



Office of Research and Sponsored Programs

2024 Annual Report



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MISSION

Wake Forest University's Office of Research and Sponsored Programs supports the Vice Provost for Research and Scholarly Inquiry in building faculty research programs of nationally recognized excellence. We assist faculty in their pursuit and management of sponsored activities; work to assure ethical research achievement, especially involving human subjects, in compliance with all relevant laws and regulations; protect the university's interests; and acknowledge and publicize faculty distinction.

CREDITS

The Office of Research and Sponsored Programs gratefully acknowledges photographs by WFU photographers Lyndsie Schlink and Ken Bennett.

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From The Assistant Vice President

Dear Researchers,

FY24 was a remarkable year! Investigators were awarded over \$18.4M for research and other sponsored programs, a \$5M increase over last year, and the highest amount ever for our campus, excluding CARES Act funding. Additionally, the 163 proposals submitted requested \$2M more than the near-record number submitted in FY23.

Once again, our junior researchers won prestigious National Science Foundation Faculty Early Career Development Program (NSF CAREER) awards: Minghan Chen, Computer Science; Ajay Ram Srimath Kandada, Physics; and Steve Winter, Physics. Only once before have three faculty been so honored in a single fiscal year. The projects are featured in the report that follows.

We also received the most funding for a single project in FY24. Dr. Steve Messier, Health and Exercise Science, is leading a team of US and international researchers in The Osteoarthritis Prevention Study (TOPS), described in this report. It is expected to receive \$17.1M over 5 years, primarily from the National Institute of Arthritis and Musculoskeletal and Skin Diseases, joined by other federal agencies and the Arthritis Foundation.

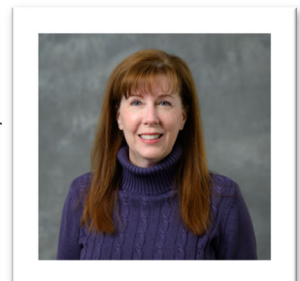
Physics Professor Keith Bonin's tenure as chief research officer ended this year. Significant changes have taken place since he took over, most notably the increase in external research support, which was only \$10M in FY19. He guided the research enterprise through the COVID crisis, established Wake Forest Intercampus Collaborative Grants, engaged the Huron Consulting Group for an independent assessment, and ensured that many of their recommendations were implemented before he stepped down.

The research administration team welcomed new staff over the past year. In anticipation of ORSP's integration of Grants and Contracts Managers (GCMs), a search was conducted, and Phillip Summers was selected and promoted to Associate Director. Mary Schrieber-Dooley was then hired as a GCM to assist the departments previously served by Phillip. Lindsay Jarvis had barely finished her master's degree in psychology before she joined us as the new Human Subjects Protection Specialist this spring. In Grants Accounting, Laney Crumbley was hired as the new Senior Analyst.

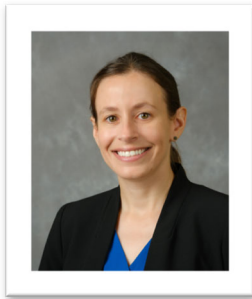
Several of the staff renewed their certifications during the fiscal year. Jeanie Baird is a Certified IRB Professional for another three years. Amy Comer and I both renewed our certifications as research administrators for three years as well.

Congratulations to all!

Sincerely, Lori Gabriel, CRA, Assistant Vice President, Research Administration



Featured Projects



ANTHROPOLOGY

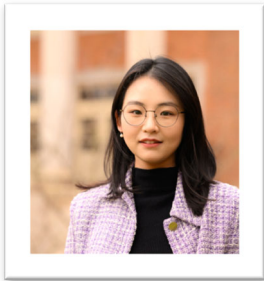
Jessica MacLellan, Assistant Professor of Anthropology, has received an award from the National Science Foundation's Division of Behavioral and Cognitive Sciences to study "Origins of Ceremonial Architecture and Sedentary Life" along the Coatzacoalcos River in southern Veracruz, Mexico.

Around the world, archaeological evidence shows that building monumental structures for public rituals predated and may have contributed to the development of a more sedentary, agriculturalist lifestyle, social complexity. Mesoamerica is one of the few regions where state-level societies developed without the influence of preexisting states. This project tests the hypothesis that the adoption of formal ceremonial architecture spread from the Olmec cultural region to the Maya lowlands c. 1400-1000 BCE and that the communal activities associated with these structures supported the transition to a sedentary lifestyle and a reliance on maize agriculture. A LiDAR survey, pedestrian surveys, excavations in public and residential areas, radiocarbon dating, analyses of ceramics and other artifacts, and paleobotanical analyses will be used to date these ceremonial complexes, to locate residential areas associated with them, and to recover evidence of early foodways.

The theoretical approach expands traditional perspectives on the emergence of elites and rulers by addressing how ritual creates both hierarchical and nonhierarchical relationships in society. A secure chronology will improve our understanding of interactions between the Olmec and Maya, and LiDAR mapping will facilitate future research and preservation efforts in southern Veracruz.

The project will also strengthen international collaboration and encourage women, as most of the collaborators, including both senior scientists, are women. Mexican and US undergraduate students and at least one PhD student will participate. Local outreach activities, including classroom and site visits and public talks, will endorse the preservation of cultural resources.

COMPUTER SCIENCE



Minghan Chen, Assistant Professor of Computer Science, has received a prestigious National Science Foundation CAREER award for “Towards a Living Neuron Twin for Improving Human Cognitive Health.”

This project will develop Neuron Twin, a digital system that integrates deep learning, multiscale modeling, network neuroscience, and systems biology to gain mechanistic and therapeutic insights into Alzheimer's disease, a devastating and incurable cognitive disorder that affects millions worldwide. Objective 1 to build a multiscale model that captures the spatiotemporal dynamics of disease progression by synthesizing information from gene regulation, protein interactions, and phenotypic heterogeneity. Objective 2 is to develop continual model-guided learning to provide neurologically consistent predictions for small data regimes and continuously improve the system with sporadic data updates. Objective 3 is to design hybrid learning-aided inference to address incomplete parameterization and hypothesis validation. The project will be evaluated through large-scale imaging studies of neurodegenerative diseases.

Results will provide a mechanistic understanding of cognitive decline and the first accurate tool for clinical prediction and effective treatment strategies. More generally, this innovative approach leverages modeling and machine learning techniques to solve complex, health-related, data

science problems, discovering relationships in large datasets and across domains.

Research findings also inform instructional materials and a summer bootcamp for underrepresented students.

HEALTH AND EXERCISE SCIENCE



Steve Messier, Professor of Health and Exercise Science, has been awarded \$17.1 million by the National Institute of Arthritis and Musculoskeletal and Skin Diseases, the Arthritis Foundation, the Centers for Disease Control and Prevention, and other sponsors to conduct The Osteoarthritis Prevention Study, TOPS.

Osteoarthritis is the leading cause of disability among adults worldwide and the third most common diagnosis for hospital stays, at 1.25 million per year. It affects nearly twice as many women as men, primarily targeting the knees. It is incurable.

In prior research, Professor Messier found that for every pound lost, the knee loses four pounds of stress. TOPS is the first clinical study to examine whether the most common treatments for osteoarthritis – weight loss and exercise – also prevent it.

Project manager **Jovita Newman** oversees operations at the Wake Forest coordinating center and three other intervention sites: Brigham and Women’s Hospital in Boston, the University of North Carolina at Chapel Hill, and the University of Sydney in Australia.

The 1,230 participating women will be randomly divided into a diet-and-guided-exercise treatment and a healthy-living treatment for the four-year study. Researchers will use MRI scans to evaluate degenerative changes in the knee at month 48 and other measures to track knee pain, mobility, and health-related quality of life.

Department of Health and Exercise Science Professor **Gary Miller** serves as head nutritionist, and Professor **Shannon Mihalko** is the Wake Forest site PI and behavioral psychologist. She aims to define methods to sustain weight-loss; very few studies look at the common problem of regaining weight and its long-term negative health consequences.

PHYSICS

Ajay Ram Srimath Kandada, Assistant Professor of Physics, has earned a prestigious CAREER award from the National Science Foundation for "Nonlinear Dynamics of Exciton-Polarons in Two-Dimensional Metal Halides Probed by Quantum-Optical Methods."

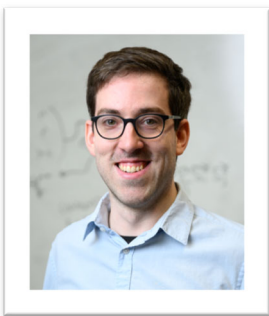


The project incorporates quantum-optical principles to enhance the sensitivity and selectivity of ultrafast nonlinear spectroscopy, which is widely used to explore light/matter interactions. The new approach addresses two challenges: (a) low signal-to-noise ratio, which prevents exploration of photo-excitation dynamics in the low-intensity regime, and (b) ineffective isolation of stochastic many-body interactions, which adds substantial ambiguity to photo-physical models. Improved comprehension of perovskite photophysics will enable optimization of their optoelectronic properties, with potential benefits for a variety of applications, including solar cells and light-emitting technologies. It will also elucidate the fundamental physics of multiparticle couplings in the presence of a dynamic fluctuating lattice, a problem of general relevance in condensed matter physics and supramolecular systems.

The research program drives the education program. First, it enables Dr. Kandada to train two graduate students in the experimental methodologies of quantum optics applied to spectroscopy. Second, the introduction of an outreach component in the physics undergraduate curriculum will inspire and equip students to spread their scientific

curiosity and knowledge into the wider community. Finally, the project's optics-based pedagogical modules will expose local high school students from economically disadvantaged backgrounds to the scientific method and critical thinking, enlarging their career horizons.

PHYSICS



Steve Winter, Assistant Professor of Physics, has been awarded the National Science Foundation's prestigious CAREER award to pursue "Effective Hamiltonian Downfolding Methods for Studying Linear and Nonlinear Responses of Quantum Materials."

Emerging quantum technologies offer unique advantages for such applications as superconductors, quantum magnets, and topological insulators. However, simulating them and predicting their properties can be challenging and computationally demanding. To address these problems, the research team will develop and distribute state-of-the-art computer codes for constructing material-specific effective models. They will focus on nonlinear responses—for example, processes in which the materials interact with light of a particular frequency and emit light at a different frequency—which can provide precise clues about the underlying quantum mechanical degrees of freedom and their entanglement.

Effective Hamiltonian methods have already yielded significant insights into the complex interactions of insulating quantum magnets. This project will advance the field by: (1) distributing codes that allow a broader community of scientists to implement such studies, (2) expanding the scope of the methods to treat multipolar couplings, itinerant systems, spin-orbital excitons, and loop-current degrees of freedom; and (3) implementing calculation of ab-initio dynamical effective Hamiltonians to model nonlinear optical experiments.

The study will have a direct impact on education at many levels. First, graduate research associates will be trained in advanced computational and analytical methods for quantum materials. Second, in partnership with Winston-Salem/Forsyth County schools, Wake Forest undergraduates will receive training in scientific outreach and public communication. The course provides a framework and materials that other institutions can adapt. Finally, a summer program will recruit Title I high-school student interns to participate, with graduate student mentors, in research and career-development activities that will prepare the next generation of researchers and educators..

SCHOOL OF BUSINESS



Stacie Petter, Peter C. Brockway Chair of Strategic Management and Professor of Management Information Systems in the School of Business, in collaboration with Gisela Bichler, Professor of Criminal Justice at California State University, San Bernardino, and Felipe Aros-Vera, Associate Professor of Industrial and Systems Engineering at Ohio University, has received a National Science Foundation grant to study “Constraining Illicit Decision Making within and across Dynamic Supply Networks.”

The project develops and deploys a networked agent-based model (NABM) to define when and why individuals decide to disregard laws and regulations and examines how their decisions affect other actors in the supply network. Initial models based on the massage-therapy industry will be extended to other potentially illicit supply networks in such industries as agriculture and pharmaceuticals. They focus on two critical determinants: (1) the competitive dynamics affecting consumers and suppliers and

(2) the role of civil, criminal, and for-profit business factors in shifting market conditions.

Findings will inform domain-agnostic interventions enacted through laws, policies, regulations, and/or business practices to constrain the benefits of illicit activity. Both graduate and undergraduate students will support this multidisciplinary project to gain experience in addressing complex societal problems.

SCHOOL OF LAW

Alyse Bertenthal, Associate Professor of Law, and **Scott Schang**, Professor of Practice and Director of the Environmental Law and Policy Clinic, have been awarded a grant from the North Carolina Wildlife Resources Commission (NCWRC) for "Improving Compliance with Boating Regulations and Associated Public Safety in North Carolina." They are working in partnership with North Carolina State University Professors Nils Peterson and Krishna Pacifici of the Department of Forestry and Environmental Resources.



The project is designed to determine and improve the practices, programs, and legal structures that promote public compliance with boating safety laws. It draws on NCWRC statistical data, observations, and interviews. In addition to analyzing citation and arrest data, the investigators will interview and ride along with law enforcement officers and review footage from body cameras. They will review case files and interview prosecutors to follow the progress of charges

through the legal system. The combined data analysis will inform interventions and best practices.

Professors Bertenthal and Schang will incorporate these research activities and analyses in their courses. Students will gain practical insight into how law can improve environmental protection and conservation.



Fellowships and Awards



Alyse Bertenthal, Associate Professor of Law, was selected by the American Bar Foundation to join the 2024-2025 cohort of the ABF/JPB Foundation Access to Justice Scholars. The fellowship brings together faculty scholars from across the nation to generate significant research on access to justice and translate it into real-world policy and practice.

Dr. Bertenthal's project will examine access to justice in environmental courts and tribunals across the United States. Drawing from ethnographic research and analysis of court data, she will explore such questions as whose environmental rights matter; what kinds of legal and scientific expertise are most effective in securing them; and whether and how specialized courts might create more opportunities for people to use the law to improve socio-environmental outcomes for their communities. She will also develop an open-access database to assist researchers, communities, advocates, and activists working to enhance access to environmental justice.



J'Nese Williams, Assistant Professor of History, has earned a fellowship from the American Council of Learned Societies, which supports outstanding scholarship in the humanities and interpretive social sciences.

The *Texture of Empire: Britain's Colonial Botanic Gardens, Science, and Authority in the Age of Revolution* sheds new light on the construction and exercise of scientific authority and government hegemony in the British empire from the 1760s through the 1860s. Previous scholarship describes botanic gardens in India, Australia, and the Caribbean as nodes in a formidable network run from London. In contrast, *The Texture of Empire* illustrates the power of local elites to resist government intervention in agriculture and resource management through the botanic gardens. In addition, garden staff, from superintendents to the workers tending the plants, including naturalists with advanced education, enslaved people, and convicts, all had their own goals. In attempting to build authority for botanic gardens as new imperial institutions, they sought recognition of their own knowledge both within and outside of the scientific community. This work reveals that while colonial gardens may have been potent symbols of rational governance and control, in practice, they were sites of controversy that exposed imperial weakness.

Professional Development

INTERNAL AWARDS

The Office of Research and Sponsored Programs assists the Vice Provost for Research and Scholarly Inquiry in coordinating and administering several internal award programs. In FY24, there were two deadlines for Pilot Research Grants and one each for Collaborative Pilot Grants and Intercampus Collaborative Grants with Wake Forest University Health Sciences. The amounts awarded are listed below. Please note that the amount shown for Intercampus Collaborative Grants represents our campus contribution; WFU Health Sciences/Atrium contributed an additional \$124,253 for the first five projects awarded under this pilot program. A gift from the ZSR Foundation supported \$69,084 of the total cost of internal grants.

Pilot Research Grants: \$78,695
Collaborative Pilot Grants: \$106,656
Intercampus Collaborative Grants: \$124,253
Bridge Funds: \$10,000

ORSP also manages matching and cost-share funds. In FY24, the university provided nearly \$272K for sponsored project cost-share, open-access publishing, and related initiatives.

PROFESSIONAL DEVELOPMENT

In FY24, the office spent over \$64K hosting and coordinating professional development workshops and events as well as faculty and staff professional development, research awards, and prizes. Supported programs and events include:

Creative Research Activities Development & Enrichment Program (CRADLE)

Responsible Conduct of Research Training for Graduate Students & Undergraduate Students

Building Research Success at Wake Forest University – New Faculty Luncheon

Winning Grants Seminar Parts I and II

Recognition of Research Excellence – Annual Reception

Centers & Institutes Retreat

ACC InVenture Prize Competition

NSF CAREER Quality Circle

Quality Circle Training

Team Building Seminar

Human Research Protection

ORSP provides administrative support to the Institutional Review Board (IRB) under federal Department of Health and Human Services (DHHS) regulations (45CFR §46). Jeanie Baird, Associate Director for Human Research Protection, maintains IRB records; facilitates communication between the IRB and researchers; coordinates meetings; updates and maintains the university's IRB policies and website; monitors training for researchers and other key personnel; provides continuing education for IRB members; and keeps the university's Federalwide Assurance and IRB Registration current. Lindsay Jarvis, Human Research Protection Specialist, coordinates the day-to-day review of all items submitted to the IRB and assists researchers with their submissions and eIRB and CITI training questions.

In FY2024, the IRB reviewed 121 new applications: the full-board reviewed one; 3 were expedited; none was exempt; and 117 were flex, or processed as exempt or expedited although not federally funded. We also processed 351 amendments, 4 continuing reviews, and 352 annual updates. The average number of active applications increased 8%, from 398 per month in FY2023 to 430, with the highest number (439) in June and December. Our human research portfolio includes very few federally funded projects, but this year, we hit an all-time high of 26.

The office is proactive, providing study-specific consultations to assist faculty, staff, and student researchers. Group outreach efforts this year targeted graduate classes in Communication and undergraduate research-methods classes in Sociology. We facilitated collaborative research by executing IRB Authorization Agreements and helping

nonaffiliated investigators to recruit WFU personnel as study subjects.

In the spring semester, the IRB reviewed and approved 27 URECA (Undergraduate REsearch and Creative Activities) Center studies by undergraduate and graduate Richter Scholars, Stamps Scholars, Wake Forest Research Fellows, and Wake Forest Arts and Humanities Research Fellows.

We are excited about, and ready to assist in, the future growth of human subjects research at Wake Forest University!



Funding Highlights

In FY24, Wake Forest University secured a record \$18.4 million in support for research and scholarly activities, excluding awards for social sciences and humanities scholarships. Faculty and staff submitted 163 proposals, requesting a total of \$79.8 million.

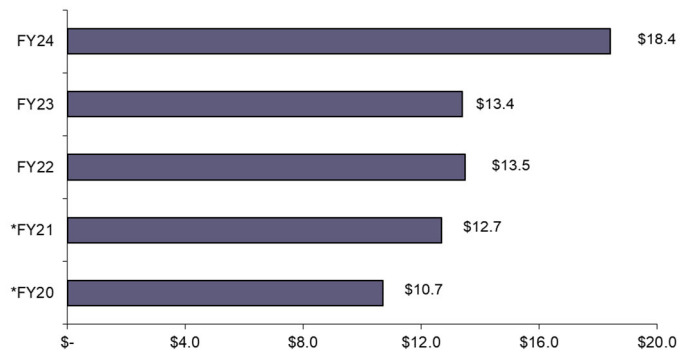
Federal grants comprised 78% of the total funding. The Health and Exercise Science Department led in funding received, the total amount requested, and tied with Computer Science for the number of proposals submitted.

The following faculty and staff received their first grants at WFU this year:

- Jessica MacLellan, Anthropology
- Nicholas Kortessis, Biology
- Carol Mitchell, Biology
- Minghan Chen, Computer Science
- Claudia Falcon, Mathematics
- Ajay Ram Srimath Kandada, Physics
- Stephen M. Winter, Physics
- Andrea Gomez-Cervantes, Sociology
- Lucy D'Agostino McGowan, Statistical Sciences
- Lorie Mabe-McCroskey, WFDD

The statistics that follow summarize Reynolda campus sponsored research activity for FY24. Graphs represent funding processed through the Office of Research and Sponsored Programs, not gifts nor fellowship awards made to individual faculty. Awards represent authorization to spend as opposed to research expenditures.

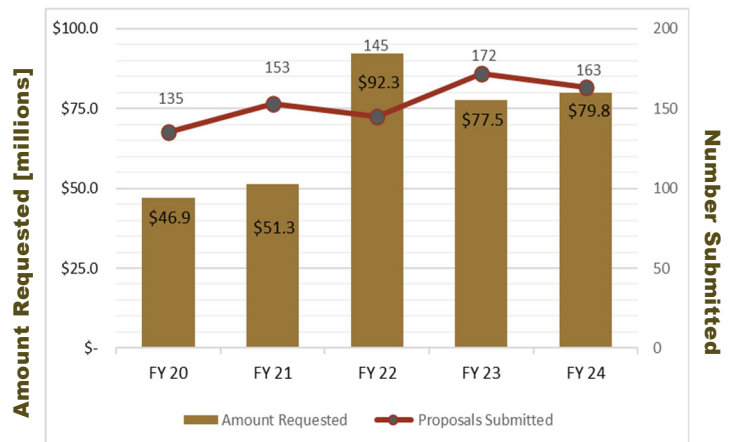
AWARDS BY YEAR: 2020-2024



**The FY20 and FY21 figures in this table exclude CARES Act Funding. Totals for FY20 and FY21 are approximately \$14.10M and \$25.90M, respectively.*

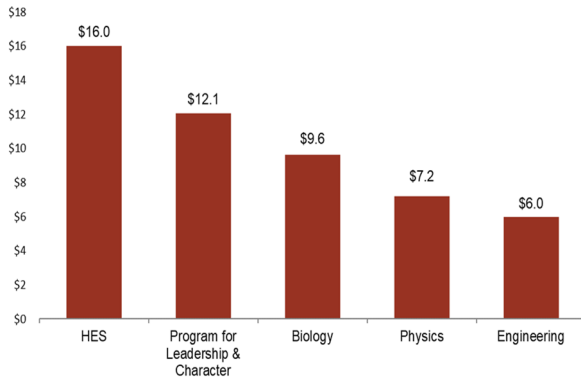
Amount Received [millions]

PROPOSALS BY YEAR: 2020-2024

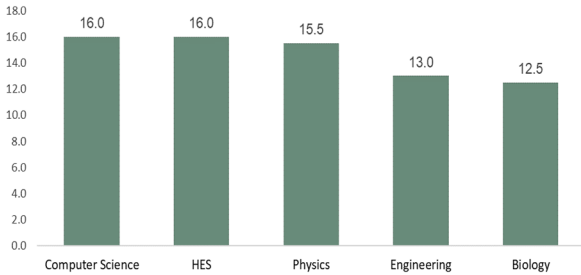


PROPOSALS BY DEPARTMENT

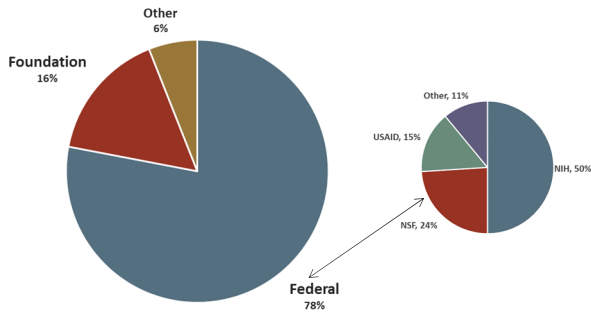
Most Dollars Requested [millions]



Most Proposals Submitted



FUNDING SOURCES



Department/Center	Awards	Amount	New Awards	Amount
Health & Exercise Science	13	5,919,606.31	6	4,010,525.43
Biology	7	3,458,678.52	3.5	1,693,551.75
CEES/Sabin Center	1.5	2,353,658.27	1	1,281,620.00
Chemistry	9	1,277,411.16	6	1,037,700.19
Physics	7.84	1,123,005.12	5	858,468.80
Computer Science	3	801,578.37	1	501,329.37
Engineering	12	770,757.49	6	543,529.00
Center for Functional Materials	2.5	655,062.19	1.5	460,062.22
Education	2	460,725.00	1	400,000.00
Civic & Community Engagement	2	211,938.00	1	215,120.00
Center for Nanotechnology & Molecular Materials	0.5	200,496.50	0.5	200,496.50
Translational Science Center	3.83	268,597.34	3	197,910.09
Statistical Sciences	4	155,174.04	1	1,667.00
Anthropology	3	115,829.00	2	16,200.00
Psychology	3	115,116.08	2	75,267.00
Center for Molecular Signaling	1.83	151,639.25	0.5	5,000.00
Law School	3	74,150.00	3	74,150.00
Sociology	1	60,000.00	1	60,000.00
Graduate School	1	49,000.00	1	49,000.00
WFU Schools of Business	1	47,327.00	1	47,327.00
Philosophy	1.5	31,471.50	1	22,426.00
Provost Office	2	30,093.63	2	30,093.63
Mathematics	2	16,800.00	2	16,800.00
Communication	1	16,328.40	1	16,328.40
Center for the Advancement of Teaching	1	10,813.56		
WFDD	1	10,000.00	1	10,000.00
Bioethics	0.5	9,045.50		
Residence Life	1	5,000.00	1	5,000.00
ZSR Library	1	2,500.00	1	2,500.00



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