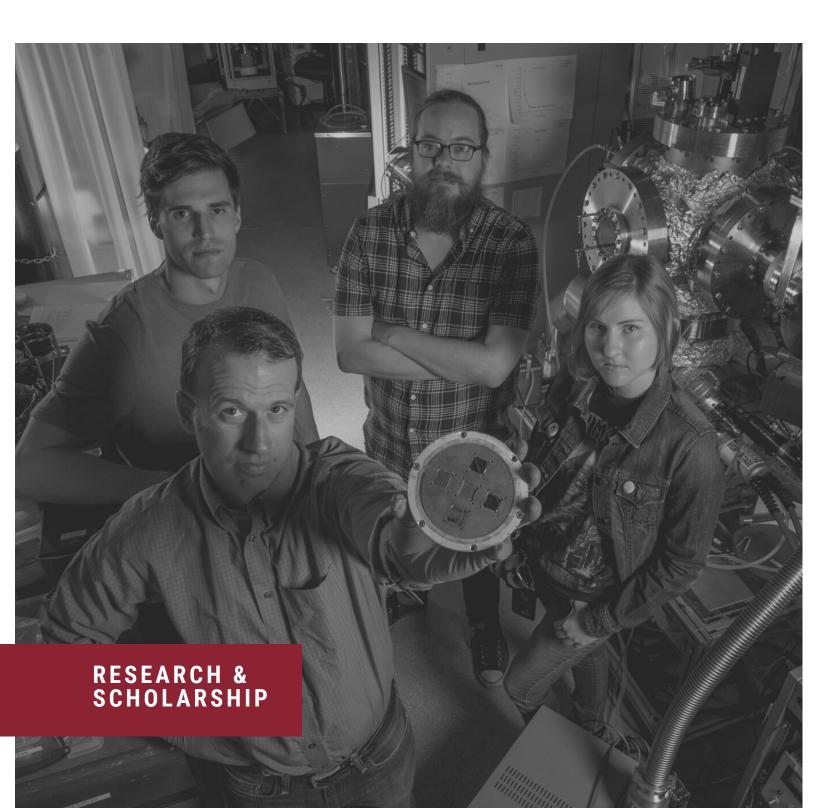
### ANNUAL REPORT 2021

SENIOR VICE PROVOST FOR RESEARCH & GRADUATE EDUCATION

**CORINNE LENGSFELD** 



# TABLE OF CONTENTS



- 02 YEAR IN REVIEW
- 03 RESEARCH OVERVIEW
- 05 CAMPAIGNS & INITIATIVES
- 06 FACULTY REPORT
- 09 AWARD ABSTRACTS
- 12 STUDENT REPORT
- 14 RESEARCH SHOWCASE
- 15 RESEARCH INTEGRITY & EDUCATION
- 16 IP & TECH TRANSFER

# WHERE WE ARE NOW



August 15, 2021

Recently, my son asked me why kids become calmer by playing with other kids. I said it's because they are connected, understood, and feel valued. Our research and scholarship community is no different.

The University of Denver community is our lifeline. It never would have been enough to just reopen labs, call people back for revenue, or only teach our students. It's what's at the core of the academic career – what drove us to be teacher/scholars in the first place – that intensified our commitment, determination, and success for the past year. The spark to create, advance, or discover something new and impactful and the desire to share that with our students, to grow the next generation of thought leaders, kept us focused and determined to make DU a place safe to return to – safe to learn, teach, work, and live.

Through another year of the COVID-19 pandemic, DU's research and scholarship shone brightly. While other institutions saw losses between 20-50%, our research expenditures topped \$38 million, crushing projections of \$36 million. Our dedicated faculty received 153 new awards totaling more than \$40 million. The backlog of unexpended awards has grown through COVID, fueled by new awards, to well over \$52 million – over \$10 million more than last year.

Our faculty have worked harder in a time when they were being pushed to focus on teaching. Thirty-five principal investigators had more than \$300,000 in research expenditures, including Nancy Lucero of Butler who topped \$3 million! Faculty were able to secure not just remarkable research funding, but also impressive awards: Dinah Loerke – Cottrell Scholars Award; Heather Taussig – Fulbright U.S. Scholar Program Award, and many others you can read about in this report.

Our staff have been nothing short of heroic. While working remotely, they found new ways to connect and solve problems to keep moving forward. Grant administrators did an incredible job keeping the administrative side of research flowing smoothly. Even from a distance, our staff seamlessly supported students and faculty doing research.



Our students never wavered in their desire to learn and grow. DU hosted the annual Research & Scholarship Showcase online via Zoom, where 78 undergraduate and graduate students participated. DU also awarded 195 doctoral degrees, 2,314 master's degrees, 42 undergraduate summer research grants, and 20 Undergraduate Partners in Scholarship (PINS) grants.

As we move toward fall term, it's been invigorating to see faculty and students walking around DU and to see research groups engaged on campus. You can feel the vibrancy of the University coming back. Our research community was even able to come together in celebration for the annual Research Dinner – a favorite event of mine. It's a wonderful thing to have our research community back together: investigating, discovering, and analyzing. It grounds us. It reignites our passion and unleashes our potential. I cannot wait to see what this year has in store.

Corinne Lengsfeld Senior Vice Provost for Research & Graduate Education

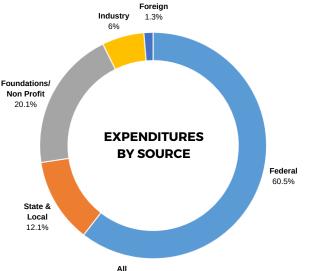
### RESEARCH OVERVIEW

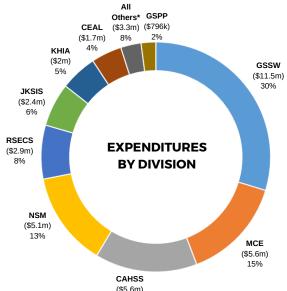
Despite the impact of COVID-19, FY 2021 was a strong year with over \$38 million in expenditures. DU out performed most universities, which were down 20-50% from FY 2020.

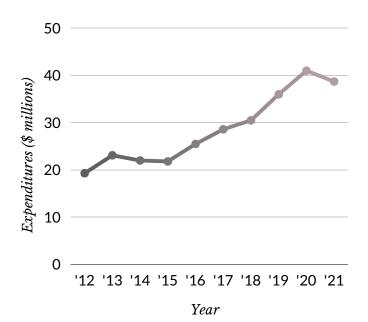
## \$38.7M

#### RESEARCH EXPENDITURES

In FY 2021, research expenditures decreased slightly over FY 2020. Over the past 10 years, expenditures have increased 82%.



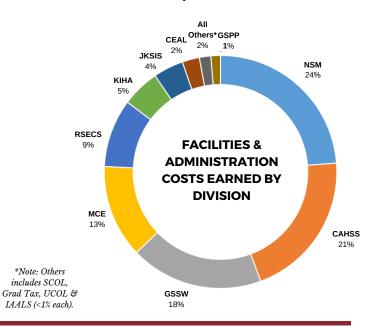




### \$1.3M

#### **FACILITIES & ADMINISTRATION COSTS EARNED**

Total indirect costs paid back to divisions in FY 2021.



# NEW GRANT AWARDS

Even with the continued disruption of COVID-19, DU's principal investigators did not let it deter them from securing new grant funding.

153

**NEW GRANT AGREEMENTS** 

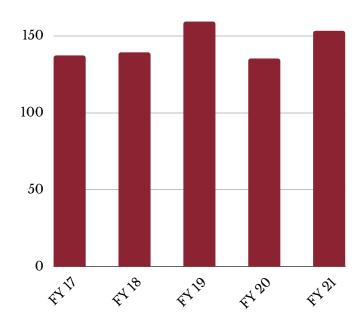
Of the 153 new grant agreements awarded in FY 2021, eight were funded at more than \$1 million.

\$40.7M

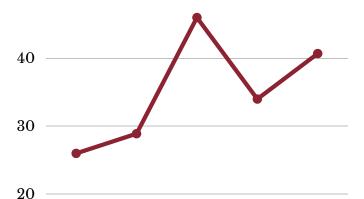
**NEW AWARD FUNDING** 

DU received \$40.7 million in new award funding, a 56% increase over the past five years.













### **CAMPAIGNS & INITIATIVES**

### STAT CONFERENCE



### **PURPOSE**

Held in January 2021, this inaugural virtual event was created to explore the ways in which institutions, researchers, and academics have pivoted in real time to respond to the unprecedented challenges of the day. Focusing on COVID-19, panelists presented on perspectives, response, and strategies for higher education and beyond.



### CONFERENCE

- Virtual via Zoom and Facebook Live
- 21 speakers from 14 colleges, universities, and private organizations
- 1200+ attendees
- Facebook Live: 4.6k watches; 770 engagements



#### CONFERENCE SUMMARY

- Media
  - Solid engagement through website and ads
- Targeted emails/display advertising with Inside Higher Ed: 99,981 impressions & 281 clicks
- Social media: 63k impressions; 2k engagements
- o Website (www.du.edu/stat): 1,763 views
- Next STAT Conference will be held January 2022

# PUBLIC IMPACT FELLOWS



### **PURPOSE**

In FY 2019, in collaboration with Marketing & Communications and the Office of the Provost, DU created the Public Impact Fellows program. This program was designed to increase faculty reach and impact of the University's faculty thought leaders.



### **2021 PIFS**

- Elaine Belansky, MCE
- Patience Crowder, SCOL
   Nate Evens BSECS
- Nate Evans, RSECSDonny Gerke, GSSW
- Chris Hughen, DCB
- Alex Huffman, NSM
- Erika Manczak, CAHSS
- Govind Persad, SCOL
- Tracy Vozar, GSPP



### FY 2021 SUMMARY

- PIF media activity was 16% of all of media hits in FY 21 (  $\uparrow$  11%)
- 15 individual fellows featured
- 117 total mentions in elite, national, and local media (↑33%)
- 15 op-eds; 8 published in elite/national outlets (The Washington Post, The New York Times & The Boston Globe)

### USNWR CAMPAIGN



### **GOAL & STRATEGY**

Currently listed as number 80 in "National Universities" by U.S. News & World Report (USNWR), the purpose and goal of this campaign is to improve perception of DU within the higher education industry with the intent of maintaining or improving current USNWR ranking. It utilizes a multi-channel marketing campaign, combining targeted email communications with robust paid, earned and owned media touchpoints.



### CAMPAIGN

- Email sent to ~1,000 recipients with a 52% open rate
- Paid Advertising: LinkedIn, YouTube & ads
- Owned Content: RadioEd podcast & video series
- 81 national & 184 local media mentions



### CAMPAIGN RESULTS

- Total campaign impressions
- $\uparrow$  19.7%; Total views  $\uparrow$  88.8%
- Chronicle.com metrics
  - $\circ~$  Impressions  $\uparrow$  116%; Clicks  $\uparrow$  275%
- Social Media (Twitter & Facebook)
  - Impressions ↓ 6.3%; Engagements ↑39.9%; Clicks ↑23.5%

### FACULTY REPORT



275 PRINCIPAL INVESTIGATORS

funded for FY 2021

### 35 PRINCIPAL INVESTIGATORS

with \$300k + in research expenditures





566 FACULTY AUTHORS

27,772 FACULTY
CITATIONS





861 ARCHIVAL PUBLICATIONS

736 MEDIA PLACEMENTS

local & national media during FY 2021



### TOP PRINCIPAL INVESTIGATORS

BASED ON FY21 EXPENDITURES

\$3,000,000 + Nancy Lucero, Butler

\$1,000,00<u>0</u> +

Elaine Belansky, MCE
Jonathan Moyer, JKSIS
Suzanne Kerns, GSSW
Robin Leake, Butler
Ann-Charlotte
Granholm-Bentley, KIHA
Douglas Clements &
Julie Sarama, MCE
Colorado Evaluation & Action Lab
Galena Rhoades, CAHSS
Amy Roberts, Butler
Elysia Davis, CAHSS
Phillip Strain, MCE

### \$500.000 +

Michele Hanna, GSSW Paul Rullkoetter, RSECS Amin Khodaei, RSECS

### \$300.000 +

Kevin Morris, GSSW Carole Wilcox, Butler Kevin Shelburne, RSECS Lena Lundgren, GSSW Pilyoung Kim, CAHSS Norma Hafenstein, MCE Meredith Silverstein, Butler Kimberly Gorgens, GSPP Gareth Eaton & Sandra Eaton, NSM Ashley Hamilton, CAHSS Charmaine Brittain, Butler Cedric Asensio, NSM Andrei Kutateladze, NSM Maciei Kumosa, RSECS Schuyler Van Engelenburg, NSM James Blankenship & Dina Loerke, NSM Mark Siemens, NSM John Latham, NSM

#### CAREER AWARDS

NATIONAL SCIENCE FOUNDATION

### Marie Berry

Associate Professor, JKSIS \$489,162

#### Xin Fan

Associate Professor, NSM \$500,773

**John Latham** Associate Professor, NSM \$751,092

### EARLY INVESTIGATOR AWARD

NATIONAL SCIENCE FOUNDATION

Scott Horowitz
Assistant Professor, KIHA
\$313, 397

NATIONAL INSTITUTES OF HEALTH

Erika Manczak
Assistant Professor, CAHSS
\$241.434

### COTTREELL SCHOLARS AWARD

**Dinah Loerke** Associate Professor, NSM

### **HIGHLY-CITED PAPERS**

### Jenalee Doom, CAHSS

Life stress and cortisol reactivity: An exploratory analysis of the effects of stress exposure across life on HPA-axis functioning

Stress and parenting during the global COVID-19 pandemic

#### David Gao, RSECS

Double-Mode Energy
Management for Multi-Energy
System via Distributed
Dynamic Event-Triggered
Newton-Raphson Algorithm

### Scott Horowitz, KIHA

Macromolecular modeling and design in Rosetta: recent methods and frameworks

### John Latham, NSM

New developments in RiPP discovery, enzymology and engineering

### Jing Li, NSM

Identifying primary public transit corridors using multi-source big transit data

#### Jonathan Moyer, JKSIS

Are we on the right path to achieve the sustainable development goals?

### Jonathan Ormes, NSM

The Fourth Catalog of Active Galactic Nuclei Detected by the Fermi Large Area Telescope

Fermi Large Area Telescope Fourth Source Catalog

### **Galena Rhoades, CAHSS**

Online Programs Improve Relationship Functioning for Distressed Low-Income Couples: Results From a Nationwide Randomized Controlled Trial

### HIGHLY-CITED PAPERS CONTINUED

### **Garrett Roberts, MCE**

Social Studies Content Knowledge Interventions for Students With Emotional and Behavioral Disorders: A Meta-Analysis

### Eugene Walls, GSSW

Differential Sexual Behavior Experiences of LGBQ and Transgender/Nonbinary Young People in Colorado

#### Karen Xie, FRITZ

Pricing strategies on Airbnb: Are multi-unit hosts revenue pros?

### **GRANTED PATENTS**

### Mohammad Mahoor, RSECS

Methods and Systems For Human Tissue Analysis Using Shearlet Transforms

UNITED STATES
PATENT 10,839,510

### Kimon Valavanis & Matthew Rutherford, RSECS

Circulation Control System for Aerial Vehicles

UNITED STATES
PATENT 10,730,607

### FULBRIGHT U.S. SCHOLAR PROGRAM AWARD

Heather Taussig Professor, GSSW

### **FACULTY-AUTHORED BOOKS**

### Jeanne Abrams, ULIB

A View from Abroad: The Story of John and Abigail Adams in Europe

### Spencer Acadia, MCE

Library and Information Studies for Arctic Social Sciences and Humanities

### Jenn Bellamy, GSSW

Practical Implementation in Social Work Practice: A Guide to Engaging in Evidence-Based Practice

#### **Christopher Brown, ULIB**

Librarian's Guide to Online Searching: Cultivating Database Skills for Research and Instruction

### Lucy Cane, CAHSS

Sheldon Wolin and Democracy: Seeing Through Loss

#### **Bonnie Clark, CAHSS**

Finding Solace in the Soil: An Archaeology of Gardens and Gardeners at Amache

### Erika Polson & Lynn Schofield Clark, CAHSS

The Routledge Companion to Media and Class

### Douglas Clements & Julie Sarama, MCE

Learning and Teaching Early Math: The Learning Trajectories Approach

### Keren Dali, MCE

Humanizing LIS Education and Practice: Diversity by Design

### Mary Kay Delaney, MCE

In Search of Wonderful Ideas: Critical Exploration in Teacher Education

### **Graham Foust, CAHSS**

Embarrassments Fifty Crudities

### Rebecca Galemba, JKSIS

La Cadena: Vida y Negocio en el Límite Entre México y Guatemala

### **Brian Gearity, GSPP**

Understanding Strength and Conditioning as Sport Coaching: Bridging the Biophysical, Pedagogical and Sociocultural Foundations of Practice

### Lawrence Golan, CAHSS

**Score Study Passes** 

### Hava Gordon, CAHSS

This Is Our School! Race and Community Resistance to School Reform

#### Norma Lu Hafenstein, MCE

Perspectives in Gifted Education: Legal Issues

#### Michele Hanna, GSSW

Introduction to Child Welfare: A Culturally Responsive, Multisystemic, Evidence-Based Approach

### Steven Hartley, DCB

Marketing: The Core

### Alison Krögel, CAHSS

Musuq Illa: Poética del Harawi en Runasimi

#### Jan Laitos, SCOL

Pioneers of Environmental Law

### Julie Laser-Maira & Nicole Nicotera, GSSW

Working with Adolescents: A Practitioner's Guide

### Nancy Leong, SCOL

Identity Capitalists: The Powerful Insiders Who Exploit Diversity to Maintain Inequality

### Mark Levine, DCB

Handbook on Exchanging Real Estate Securities: Syndicating Real Estate

### Mark Levine & Libbi Segev Levine, DCB

Real Estate Transactions, Tax Planning and Consequences

### Seth Masket, CAHSS

Political Parties Learning from Loss: The Democrats, 2016-2020

### Glenn Mueller, DCB

**Educated REIT Investing** 

#### **Thomas Nail, CAHSS**

Theory of the Earth Marx in Motion: A New Materialist Marxism

### Marco Nathan, CAHSS

Black Boxes: How Science Turns Ignorance into Knowledge

#### Jesse Owen, MCE

Mindfulness-Based Practices in Therapy: A Cultural Humility Approach

### Ann Petrila, GSSW

Voices from Srebrenica: Survivor Narratives of the Bosnian Genocide

### Jayson Richardson, MCE

Bringing Innovative Practices to Your School: Lessons from International Schools

### Nantiya Ruan Rogers, SCOL Fair Labor Standards Act

#### Dean Saitta, CAHSS

Intercultural Urbanism: City Planning from the Ancient World to the Modern Day

### Jing Sun, CAHSS

Red Chamber, World Dream: Actors, Audience, and Agendas in Chinese Foreign Policy and Beyond

#### Kate Tennis, JKSIS

Outsourcing Control: The Politics of International Migration Cooperation

### Kimon Valavanis & Matthew Rutherford, RSECS

Nonlinear Control of Fixed-Wing UAVs with Time-Varying and Unstructured Uncertainties

### Paul Viotti, JKSIS

American Foreign Policy and National Security International Relations Theory

### Aleysia Whitmore, CAHSS

World Music and the Black Atlantic: Producing and Consuming African Musics on World Music Stages

### Joshua Wilson, CAHSS

Separate but Faithful: The Christian Right's Radical Struggle to Transform Law and Legal Culture

### Suisheng Zhao, JKSIS

Chinese Authoritarianism in the Information Age: Internet, Media, and Public Opinion



### GALENA RHOADES, CAHSS

Relationship Education for Pregnant and Parenting Teens and Young Adults
Administration for Children and Families, \$3.75m



The aim of the proposed project is to counteract the risks of having a baby as a teen. Teens and young women (14 to 19 years of age; 200 per year) who are pregnant or who have already had a baby will be recruited from Denver's largest hospital system (Denver Health) as well as local organizations, agencies, and high schools to participate.

### ELYSIA DAVIS & JENA DOOM, CAHSS





Reducing Maternal Prenatal Depression to Improve Child Cardiovascular Health National Institutes of Health, \$3.4m

Cardiovascular disease (CVD) is the leading cause of death worldwide. Prenatal maternal depressive symptoms predict offspring cardiovascular risk, though this association has not been demonstrated experimentally; as such, the proposed research will follow up a sample of offspring from pregnant mothers who participated in a randomized controlled trial to test whether reducing prenatal maternal depressive symptoms improves offspring cardiovascular health in early childhood.

### NORMA HAFENSTEIN, MCE

IREECH - JAVITS
Department of Education, \$2.84m

Location should not determine the quality of identification practices, programming or access to services. Project I-REECCH (Impacting Rural Education through Expanding Culturally responsive curriculum, Computer science training and Higher order thinking skill development) will accomplish the Jacob K. Javits Gifted and Talented Students Education Program Application Requirements (1), (2), (3), (4)(c) and (4)(d) and all three Competitive Preference Priorities.





### **AURÉLIE LEDREUX, KIHA**

Noradrenergic Dysfunction in Down Syndrome National Institutes of Health, \$1.85m



Down syndrome (DS) is a genetic condition that occurs in 1 out of 700 births with more than 350,000 Americans affected. Alzheimer's disease (AD) occurs with high penetrance in DS and few treatment options are available. Data obtained from this project can translate to treatment potentials in AD in the general population and are focused on noradrenergic systems and inflammation.

MICHELE HANNA,
ANEESHA BARWANI,
ERIN POOLE & MICHAEL
TALAMANTES, GSSW &
MEREDITH SILVERSTEIN, BUTLER

Behavioral Health Workforce Education
and Training (BHWET) Program
Health Resources and Services Administration, \$1.44m

The Collaborative Learning and Innovative Models of Behavioral Health at the University of Denver (CLIMB@DU) will over the four year grant period, provide stipends to a minimum of 116 MSW students who complete their concentration year internship in agencies that include interdisciplinary training of two or more health disciplines using a team-based care approach to provide quality behavioral health services. The purpose of the CLIMB@DU initiative is to build the behavioral health workforce in Colorado's rural and medically underserved areas by supporting the professional development of social work students, faculty and field supervisors.

### KINGSHUK GHOSH, NSM

Modeling Conformational Ensembles of the Disordered Proteins National Institutes of Health, \$1.33m



Intrinsically disordered proteins and disordered regions (IDPs) perform vital biological functions in transcriptional regulation, cell differentiation, and DNA condensation. We propose to build a novel computational framework based on physico-chemical principles to describe the ensemble of disordered conformations for IDPs with arbitrary sequence. This project will provide guidance to determine how IDP conformations differ in vitro and in vivo, harness limited data to make predictions for distances between arbitrary residue pairs, and build a rigorous framework for comparing residue-pair specific interaction parameters between different force fields and experiments.





### GALENA RHOADES, CAHSS



Decreasing Repeat Pregnancy Among Pregnant and Parenting Teens Administration for Children and Families, \$1.3m

The aim of the proposed project is targeted prevention with the goal of increasing optimal health and reducing STIs and repeat pregnancies among teen mothers. The overarching goal of this program is to empower and guide adolescent mothers to choose less risky sexual behavior, ultimately reducing repeat teen pregnancies and STIs and increasing optimal health.

### GALENA RHOADES, CAHSS



Ready2Relate
Center for Relationship Education, \$1.15m

This evaluation will inform future programming as it will demonstrate whether an intensive, integrated high-school based program leads to change in key outcomes of interest to the fields of relationship education, teen pregnancy prevention, and youth development. It will support future programming in this area by indicating whether this model is effective. Few rigorous, large-scale tests of relationship education with high-school students like this one exist in the published literature.

### STUDENT RESEARCH & SCHOLARSHIP

Even through the continued COVID-19 pandemic, the University of Denver supported a large number of graduate and undergraduate students through funding for research and scholarship. DU contributed grant funding, supporting 555 students and resulting in 19.4% of all students paid on campus being supported by grants. Additionally, the number of graduate assistantships are on the rise, more than doubling from FY 2010 to present.

While no international travel grants or graduate student conference travel grants were awarded in FY 2021, DU students still shined brightly. 2,314 Master's degrees and 195 Doctoral degrees were awarded to graduate students. The Graduate Research Fellowships Program (GRFP) awarded 5 DU graduate students in FY 2021 and 42 undergraduates received Undergraduate Summer Research Grants.

In its second year, the <u>Undergraduate</u> <u>Research Journal</u>, published two complete issues, featuring 24 articles, biographies, and interviews, all authored and peer reviewed by DU undergraduate students.

552
students were supported

students were supported by \$3 million in grant funding in FY 2021

147

graduate research
assistantships were supported
by grant funding during
FY 2021

19.4%

of all students paid on campus were supported by grants for FY 2021 1

UNDERGRADUATE SCHOLAR TRAVEL FUND GRANTS

> AWARDED IN FY 2021 TOTALING \$500

42

UNDERGRADUATE SUMMER RESEARCH GRANTS

AWARDED IN FY 2021 TOTALING \$139,832 2,314

MASTER'S DEGREES

AWARDED IN FY 2021

**GRFP AWARDS** 

**AWARD RECIPIENTS:** 

ELIZA KRAMER SAMANTHA SCOTT LYNÉE ALVES KELSIE HUNNICUTT KEVIN SUMMERS 20

UNDERGRADUATE
PARTNERS IN
SCHOLARSHIP
(PINS) GRANTS

AWARDED IN FY 2021 TOTALING \$22,308 195

DOCTORAL DEGREES

AWARDED IN FY 2021

# RESEARCH & SCHOLARSHIP SHOWCASE

### Going Virtual

For the second year, the DU Research & Scholarship Showcase pivoted to an online platform, allowing presenters to showcase their work, even in the midst of a pandemic.

**73** 

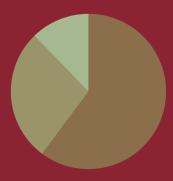
students

participated in the 2021 Research & Scholarship Showcase



The University of Denver's Research & Scholarship showcase welcomes DU community members to join in admiration of the exemplary scholarship of our graduate and undergraduate students. With the COVID-19 pandemic ongoing, the annual <a href="showcase">showcase</a> was held as a Zoom conference. Presenters crafted engaging visual presentations, sharing their research and findings. Event attendees were able to view presentations, ask questions, and leave comments for presenters during the sessions. All research presentations are available upon request via e-mail at uapresearchshowcase@du.edu.

# OFFICE OF RESEARCH INTEGRITY & EDUCATION



**59%** of all submissions are by faculty investigators, **27%** by doctoral candidates, and **12%** by masters candidates

As the COVID-19 pandemic continued through 2020 and into 2021, our investigators and their staffs were allowed more access to the labs and slowly transitioned back to conducting in-person research interventions with participants on campus and within the community. Even as in-person interaction with participants was limited, the highest number of submissions were processed during the first quarter of the fiscal year, with 109 new submissions in July alone, and averaging 77 submissions each month for remainder of the year. The average time for the IRB to complete a preliminary review on a new submission is 5.95 days. DU faculty investigators contributed 59% of all of the submissions and 39% were submitted by student investigators. The type of submissions also shifted over the past year, recording a 15% increase in new project submissions from the previous year, with 60% of the total submissions reviewed and processed as new projects.

The National Institutes of Health (NIH) and other private and public entities have strongly encouraged investigators to collaborate on multi-site research projects. As of January 20, 2020, an NIH funded study being conducted at more than one U.S. site may be subject to the NIH Single IRB (sIRB) Policy. The policy states that investigators on the project must identify a single IRB for the project as required by the terms and conditions of the award. In response to the new policy, ORIE worked with DU investigators to initiate and process 36 collaborative agreements between one or more investigators from other organizations and educational institutions.



## INTELLECTUAL PROPERTY & TECHNOLOGY TRANSFER

This year, the pandemic has put a spotlight on the impact of university researchers and their discoveries on society. From drug therapeutics, face shield designs, to app development and vaccine discovery, all are made possible by the rapid response of the research community. Our office witnessed firsthand the resilience and dedication of our DU researchers during this time of crisis. From facilitating material transfers, to collaborating with other universities on COVID-19 testing techniques, we are honored to support our DU researchers this past year in their innovation to keep our campus and community safe. We will continue to strive to provide exemplary administrative and legal service to support our DU community in all of its research and commercialization endeavors.

Material Transfer Agreements
(10 stand-alone +
27 orders under master
agreements)

Non-Disclosure
Agreements (NDA) /
Confidentiality
Agreements (CDA)

Data Use Agreements (DUA) /
Data Share Agreements



### TOTAL AGREEMENTS PROCESSED

Since FY 2014, the total agreements processed has increased significantly

