



**ANNUAL  
REPORT**



In FY 2022, North Dakota State University (NDSU) achieved significant milestones in research, with expenditures climbing to \$164 million—a \$11 million increase from the previous year. This growth secured NDSU an R1 classification as a "Doctoral University - Very High Research Activity" from the Carnegie Classification of Institutions of Higher Education, ranking it among the top 146 institutions nationwide.

NDSU's research efforts span various disciplines, focusing on areas such as food, energy, and water security; cybersecurity; life sciences; entrepreneurship and innovation; and materials. This year marked substantial foundational developments in these critical areas.

Among the key infrastructure accomplishments was the completion of Sugihara Hall, a \$51 million state-of-the-art facility serving the departments of chemistry and biochemistry, and earth, environmental, and geospatial sciences. Additionally, construction began on the Peltier Complex, a new facility dedicated to agricultural product research. This complex is set to advance research in fields like food science, meat science, muscle biology, food safety, nutrition, and the development of new agricultural products, further solidifying NDSU's leadership in research.

Furthermore, FY 2022 saw the laying of foundational initiatives with profound implications for future discoveries and commercialization across the state and beyond. The NIH Center of Biomedical Research Excellence for Diagnostic and Therapeutic Strategies in Pancreatic Cancer secured Phase 2 funding to continue developing early detection methods and treatment protocols for pancreatic cancer.

NDSU researchers also received a \$6 million award from the National Science Foundation to develop an AI-enabled sustainable energy infrastructure network. This new AI research center will address challenges like disruptions in the nation's energy grid.

Additionally, NDSU's plant sciences department initiated a \$1.2 million project to increase the protein content in peas, catering to the booming industry around alternative protein sources. The North Dakota Agricultural Experiment Station also had a fruitful year, testing various crop varieties and releasing new, more nutritious and resilient varieties of durum wheat and soybeans.

Overall, NDSU's research community is well-positioned to continue making significant contributions to science and technology.

**Colleen Fitzgerald, PhD**

**NDSU Vice President for Research and Creative Activity**

# RCA Budget

## *Operating: Campus Support and Programs*

Equipment Match/Repair/Purchases	274,154
Faculty Cohort Programs	1,448
Faculty Fellows	21,621
Misc. Campus Support	49,060
Proposal Assistance/Workshops	34,400

## *Research Core Operations*

EML	145,858
MERC and R2 Operating	14,045
UAS Operating	3,368
CBF Technician Partial Salary	21,589
Research Support Services	34,797
Travel Awards	7,976
Undergraduate Res Symp and Resources	1,868
<b>Total Campus Support</b>	<b>610,184</b>

<i>Operating: RCA Business Units</i>	83,847
Salary Budget: RCA	2,310,481
Salary Budget: EML	146,652
<b>Total Budget</b>	<b>3,151,164</b>



# **Innovation and Economic Development**

**Composed of the Business Development Unit and Licensing, this group aims to maximize the opportunities for industry-sponsored research and licensing of intellectual property through streamlined intellectual property discussions during negotiation of sponsored research agreements and continuity for research sponsors interested in licensing technologies developed at NDSU.**

## **Invention disclosures**

- 1 horticulture
- 4 plant
- 24 technology
- 79 Confidentiality/Nondisclosure agreements
- 98 Material/Data Use agreements
- 86 new subawards

## **US Issued Patents:**

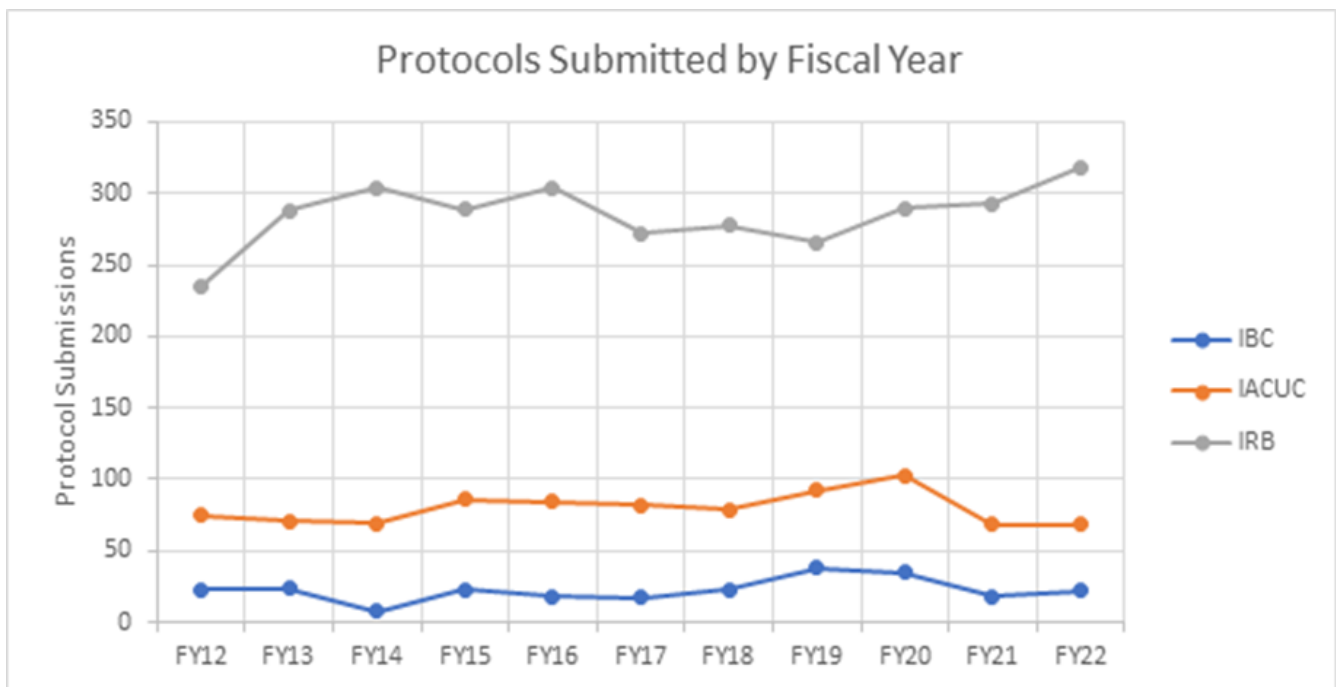
- Highly Functional Epoxidized Resins and Coatings
- Eco-Friendly Materials and Methods for Renewable and Sustainable Applications in Material Chemistry
- Acetoacetylated and (Meth)Acrylated Lignin and Thermosets Therefrom
- Integrated Dielectrophoretic and Surface Plasmonic Apparatus and Methods for Improvement in the Detection of Biological Molecules

## **Foreign Issued Patents:**

- Selective Laser-Assisted Transfer of Discrete Components
- Novel Non-Isocyanate Siloxane-Modified Glycidyl Carbamate Resins and Coatings Containing Them
- Bio-Based Thermosets

# Research Integrity and Compliance

Research Integrity supports Institutional Review Board (IRB), Institutional Animal Care and Use (IACUC), Institutional Biosafety Committee (IBC) operations; oversees financial conflicts of interest reviews; provides veterinary animal care and consultation; and subject matter expertise on promoting research integrity and compliance with federal regulations.



# Sponsored Programs

The Sponsored Programs Administration (SPA) office is the central administrative support office under the Vice President for Research and Creative Activity unit. The office encourages and supports university faculty and staff in their pursuit of external funding to conduct research or other scholarly activity, with an emphasis on administrative functions that advance a culture of compliance with applicable regulations. SPA provides budget review and institutional signature for all external proposal submissions, manages electronic application submission processes, and negotiates awards received from external sources for sponsored program activities on behalf of the university. The office also assists in non-financial post award administration matters.

	FY2022
External Awards	\$ 107,486,670
<i>Total External Awards</i>	\$ 107,486,670
Hatch/McIntire-Stennis Funds	\$ 3,318,175
Extension Service Smith-Lever Formula Funds	\$ 4,107,098
Student Financial Aid	\$ 9,994,423
<i>Total Federal Formula Funds</i>	\$17,419,696
<b>Grand Total</b>	<b>\$124,906,366</b>

College/Unit*	Proposals Processed through Sponsored Programs Administration	Total Dollars Requested from External Funding Sources	Total Dollars Awarded from External Funding Sources**
Agriculture Experiment Station & Extension Service	463	\$99,315,202	\$30,451,875
Agriculture, Food Systems & Natural Resources	74	\$4,776,713	\$1,039,141
Arts, Humanities & Social Sciences	37	\$1,785,928	\$1,860,975
Business	7	\$190,522	\$36,348
Engineering	135	\$57,478,656	\$13,259,055
Graduate School	1	\$220,436	\$408,682
Health Professions	106	\$48,433,902	\$15,794,236
Human Sciences & Education	37	\$6,037,747	\$1,912,912
Information Technology	1	\$207,584	\$0
Miscellaneous Offices	38	\$10,512,661	\$19,371,452
Science & Mathematics	83	\$46,823,016	\$15,063,121
Upper Great Plains Transportation Institute	64	\$8,560,034	\$8,288,873
<b>TOTAL</b>	<b>1,046</b>	<b>\$284,342,401</b>	<b>\$107,486,670</b>

# Research and Faculty Development

**The mission of the Research and Faculty Development unit is to enhance NDSU's ability to compete for external funding by providing resources, training, and assistance related to developing successful research programs. Activities of the research development office include announcing funding opportunities, managing the SPIN database subscription and offering training and support for users of the system, developing and coordinating grant writing workshops and professional development opportunities for faculty, managing internal funding programs such as travel awards and research support services, support for broader impacts, and developing proposal writing resources and tools.**

## FY22 Programming

- NSF Proposal Development Program (7 sessions, 13 participants in cohort)
- NSF CAREER Proposal Development Program (7 sessions, 11 participants in cohort)
- New Faculty Program (9 sessions, 32 participants)
- USDA Program Director Panel (41 NDSU participants; 62 total participants from 9 institutions)
- Workshop: Write Winning Grant Proposals (57 participants)
- Workshops: NEH / Funding in AHSS (41 participants)
- Workshops: NSF and Social Science / Convergence Research (36 participants)
- Research Symposium on Mental Health (co-hosted with President's Council for Campus Well-being; 70 participants)



Program	Participants
NSF Proposal Development Program [7 sessions]	13
NSF CAREER Proposal Development Program [7 sessions]	11
New Faculty Program [9 sessions]	32
Panel: USDA Program Directors	41 NDSU participants <i>62 total participants from 9 institutions</i>
Workshop: Write Winning Grant Proposals	57
Workshops: NEH / Funding in the Arts & Humanities	41
Workshops: NSF and the Social Sciences / Convergence Research	36
Research Symposium on Mental Health <i>co-hosted with President's Council for Campus Well-being</i>	70

## FY22 RCA Awards

- Research Support Services Awards: \$12,988 was awarded to 13 faculty.
- Research Development Travel and Conference Support Awards: \$27,387.19 was awarded to 28 faculty to support participation at conferences.
- Proposal Support: \$71,373 was awarded to support development and review of 22 proposals.

College	RSS	Travel	Proposals
AFSNR	1	1	3
AHSS	2	7	
BUS			
ENG	2	7	11
HP	5	5	1
HSE		7	
SM	3	1	5
Other			2

## FY22 Undergrad Research

- Initiated collaborative effort with the Graduate Student Council and Gamma Sigma Delta to launch NDSU Student Research Day. The inaugural event scheduled took place April 19, 2022. RCA hosted NDSU EXPLORE at Student Research Day, with 43 undergraduate student participants.
- The RCA Office funded registration for 8 students to present at the 2022 National Conference on Undergraduate Research virtual conference in April 2022, and funded registration for 2 faculty members.
- RCA Faculty Fellow Ying Huang managed the INBRE summer undergraduate biomedical research program, with 18 student participants from around the state.

## **NDSU Research in the News**

- NDSU education professor lands contract with US Air Force
- NDSU researchers awarded NIH grant to study how socioeconomics and perceived control can affect dementia-related diseases
- NDSU receives \$2.9 million NSF award to help post-baccalaureate students get involved with research
- NDSU pancreatic cancer research center receives phase 2 funding from NIH
- NDSU researcher awarded R15 grant to measure muscle function in older adults
- NDSU researcher Barney Geddes receives prestigious FFAR New Innovator Award
- NDSU geosciences researchers add two new state-of-the-art analytical instruments
- NDSU receives \$6 million research infrastructure award to develop an AI-enabled sustainable energy infrastructure network
- NDSU Researchers Included in Rankings of World's Top Cited Scientists
- NDSU researcher receives award to study how countries control online access to information
- Center for Bioplastics and Biocomposites Receives NSF Grant Phase II Funding
- John Creese collaborates with Wisconsin Anishinaabe tribe on archeological project and field school

# Faculty Publications

**2022**

**RECLAIMING MIGRANT MOTHERHOOD: IDENTITY, BELONGING,  
AND DISPLACEMENT IN A GLOBAL CONTEXT**

Editor/Author Maria D Lombard  
Publisher Rowman & Littlefield

**CHOCOLATE: A CULTURAL ENCYCLOPEDIA.**

Editor/Author COLLINS, ROSS F  
Publisher ABC-CLIO

**THRESHOLD CONCEPTS IN WOMEN'S AND GENDER STUDIES:  
WAYS OF SEEING, THINKING, AND KNOWING.**

Editor/Author LAUNIUS, CHRISTIE  
Publisher ROUTLEDGE

**RECENT ADVANCES IN OPERATIONS MANAGEMENT  
APPLICATIONS: SELECT PROCEEDINGS OF CIMS 2020**

Editor/Author ANISH SACHDEVA  
Publisher SPRINGER

**MATERIALITY AND WRITING STUDIES: ALIGNING LABOR,  
SCHOLARSHIP, AND TEACHING.**

Editor/Author HASSEL, HOLLY  
Publisher NATL COUN TEACHERS OF ENG

**TEACHING AND LEARNING FOR SOCIAL JUSTICE AND EQUITY IN  
HIGHER EDUCATION: VIRTUAL SETTINGS**

Editor/Author LAURA PARSON  
Publisher PALGRAVE MACMILLAN

# Faculty Publications

2021

## **MECHANICAL HARVEST OF FRESH MARKET APPLES: PROGRESS OVER THE PAST DECADES.**

Editor/Author ZHANG, ZHAO

Publisher SPRINGER

## **EMERALD HANDBOOK OF GROUP AND TEAM COMMUNICATION RESEARCH**

Editor/Author MICHAEL ROBINSON

Publisher SPRINGER

## **TEACHING AND LEARNING FOR SOCIAL JUSTICE AND EQUITY IN HIGHER EDUCATION: CO-CURRICULAR ENVIRONMENTS**

Editor/Author LAURA PARSON

Publisher PALGRAVE MACMILLAN

## **HANDBOOK OF EMBODIED PSYCHOLOGY: THINKING, FEELING, AND ACTING**

Editor/Author MICHAEL ROBINSON

Publisher SPRINGER

## **POLICING: THE ESSENTIALS.**

Editor/Author ARCHBOLD, CAROL,

Publisher SAGE PUBLICATIONS

## **HYDRAULIC AND CIVIL ENGINEERING TECHNOLOGY VI**

Editor/Author M. YANG

Publisher IOS PRESS

## **TRANSFORMATIONS: CHANGE WORK ACROSS WRITING PROGRAMS, PEDAGOGIES, AND PRACTICES**

Editor/Author HOLLY HASSEL

Publisher UTAH STATE UNIV PRESS

## **NDSU AAAS fellows (2022)**

Mukund Sibi, University Distinguished Professor of chemistry and biochemistry, and Colleen Fitzgerald, vice president for Research and Creative Activity, have been named fellows by the American Association for the Advancement of Science.

Sibi was honored for “pioneering work in enantioselective radical reactions and asymmetric synthesis and building biomedical research infrastructure through effective leadership and mentoring.”

He joined the NDSU faculty in 1987 and has built an international reputation in synthetic organic chemistry – radical chemistry in particular. He developed the first catalytic method for carrying out enantioselective radical reactions.

Fitzgerald was recognized for “outstanding contributions to the field of linguistics, with a focus on language documentation, language revitalization and empowering Indigenous communities through collaborative work.”

Fitzgerald came to NDSU as the vice president for research and creative activity on Oct. 1, 2021, from Texas A&M University – Corpus Christi, where she was associate vice president for research. Prior to that, she was on the faculty at the University of Texas at Arlington from 2008 to 2019, and for the last four years of that period, she served as program officer for the Documenting Endangered Languages Program, a joint funding initiative between the National Science Foundation and the National Endowment for the Humanities.

Both are members of a 2021 cadre of 564 scientists, engineers and innovators from the around the world who will receive the lifetime honor.

