ANNUAL REPORT

SENIOR VICE PROVOST
FOR RESEARCH & GRADUATE EDUCATION

CORINNE LENGSFELD
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It is fair to say that most of us did not see what Fiscal Year 2020 had in store for the world and for the University of Denver.

In March, due to concerns around the Coronavirus, the University quickly switched to online learning and temporarily shut down much of our research, scholarship and creative work. This sparked incredible initiative by our faculty and staff. Some conducted research, like Schyluer van Enberg on vaccines or Kimberly Chiew and Peter Sokوهessner on epidemiological data to examine how people feel, think and behave under stress. Some created products to help in this pandemic, like Alex Huffman, working with facilities to calculate aerosols and case rates in Lamont singing and instrument classes; the Innovation Lab, manufacturing face shields; and KIHA, making hand sanitizer. So many more contributed to the health and well-being of our campus. Please read more about their work in this report.

Through all this, the University, and our faculty, staff, and students still thrived. Again this year, DU’s research and scholarship saw unprecedented growth. Our research expenditures increased 13% over FY 2019, topping $41 million. Our dedicated and passionate DU faculty received 135 new awards totaling more than $34 million. Thirty-two principal investigators had more than $300,000 in research expenditures, including Robin Leake of GSSW who topped $3 million! There were three new large grants over $3 million.

Distance did not hold our students back this year from incredible contributions to research and scholarship. DU hosted the annual Research & Scholarship Showcase online via Twitter (a first for the University!), where 75 undergraduate and 14 graduate students participated. DU also awarded 183 doctoral degrees, 1,991 masters degrees, 35 undergraduate summer research grants, and 25 Undergraduate Partners in Scholarship (PINS) grants.

Throughout this fiscal year, our leadership never wavered as Dr. Kimberly Bender successfully led DU’s research enterprise as interim associate vice provost for research. Kim has done an outstanding job in this role, displaying impressive leadership throughout her tenure, but especially during the Coronavirus shut down and the subsequent resumption of research, scholarship and creative work on campus. Kim engaged with faculty to facilitate cross-division collaboration, as well as to spark new collaborations within and between unlikely units. This is most dramatically apparent in the successful launch of the Knowledge Bridge program. Thank you, Kim!

Each year I say that I am proud of the accomplishments of our faculty, staff, and students. But this year, it’s more than that. I am deeply touched by how we all came together to support one another, to make tough decisions and sacrifices for the benefit of the University, to be creative and thoughtful in a time of uncertainty, and so much more. You, as always, remain the reason we constantly push the limits, raise the bar, and serve the public good. Thank you.

Corinne Lengsfeld
Senior Vice Provost for Research & Graduate Education
RESEARCH OVERVIEW

FY 2020 was yet another record-breaking year for research expenditures at the University of Denver.

$41.4M
RESEARCH EXPENDITURES

In FY 2020 research expenditures increased 13% over FY 2019, topping $41 million. Over the past 10 years, expenditures have increased 93%.

$1.3M
FACILITIES & ADMINISTRATION COSTS

Total indirect costs paid back to divisions in FY 2020.
NEW GRANT AWARDS

Even with the disruption of COVID-19, DU’s Principal Investigators did not let it deter them from securing new grant funding.

135 NEW GRANT AGREEMENTS

Of the 135 new grant agreements awarded in FY 20, eight were funded at more than $1 million.

$34M NEW AWARD FUNDING

DU received $34 million in new award funding, a 7% increase over the past five years.
### USNWR Campaign

#### Goal & Strategy
Raise awareness and perception of the University of Denver's research prowess and thought leadership—to improve scoring in USNWR’s annual expert opinion survey over the next 1-3 years. Utilizing a multi-channel marketing campaign, combining targeted email communications with robust paid, earned and owned media touchpoints.

<table>
<thead>
<tr>
<th>EMAIL CAMPAIGN</th>
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<tbody>
<tr>
<td>~1,000 recipients</td>
</tr>
<tr>
<td>52% open rate</td>
</tr>
<tr>
<td>14% click-through rate</td>
</tr>
<tr>
<td>6 total unsubscribes</td>
</tr>
<tr>
<td>95 unique website landing pages created</td>
</tr>
<tr>
<td>2:00 avg. time on page</td>
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<table>
<thead>
<tr>
<th>PAID ADVERTISING</th>
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<tbody>
<tr>
<td>Linkedin – 1,063 clicks; 174k impressions; 0.61% click-through rate</td>
</tr>
<tr>
<td>YouTube – 879 clicks; 125k impressions; 0.70% click-through rate</td>
</tr>
<tr>
<td>Display ads – 44k clicks; 5.4M impressions; 0.81% click-through rate</td>
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<tr>
<td>Gmail ads – 183k clicks; 232k impressions; 78.80% click-through rate</td>
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<th>OWNED CONTENT</th>
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<tbody>
<tr>
<td>RadioEd podcast – 2,241 listens; 41 states, 22 countries</td>
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<tr>
<td>Video series – 6 new videos + research and innovation playlist; 27k total views</td>
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<tr>
<th>EARNED MEDIA</th>
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<tbody>
<tr>
<td>81 national media mentions</td>
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<tr>
<td>184 local media mentions</td>
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<tr>
<th>RESULTS</th>
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<tbody>
<tr>
<td>High click-through rates</td>
</tr>
<tr>
<td>Increased engagement through emails and Google ads</td>
</tr>
<tr>
<td>Quality of 2020 media placements + 4.5%</td>
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### 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.

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<thead>
<tr>
<th>'19 PIFS</th>
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<tr>
<td>Jeanne Abrams, ULIB</td>
</tr>
<tr>
<td>Apryl Alexander, GSPP</td>
</tr>
<tr>
<td>Yol Aryan, GSSW</td>
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<tr>
<td>Kimberly Bender, GSSW</td>
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<tr>
<td>Elizabeth Campbell, CAHSS</td>
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<tr>
<td>Anne DePrince, CAHSS</td>
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<tr>
<td>Stacey Freedenthal, GSSW</td>
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<td>Jennifer Greenfield, GSSW</td>
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<td>Eric Holt, DCB</td>
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<table>
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<th>'20 PIFS</th>
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<tr>
<td>Melissa Akaka, DCB</td>
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<tr>
<td>Erin Anderson, MCE</td>
</tr>
<tr>
<td>Deborah Avant, JKSSS</td>
</tr>
<tr>
<td>Katy Barns, GSPP</td>
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<tr>
<td>Marie Berry, JKSSS</td>
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<tr>
<td>Ali Besharat, DCB</td>
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#### Media Mentions
- 2020: 88 total mentions in elite, national, and local media (66% increase over FY 2019)
- 2019: 53 total mentions in elite, national, and local media

#### Media Publications

#### Most Media Hits
- 2019: Jennifer Greenfield, GSSW
- 2020: Apryl Alexander, GSPP
FACULTY REPORT

244 PRINCIPAL INVESTIGATORS
funded for FY 2020

23 PRINCIPAL INVESTIGATORS
with $300k + in research expenditures

401 FACULTY AUTHORS

25,124 FACULTY CITATIONS

807 ARCHIVAL PUBLICATIONS

25,124 MEDIA CITATIONS

TOP PRINCIPAL INVESTIGATORS
BASED ON FY20 EXPENDITURES

$3,000,000 +
Robin Leake, GSSW/Butler

$1,000,000 +
Elaine Belansky, MCE
Douglas Clements & Julie Sarama, MCE
Nancy Lucero, GSSW/Butler
Galena Rhoades, CAHSS
Barton-CEAL
Jonathan Moyer, JKSIS
Margaret Franko, GSSW/Butler
Ann-Charlotte Granholm-Bentley, KIHA
Suzanne Kerns, GSSW
Phillip Strain, MCE
Paul Rullkoetter, RSECS
Elyisia Davis, CAHSS

$500,000 +
Michele Hanna, GSSW
Kevin Shelburne, RSECS
Pilyoung Kim, CAHSS
Carole Wilcox, GSSW/Butler
Mark Siemens, NSM
Kevin Morris, GSSW

$300,000 +
Gareth Eaton & Sandra Eaton, NSM
John Latham, NSM
Cedric Asensio, NSM
James Blankenship & Dina Loerke, NSM
Lena Lundgren, GSSW
Amin Khodaei, RSECS
Lauren McGrath, CAHSS
Schuyler Van Engelenburg, NSM
Lynn Clark, Project XITE
Donald New, ARTI
Cullen Hendrix, JKSIS
Rashida Banerjee, MCE
Assessment: Recommended Practices for Young Children and Families

Jessica Bartley, GSPP
What You Need to Know About Eating Disorders

Christopher Brown, ULIB
Mastering United States Government Information: Sources and Services

Lucy Cane, CAHSS
Sheldon Wolin and Democracy: Seeing Through Loss

Mark Engberg, MCE
Expanding Inquiry on Intercultural Wonderment to Optimize Study Abroad Learning Contexts

Graham Foust, CAHSS
Fifty Crudities

Brian Garity, GSPP
Coach Education and Development in Sport: Instructional Strategies; & Understanding Strength and Conditioning as Sport Coaching: Bridging the Biophysical, Pedagogical and Sociocultural Foundations of Practice

Lawrence Golan, CAHSS
Score Study Passes

Norma Hafenstein, MCE
Perspectives in Gifted Education: Legal Issues

Robert Hardaway, SCOL
Saving the Electoral College

Steven Hartley, DCB
Marketing

W. Scott Howard, CAHSS
Archive and Artifact: Susan Howe’s Factual Telepathy

Micheline Ishay, JKSIS
The Levant Express: Arab Uprisings, Human Rights and the Future of the Middle East

Barbara Jackson, DCB
Construction Management Jump Start

Mark Levine, DCB
Handbook of Real Estate Exchanges Handbook on Real Estate Exchange International Real Estate Real Estate Securities

Mark Levine & Libbi Levine Segev, DCB
Real Estate Transactions: Tax Planning and Consequences

Sarah Morelli, CAHSS
A Guru’s Journey: Pandit Chitresh and Indian Classical Dance in Diaspora

Erika Polson & Lynn Schofield Clark, CAHSS
The Routledge Companion to Media and Class

Carl Raschke, CAHSS
Neoliberalism and Political Theology: From Kant to Identity Politics

Chip Reichardt, CAHSS
Quasi-Experimentation

Jack Sheinbaum, CAHSS
Good Music: What It Is and Who Gets to Decide

Paul Sutton, NSM
Ecosystem Services Valuation of Mesoamerica and the Caribbean

Philip Tedeschi, GSSW
Transforming Trauma: Resilience and Healing Through our Connection with Animals

Aleysia Whitmore, CAHSS
World Music and the Black Atlantic

Suisheng (Sam) Zhao, JKSIS
China’s New Global Strategy: The Belt and Road Initiative (BRI) and Asian Infrastructure Investment Bank (AIIB)
**GRANTED PATENTS**

**MOBILE SELF-LEVELING LANDING PLATFORM FOR SMALL-SCALE UAVS**

**United States Patent**
10,618,675
10,538,339

**DU Inventors:**
Kimon Valavanis, Professor, Electrical & Computer Engineering, & Matthew Rutherford, Associate Professor, Computer Science, Ritchie School of Engineering and Computer Science

**FULL CYCLE RAPID SCAN EPR AND DECONVOLUTION**

**United States Patent**
10,578,703

**DU Inventors:**
Mark Tseytlin, Senior Research Scientist (previous), Department of Chemistry and Biochemistry, College of Natural Sciences and Mathematics

**MOBILE SELF-LEVELING LANDING PLATFORM FOR SMALL-SCALE UAVS**

**United States Patent**
10,538,339

**DU Inventors:**
Kimon Valavanis, Professor, Electrical & Computer Engineering, & Matthew Rutherford, Associate Professor, Computer Science, Ritchie School of Engineering and Computer Science

**CROSSED-LOOP RESONATORS**

**United States Patent**
10,502,797

**DU Inventors:**
George Rinard, Senior Research Engineer; Department of Department of Mechanical and Materials Engineering, Ritchie School of Engineering and Computer Science

**MOBILE SELF-LEVELING LANDING PLATFORM FOR SMALL-SCALE UAVS**

**United States Patent**
10,509,091

**DU Inventors:**
Mark Tseytlin, Senior Research Scientist (previous); Gareth Eaton, Professor; & Sandra Eaton, Professor, Department of Chemistry and Biochemistry, College of Natural Sciences and Mathematics

**GEORGE RINARD, Senior Research Engineer, Department of Department of Mechanical and Materials Engineering, Ritchie School of Engineering and Computer Science**

**EPR METHODS AND SYSTEMS**

**United States Patent**
10,588,534

**DU Inventor:**
Mohammad H. Mahoor, Professor; Department of Electrical & Computer Engineering; Ritchie School of Engineering and Computer Science

**IMAGE PROCESSING FOR POSE ESTIMATION**

**United States Patent**
10,540,782

**DU Inventors:**
Kimon Valavanis, Professor, Electrical & Computer Engineering, & Matthew Rutherford, Associate Professor, Computer Science, Ritchie School of Engineering and Computer Science

**MOBILE SELF-LEVELING LANDING PLATFORM FOR SMALL-SCALE UAVS**

**United States Patent**
10,540,782

**DU Inventors:**
Kimon Valavanis, Professor, Electrical & Computer Engineering, & Matthew Rutherford, Associate Professor, Computer Science, Ritchie School of Engineering and Computer Science

**UNITED STATES PATENT**

10,578,703

**DU Inventors:**
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**MOBILE SELF-LEVELING LANDING PLATFORM FOR SMALL-SCALE UAVS**

**United States Patent**
10,543,794

**DU Inventors:**
Kimon Valavanis, Professor, Electrical & Computer Engineering, & Matthew Rutherford, Associate Professor, Computer Science, Ritchie School of Engineering and Computer Science
During the COVID-19 pandemic, our faculty took initiative in their respective areas to, once again, contribute to the public good. This list is not complete; however, that does not diminish the value and meaning of all the incredible work, time & energy devoted to the cause.

VACCINE RESEARCH

Van Engelenburg Lab, NSM
Creating synthetic versions of SARS-CoV-2 virus, which could enable a way to manufacture effective diagnostics & a vaccine.

COVID-19 AT DU MODEL

Julia Dmitrieva, CAHSS
This model predicts the impact of various public health measures and epidemiologic conditions on the rates of infection and fatalities on campus throughout Fall quarter.

COVID CONTACT TRACING

Andrew Urbaczewski & Young-Jin Lee, DCB
Published in the European Journal of Information Systems, this paper explores the benefits and drawbacks of government surveillance within the COVID-19 outbreak of 2020.

PPE PRODUCTION

The Innovation Labs, RSECS
Production of personal protective equipment (PPE), such as face shields, protective barriers, face mask dispensers, and dispensers for disinfection supplies for classrooms & other spaces on campus.

HAND SANITIZER PRODUCTION

KIHA
Manufactured and donated 60% alcohol hand sanitizer to six nursing homes and home care facilities, & an Emergency Room.

BEHAVIORAL RESEARCH

Kimberly Chiew & Peter Sokol-Hessner, CAHSS
Collecting behavioral & epidemiological data from a nation-wide sample to examine how people feel, think, & behave under the sustained stress of the pandemic.

SPIT LAB

Phil Danielson, NSM; Sarah Watamura, CAHSS; Matthew Rutherford, RSECS; Corinne Lengsfeld, Provost’s Office
New facility to contribute to low cost, mass, rapid COVID-19 testing using salivary collection and limited resource consumption.

MENTAL HEALTH & WELL-BEING

The Mental Health & Well-Being Collaborative (The Collaborative)
Assisted people accessing DU’s clinic resources on campus, developed a website to centralize information about DU’s mental health clinics to provide guidance on which clinic on campus is best suited given the patient’s needs, and hosted mental health resources for BIPOC communities gathered by the Collaborative.

ROUNDTABLE DISCUSSION ON COVID-19 PANDEMIC

Daniels College of Business
Hosted a Voices of Experience miniseries where three prominent C-suite executives discussed how COVID-19 has affected their industries and challenged them as leaders.

FAIR ALLOCATION OF SCARCE MEDICAL RESOURCES

Govind Persad, SCOL
This article argues that governments and policy makers must do all they can to prevent the scarcity of medical resources and provides six recommendations to be used to develop guidelines that can be applied fairly and consistently across cases.

VACCINE RESEARCH

Van Engelenburg Lab, NSM
Creating synthetic versions of SARS-CoV-2 virus, which could enable a way to manufacture effective diagnostics & a vaccine.

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Kimberly Chiew & Peter Sokol-Hessner, CAHSS
Collecting behavioral & epidemiological data from a nation-wide sample to examine how people feel, think, & behave under the sustained stress of the pandemic.
ELAINE BELANSKY & BENJAMIN INGRAM, MCE

Make It Happen
Colorado Health Foundation, $4.95m

The Make it Happen grant is intended to support 27 rural school districts located in the San Luis Valley and Southeastern Colorado in the implementation of aspects of their comprehensive health and wellness plans that pertain to physical activity, nutrition, health education, and staff wellness. Specifically, this grant will provide monetary and professional development resources to support school districts in implementing best practices and collecting program evaluation data.

DOUGLAS CLEMENTS & JULIE SARAMA, MCE

Learning Trajectories as a Complete Early Mathematics Intervention: Achieving Efficacies of Economies at Scale
National Science Foundation, $4.5m

Early proficiency in mathematics is a powerful predictor of long-term academic success. This proposal is an Impact Study in the Teaching Strand focused on mathematics intervention geared toward kindergarten students. Using a web-based tool (Learning Trajectories [LT2]), this project seeks to study the [LT2] model as implemented within Jefferson County School District. This study has the potential to meaningfully advance our understanding of early mathematics interventions both in terms of impact and cost-effectiveness.

ROBIN LEAKE & NANCY LUCERO, GSSW

National Child Welfare Capacity Building Center for Tribes
Administration for Children and Families, $3.7m

Capacity Building Center for Tribes (CBCT) will be the principal Children’s Bureau (CB)-supported technical assistance (TA) provider responsible for building the capacity of tribal child welfare systems. CBCT will assist tribes in improving their practice and programs by assessing the most pressing needs for improvement as the foundation for identifying TA priorities. CB believes that effective training, coaching, tools, tailored consultation, and other support services can enhance the knowledge and skills of child welfare professionals and build organizational capacity to increase the likelihood that child welfare agencies can improve outcomes for children and families.
The Pardee Center will provide services as needed under the USAID/Uganda Learning Activity. This experience includes: quantitative forecasting using the International Futures (IFs) forecasting system, which is developed and maintained by the Pardee Center. IFs has been used to inform development planning for several USAID country and regional missions; training and capacity development on IFs, quantitative analysis, scenario planning, and data management for dozens of organizations; data management and visualization to enhance understanding of development trends.

The objective of this proposal is to test the hypothesis that species boundaries are an emergent property of multiple variable barriers. The proposed research will integrate field-based and common garden studies of barrier phenotypes (temporal, habitat, behavioral, fertilization, and postzygotic isolation) with patterns of spatial variation in recombination, hybridization, and selection. Hybrid zones of North American field crickets will be replicated to understand variation in reproductive barriers across different scales of biological diversity.

This project will study whether behavior and sleep problems in toddlers are best remediated with existing interventions that target behavior management, sleep, or both. The sub-award will take responsibility for over half of the planned recruitment, running and evaluation of data from 300 families. This will include delivery of the two planned interventions and pre- and post-intervention research data collection. We will also serve as the statistical analysis hub for the entire project, analyzing data from all 500 planned families.
The purpose of CLIMB-OWEP is to enhance community-based experiential training for concentration year MSW students preparing for work in behavioral health with an emphasis on Opioid Use Disorder (OUD) and other Substance Use Disorders (SUD).
More graduate and undergraduate students were supported by funding for research and scholarship in FY 2020, a 19% increase over FY 2019. The University of Denver contributed grant funding, supporting more than 600 students and resulting in 20% 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.

In the nine years of awarding conference travel grants, DU graduate students, representing 9 divisions and more than 39 programs, have presented in 90 U.S. cities, 34 U.S. states, and 29 countries, at a number of competitive conferences. In 2019-2020 awards averaged $508, allowing DU’s students to advance the scholarship in their respective fields through innovative and groundbreaking research.

FY 2020 also saw the inaugural year of the Undergraduate Research Journal, which published two complete issues, featuring 24 articles, biographies, and interviews, all authored and peer reviewed by DU undergraduate students.
12
UNDERGRADUATE SCHOLAR TRAVEL FUND GRANTS
AWARDED IN FY 2020 TOTALING $9,240

35
UNDERGRADUATE SUMMER RESEARCH GRANTS
AWARDED IN FY 2020 TOTALING $120,091

183
DOCTORAL DEGREES
AWARDED IN FY 2020

1,991
MASTER'S DEGREES
AWARDED IN FY 2020

25
UNDERGRADUATE PARTNERS IN SCHOLARSHIP (PINS) GRANTS
AWARDED IN FY 2020 TOTALING $35,261

15
GRADUATE INTERNATIONAL INTERNSHIP GRANTS
AWARDED IN FY 2020 TOTALING $20,470

01
GRFP AWARD
AWARD RECIPIENT: AARON WIKLE, NSM
This year, the DU Research & Scholarship Showcase pivoted to an online platform, allowing presenters to still showcase their work, even in the midst of a pandemic.

The second annual Research and Scholarship Showcase was held as a Twitter conference in response to the outbreak and spread of COVID-19. All presenters crafted engaging visual presentations using Prezi, and keynote speakers produced an additional video lecture to share their research and findings. Event attendees were able to view presentations, ask questions, and leave comments for presenters using the designated event hashtags. All research presentations are still available on Twitter by searching #DURSS2020 for all research projects and feedback, #DUUGResearch for undergraduate research, and #DUGradResearch for graduate research.
KEYNOTE SPEAKERS

Marianne Hughes, CAHSS
*How Power Dresses: The Gendered Aesthetics of Uniform* A Comparative Case Study of Contemporary Female Heads of State and/or Government in Australia, Indonesia, and the Philippines

Grant Goble, MCE
*The Impact of a High School Theatre Arts Program on Student Academic and Non-Academic Outcomes: A Case Study*

Christina Herrera, DCB
*Revenue Management and Restaurants*

Samir Rezgui, NSM
*Synthesis of Fluorescent Compounds to Detect Ethylene Gas*

Kaitlyn Elting, GSSW
*The One Health Impacts of Trap-Neuter-Return*

Andres Pulido, DCB & Avery Stackle, JKSIS
*Advancing A Community Solution Towards Homelessness*

Note: All research presentations are still available on Twitter by searching #DURSS2020 for all research projects and feedback, #DUUGResearch for undergraduate research, and #DUGradResearch for graduate research.
As our investigators adapted to the challenges of conducting research in labs and converting in-person interactions with research participants to remote options in response to the COVID-19 pandemic, an increase for research project reviews involving human subjects, animal welfare, and biosafety continued, averaging 32% over the previous year. The number of submissions for research compliance review peaked in January 2020, reaching 85 new submissions that month, and continued to plateau, averaging 70 submissions per month for the remainder of the fiscal year.

The Office of Research Integrity and Education (ORIE) professional team processed 1,045 submission requests, conducted 22 one-on-one post approval monitoring visits, and provided an average of 20 consultations with faculty, staff, and students each month. Many students are required to complete a research project to fulfill a Masters or Doctoral program. The ORIE professional staff offered regular regulatory guidance for student investigators who represented 45% of the total submission volume.

The Research Compliance & Education Program, DU’s post approval monitoring program, continues to demonstrate how in-depth reviews of approved research during one-on-one sessions with faculty investigators has proven to be a valuable resource in recognizing not only exceptional investigators on our campus, but providing professional guidance to ensure ongoing compliance.
This year, in spite of the difficulties presented by COVID-19, the Office of Intellectual Property and Technology Transfer (OIPPT) continued to experience a growth in number of research-related agreements, which shows the tremendous resilience of our researchers. There also has been an unprecedented number of eight patents granted to our researchers. In addition, DU received $160,000 in royalty revenue from three technology licenses and distributed $106,667 to inventors and departments.

To continue to build the necessary legal and administrative infrastructure, in collaboration with the Office of Research Integrity & Education, OIPPT implemented a new data agreement review process to handle the increasing need of our researchers to access data and collaborate with other institutions. OIPPT will continue to strive to build trust and seek innovative ways to engage with the DU community.

**INTELLECTUAL PROPERTY & TECHNOLOGY TRANSFER**

**TOTAL AGREEMENTS PROCESSED**

*Since FY 2014, the total agreements processed has increased significantly*