collaborative project requires a wide range of multi-instrumental collaboration with excellent contemporary composers, musicians, recording engineers, and editors. Collaborations will also include contemporary composers such as Oscar-winning composer Yuval Ron and University of Denver emeritus Professor Ricardo Iznaola, an esteemed Cuban composer. Placing these works in conversation with each other allows for a multifaceted exploration, of the multiple cultural influences that can be heard through a single instrument. This focus on love allows us to hear across these differences, to moments that connect us all.

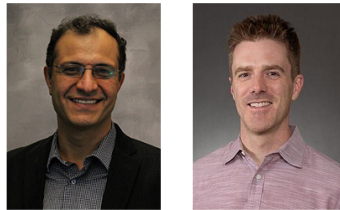
As we enter the third year of a global pandemic, human connection, care, ethics, and community -- the radical possibility that love embodies -- is what sustains us. This album seeks to answer this call through this field and to explore its possibilities through the violin and its repertoire.

*For more information, contact:
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GENERATING AN UNBIASED FACIAL EXPRESSION DATABASE FOR RESEARCH ON MACHINE LEARNING AND PSYCHOLOGY

MOHAMMAD MAHOOR & TIMOTHY SWEENY

Facial expression databases are an essential tool in the fields of Artificial Intelligence (AI), Machine Learning (ML), and Psychology. Yet, existing databases (static images or videos) utilized for research in these disciplines are notoriously biased and imbalanced. Stimulus sets used for psychological research, for example, are often quite small, containing only a limited number of actors posing extreme or unnatural expressions of emotion, with little diversity in terms of race, gender, and/or age. And while face datasets for ML are often massive, unposed, and more inclusive of different identities, they inadvertently perpetuate stereotypes about race, gender, emotion, and aggression (for example, featuring more aggressive expressions from Black men, or happy expressions from White women).



These shortcomings have unfortunate social consequences not just for research in Engineering and Psychology, but also real-world application in law enforcement and decisions about whom to hire. This proposal aims to rectify these issues by taking a multidisciplinary approach, using expertise and state-of-the-art technology from both fields to create a large and unbiased facial expression database balanced in terms of gender, race, age, attractiveness, and emotional expression.

Throughout this project, Drs. Mohammad Mahoor and Timothy Sweeny, and postdoctoral researcher Dr. Ali Pourramezan Fard will train and use Generative Adversarial Networks (GANs) to synthesize 12,000 photorealistic images of facial expressions on people with a wide range of attributes (gender, race, age). They will then gather information about how perceivers evaluate each computer-generated face in terms of these dimensions (e.g., How angry? What age? Etc). These ratings will be used to cull the database so that it is balanced in terms of expression, race, gender, and age. The outcome of this project will be a uniquely validated and balanced face database, GANs algorithms, and open-source Python scripts that can be freely used for less biased research and real-world application.

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THE WORLD THROUGH MUSLIM EYES: ILLUSTRATED COSMOGRAPHIES, 1550-1700

BILHA MOOR



How did Muslims perceive the world in the Early Modern period? This is the main question posed in Bilha Moor's book manuscript in preparation, tentatively titled "The World through Muslim Eyes: Illustrated Cosmographies, ca. 1550-1700."

The cosmographies are a popular genre in pre-modern Islamic literature; they combine knowledge of astrology, botany, zoology, and geography. Overall, dozens of illustrated cosmographies were produced in the span of six hundred years. These manuscripts offer a panoramic view of the world, and provide a range of geographical and anthropological information, as well as anecdotes on cities and shrines, fanciful islands, and wondrous creatures.

This study is based on firsthand research of Islamic illustrated manuscripts in Arabic, Persian, and Ottoman Turkish. It examines word and image in encyclopedias and cosmographies, which were copied and illustrated by three political entities: the Ottomans in Istanbul and the provinces, the Safavids in Greater Iran, and the Mughals in India.

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PROF AWARDEES

SOCIAL SCIENCE METHODS

Marie Berry, JKSSIS

Womens' Rights After War Project

Doug Clements & Julie Sarama, MCE

Bajillions: An Innovative App to Reduce Inequality in Early Mathematics Education

Elysia Davis, CAHSS

Identifying Plausible Mechanisms Underlying Prenatal Programming of Child Obesity Risk?

Jennifer Greenfield, Chiara Piovani & Lapo Salucci, GSSW/CAHSS/JKSSIS

The COVID-19 Legacy: Building Toward Equality or Worsening Disparities?

John Holmberg, GSPP

Mental Health Ally Intervention for Fatherhood Programs

Kamila Legette & William Anderson, MCE

Exploring Links Between Inclusive Classroom Climate and Black Youth Racial Identity

Angela Narayan, CAHSS

Resilience in the Context of Race-Based and Pandemic-Related Adversity in Diverse and Marginalized Families with Kindergartners

Garrett Roberts, MCE

Embedding Behavior Supports into Reading Instruction for Students with Reading Difficulties and Inattention: A Pilot Study

Guiming Zhang, NSM

The Changing Dynamics of Human-Nature Interactions during COVID-19: A Case Study of the iNaturalist Citizen Science Community

SCIENTIFIC METHODS

Donna Beth Ellard, CAHSS

Writing with Birds, Writing with the Biosciences

Bilha Moor, CAHSS

The World through Muslim Eyes: Illustrated Cosmographies, 1550-1700

Matthew Taylor, NSM

Violent Guatemala: A Time/Space Visual Perspective

EXPLORING LINKS BETWEEN INCLUSIVE CLASSROOM CLIMATE AND BLACK YOUTH RACIAL IDENTITY

KAMILAH LEGETTE & WILLIAM ANDERSON

Racial identity is defined as the way one perceives themselves as a part of their racial group, how they perceive others view their racial group, and the importance of their race to their self-concept. A positive racial identity fosters positive achievement related outcomes for Black youth such as school belonging, academic identity, and academic motivation. The promotion of an inclusive school climate is suggested to have a positive impact on Black youth racial identity (Milner, 2017), however, it is unclear the type of school messages and/or practices that relate to fostering a positive racial identity.

Using mixed methods (surveys and focus groups) this study by Kamilah Legette and William Anderson seeks to identify ways



Black youth school experiences and school characteristics relate to their racial identity over time. Using two schools that service 6–12th grade students, this study seeks to understand ways Black youth interactions and relationships with teachers and peers relates to their racial identity, explore ways school characteristics relate to similarities and differences in Black youth racial identity from early (12) to late (18) adolescence over time, and coauthor recommendations with participating students for school district

leaders to promote positive racial identity.

From this project, in collaboration with the Black youth in the study, recommendations will be provided to the school district on ways to promote a positive racial identity for Black students in their school and district wide. The information gained from this study will also be used to support a grant to further the partnership with DPS to follow up with the middle school students after they enter high school and continue to gain student voices to inform the thinking of leaders within their schools and district.

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ABOUT THE PUBLICATION

Research and Scholarship Matters is a quarterly newsletter produced on behalf of the faculty of the University by the Senior Vice Provost Provost for Research and Graduate Education. Faculty with notable accomplishments or images suitable to the front panel of the next issue are encouraged to send them to Audry.LaCrone@du.edu. Not all submissions can be included, but every attempt will be made to be inclusive of all high quality research, scholarship & creative works.

Previous issues can be found [here](#).

WANT MORE INFORMATION?

Want to receive emails regarding resources, celebrations, opportunities, and upcoming deadlines related to research and scholarship?

Join the DU-Research listserv, please email:
orspadmin@du.edu.