



# RESEARCH

BOARD OF TRUSTEES REPORT  
JULY 2022



## ▶ From the Vice President for Research

Dear Board of Trustees members,

I hope you are enjoying your summer and are as excited as I am for Clemson to begin another successful academic year in the fall.

As I reflect on the past year, I am pleased to see our research enterprise continue to post strong momentum. Per the theme of our upcoming Research and Economic Development Committee meeting, I have prepared a report on [pages 4-20](#) to highlight the quality, efficiency and relevance of our research enterprise. This year, Carnegie confirmed our R1 status, placing Clemson among the most relevant, highest quality research institutions in the country ([page 5](#)). The scholarly community has increasingly confirmed our quality through the publication and citation of Clemson research ([page 7](#)). While our research has grown tremendously, I am proud to report that we have handled the growth efficiently with great increases in per-capita productivity ([page 9](#)). In fact, the efficiency of Clemson's research enterprise compares favorably to our peers ([page 10](#)), suggesting we are at the limits of our capacity ([page 11](#)). Additionally, the scholarly community continued to validate the relevance of Clemson research ([pages 12-13](#)), and our researchers were rewarded with patents for their high-quality innovations ([pages 14-15](#)). And of course, they continue to work tirelessly to pursue meaningful, impactful projects that improve our communities ([pages 16-20](#)).



Tanju Karanfil

Clemson researchers continued to lift our research enterprise in fiscal year 2022, based on our research metrics through the first three quarters of the fiscal year, the latest data available:

- Competitive research expenditures reached \$95 million, a 28 percent increase from the same period a year ago ([page 23](#)).
- Proposal submissions were \$499 million through the first three quarters as faculty continue to pursue new projects ([page 24](#)).
- Competitive research awards were \$97 million. While this is down from the prior year, which was a banner year for Clemson, they remain elevated when compared to fiscal years 2019 and 2020 ([page 25](#)).
- Researchers from across Clemson's footprint are contributing. Our list of the highest competitive grants received in the past quarter include faculty from nursing, agriculture, sociology, engineering and science. It is an impressive list of academic diversity ([pages 26-27](#)).
- Additional data on our research enterprise is included in the Research Report Card ([pages 28-31](#)).

Behind our success, of course, are exceptional faculty members and students. It is important to recognize the great impact they are having through their research. At the annual Research Symposium in May, we recognized our Researchers of the Year ([pages 33-34](#)), and we also

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# ▶ From the Vice President for Research

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presented our University Research, Scholarship and Artistic Achievements Awards to faculty members who have earned rare career milestones and recognitions ([pages 35-36](#)). This is a high-quality group of Clemson's brightest minds.

And there is so much more to celebrate. I have included examples of impacts, honors and achievements of Clemson faculty members and students on [pages 37-44](#). Additionally, the colleges have provided brief profiles of faculty members to give you a sense of the breadth of research activity at Clemson ([pages 45-63](#)).

I am proud of what we have accomplished at Clemson. It truly is a great time to be a Tiger.

Respectfully submitted,



**Tanju Karanfil**, Ph.D., PE, BCEE, IWA Fellow

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# QUALITY, EFFICIENCY, RELEVANCE

This section covers the quality, efficiency and relevance of Clemson's research enterprise.

## Executive Summary

- *The Carnegie R1 designation places Clemson among the highest quality, most relevant research universities in the country ([page 5](#)).*
- *Federal agencies continue to reward high quality ideas and proposals from Clemson faculty ([page 6](#)).*
- *The scholarly community is increasingly publishing and citing Clemson research, confirming its quality ([page 7](#)).*
- *Clemson has grown efficiently with great gains in output ([page 8](#)) and per-capita productivity ([page 9](#)).*
- *Clemson's research enterprise operates efficiently when compared to peers and is at the limits of its capacity ([pages 10-11](#)).*
- *Clemson faculty are being highly cited for relevant research ([pages 12-13](#)).*
- *Clemson faculty are earning patents for high quality innovations ([pages 14-15](#)).*
- *Clemson continues to positively impact the community with relevant projects ([pages 16-20](#)).*

# Carnegie R1 status confirms highest quality

The latest Carnegie Classification has been released and again Clemson University has been named among the most active research universities in the United States. The designation as an R1 institution confirms the quality and relevance of Clemson's research enterprise and boosts our reputation globally.

Being an R1 institution helps Clemson recruit the best faculty and students, opens the door for more collaboration and funding, boosts our overall national reputation, and attracts industry looking for a reputable, relevant, world-class academic research partner in South Carolina. To compile the classification, Carnegie tracks research activity and PhD productivity across all disciplines, so every college at Clemson plays an important role in earning our R1 designation.

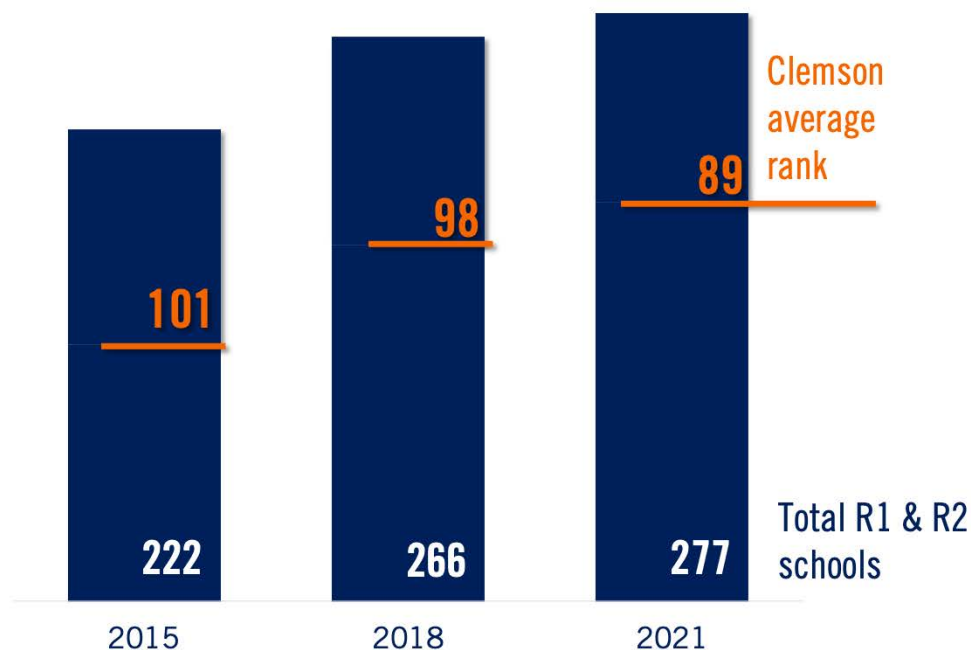
Doctoral universities are grouped into three categories:

- D/PU - Doctoral/Professional Universities;
- R2 Doctoral Universities – High Research Activity; and
- R1 Doctoral Universities – Very High Research Activity.

Carnegie collects the data every three years to compile its university classifications.

Clemson first became an R1 university in 2015 and – based on analysis of performance among peers – continues to solidify its place among the nation's most active research institutions. There are 277 schools classified as either R1 or R2. While Carnegie does not rank schools, the Division of Research has been analyzing Clemson's performance in Carnegie metrics to estimate its position among Carnegie R1 and R2 institutions.

Clemson has improved its position since 2015 from No. 101 out of 222 R1 and R2 schools to No. 89 out of 277 schools (see the chart below). Clemson is penetrating deeper into the field of perennial R1 institutions, solidifying its position as one of the nation's most active and relevant research universities.



# Federal Agencies reward quality proposals

Federal funding for research is highly competitive. Federal agencies are looking for relevant ideas with the most potential for great societal impact. The best universities across the country are competing for limited resources, trying to prove they have the best, most relevant ideas. Clemson has been increasingly successful since 2016 in securing federal funding, following a long period of flat levels of federal funding for research, as shown in the chart below.

Clemson recently earned its fourth Center of Biomedical Research Excellence (COBRE) project from the National Institutes of Health, a \$10.6 million grant for the COBRE in Human Genetics. This is the maximum number of COBRE projects a university can have at any given time and is an incredible feat for a university without a medical school. [READ MORE](#)

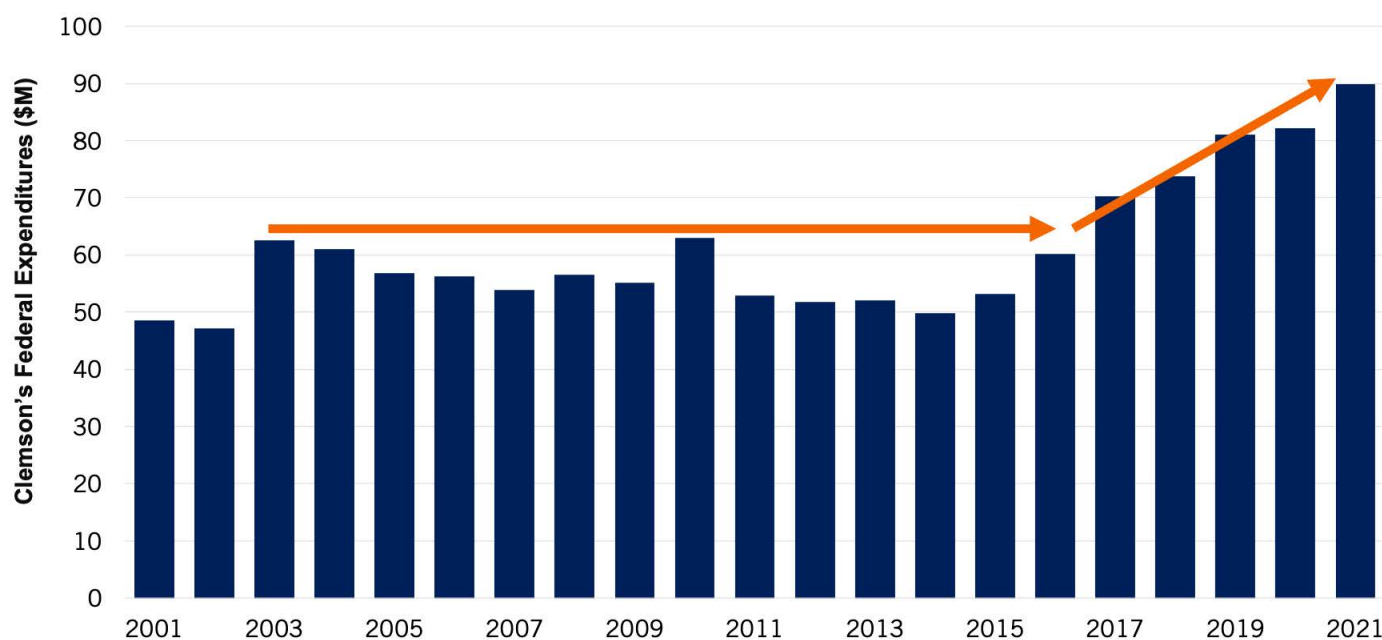
In another example of a high-value project, the U.S. Army DEVCOM Ground Vehicle Systems Center (GVSC) announced an additional \$22 million for a research partnership with Clemson aimed at developing innovative virtual prototyping tools for designing the next generation of on- and off-road vehicles. The U.S. Army contributed an initial \$18 million to the Center in 2020. The Virtual Prototyping of autonomy-enabled Grounds Systems (VIPR-GS) Research Center at Clemson University is providing new simulation and digital engineering capabilities, as well as hardware demonstrations to increase efficiency in design-to-build processes in support of GVSC's ambitious goals for rapid modernization of U.S. Army fleets. [READ MORE](#)

**71** research projects of at least \$2M won since 2015.

Total value of these projects is

**\$312M**

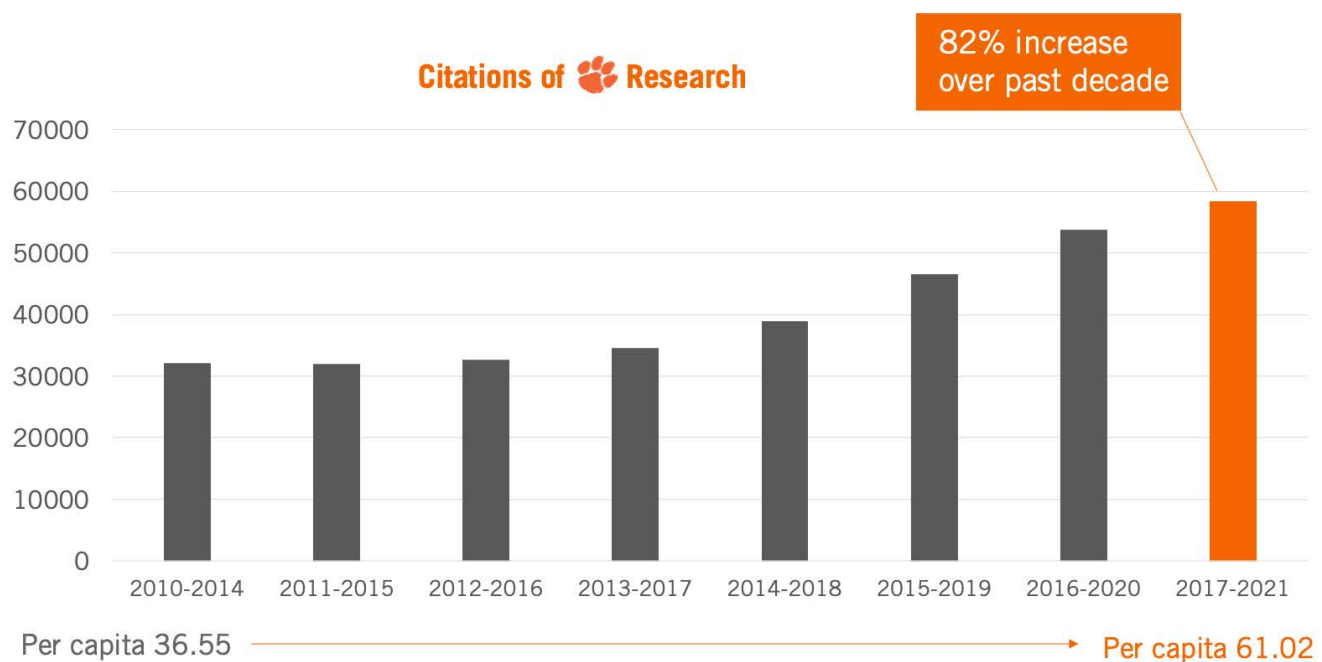
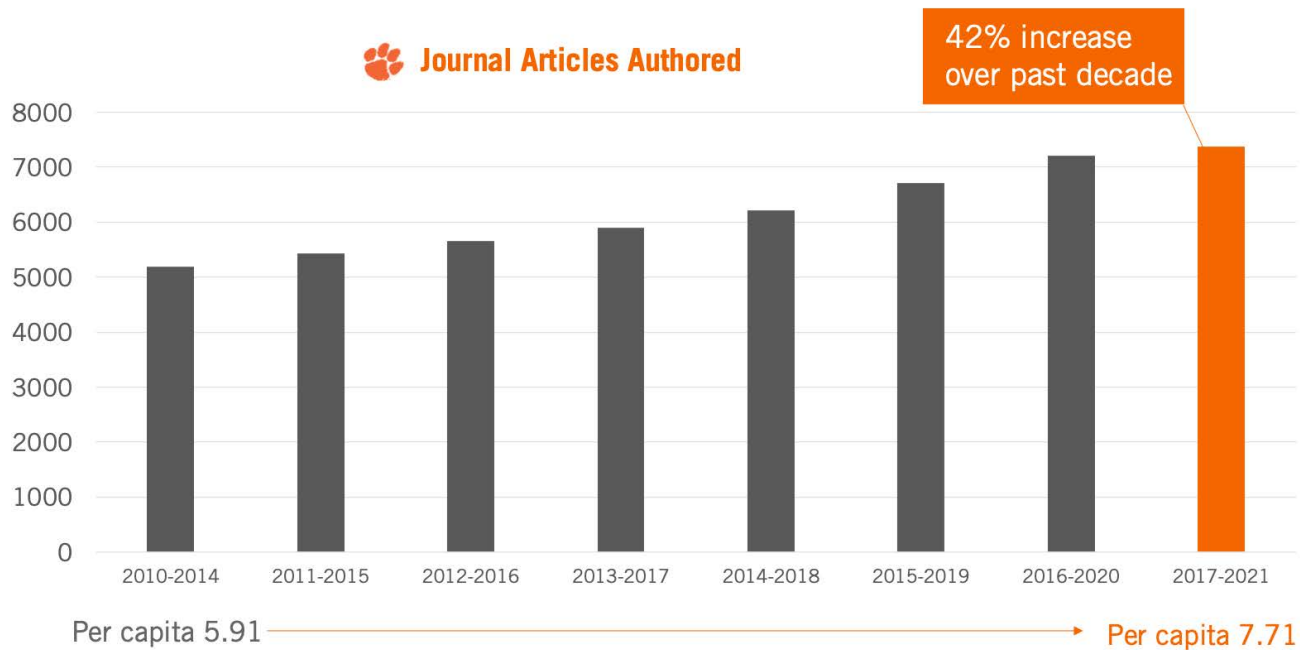
## Federal Agencies Increasingly Reward Relevant Ideas



SOURCE: NSF HERD (Higher Education Research and Development) Survey

# Peers confirm quality of research

Peer-reviewed journal articles provide needed research findings to the scholarly community and contribute to ongoing discovery and innovation. When journals publish Clemson articles, they confirm the relevance of the work and declare it a worthwhile contribution that others should read. Clemson has greatly increased its scholarly productivity in this area over the past decade, increasing its relevance to the scholarly community. The charts below show the annual average number of publications by Clemson authors and the average number of citations of Clemson research over four-year periods.



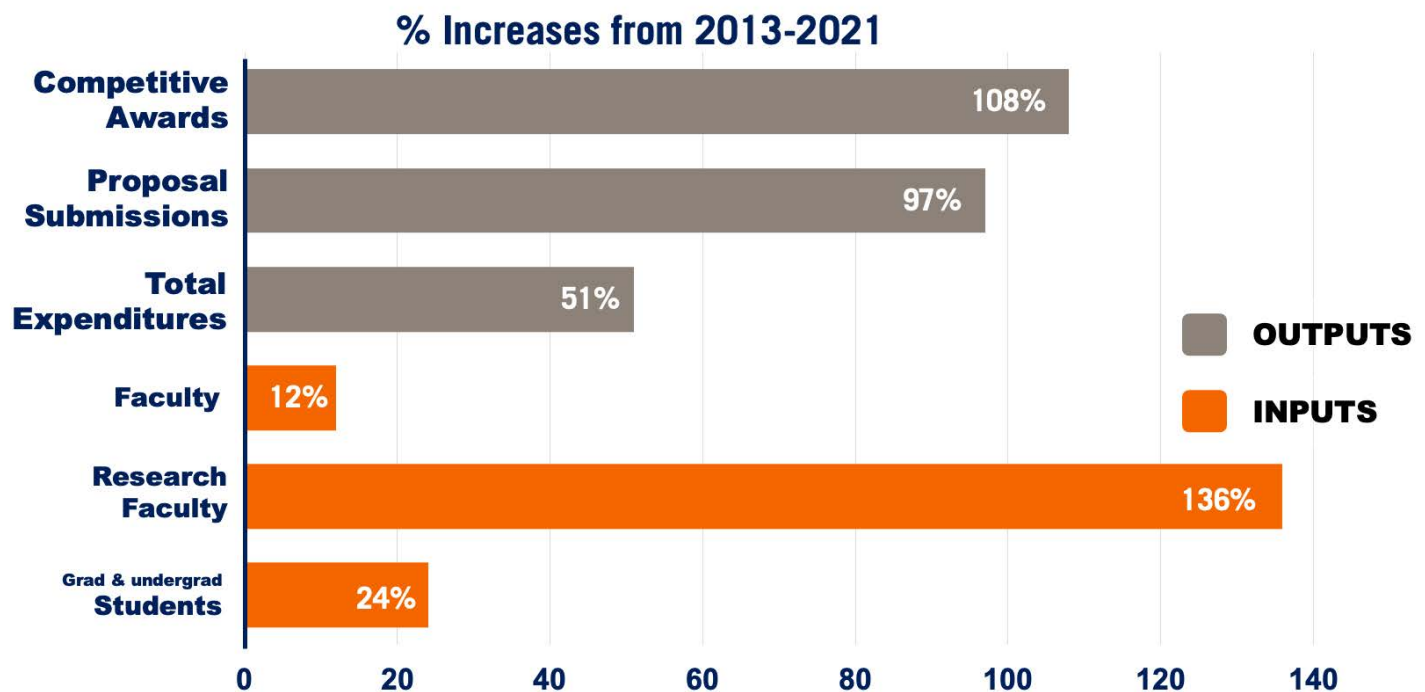
# Productivity increasing efficiently

To review research efficiency, we analyzed our productivity and have experienced notable improvements in the past seven years.

Research outputs, which are productivity measures including awards, submissions and expenditures, have been increasing at a greater percentage than our inputs, or the number of faculty members, students and research faculty who do the work.

In the chart below, the gray bar represents outputs, and the orange bar denotes inputs. The bars show growth from 2013 to 2021, the most recent fiscal year for which year-end data is available. Total expenditures compare 2013 to 2020 because year-end data is not year available for 2021.

The number of research faculty has increased substantially. Funds for those positions are covered by the grants and included in proposals submitted by faculty. The increase in research faculty is attributed to faculty members' increased success in earning competitively bid projects.



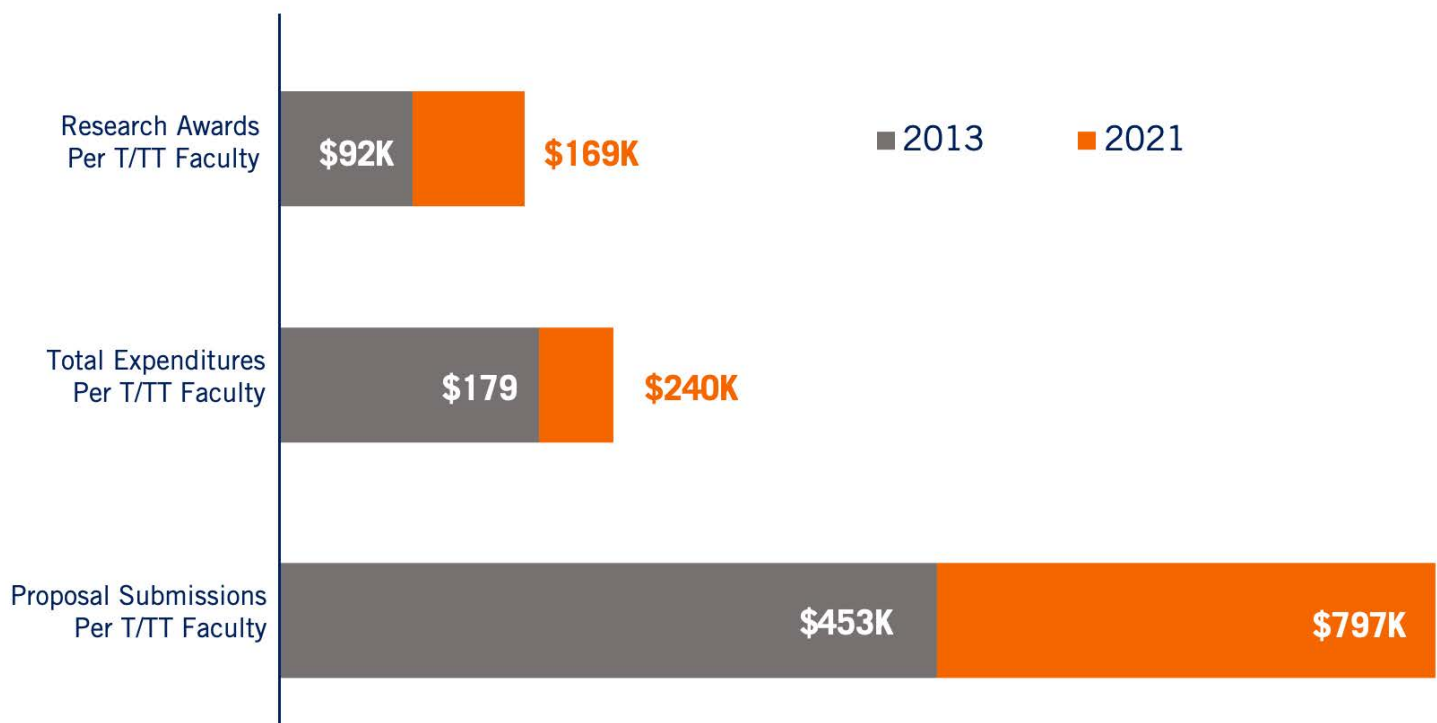


# Per-capita productivity shows efficient growth

To further review efficiency, we analyzed productivity on a per-capita basis.

We can see that on a per-capita basis, we are more productive than we were seven years ago.

In the chart below, the gray bar represents the per-capita output in 2013 and the orange bar represents the per capita output in 2021. Per-capita output is the number of awards, expenditures and proposal submissions per tenure/tenure-track faculty member. Data for total expenditures is for 2020 because 2021 data is not yet available.



T/TT = Tenure/Tenure Track Faculty

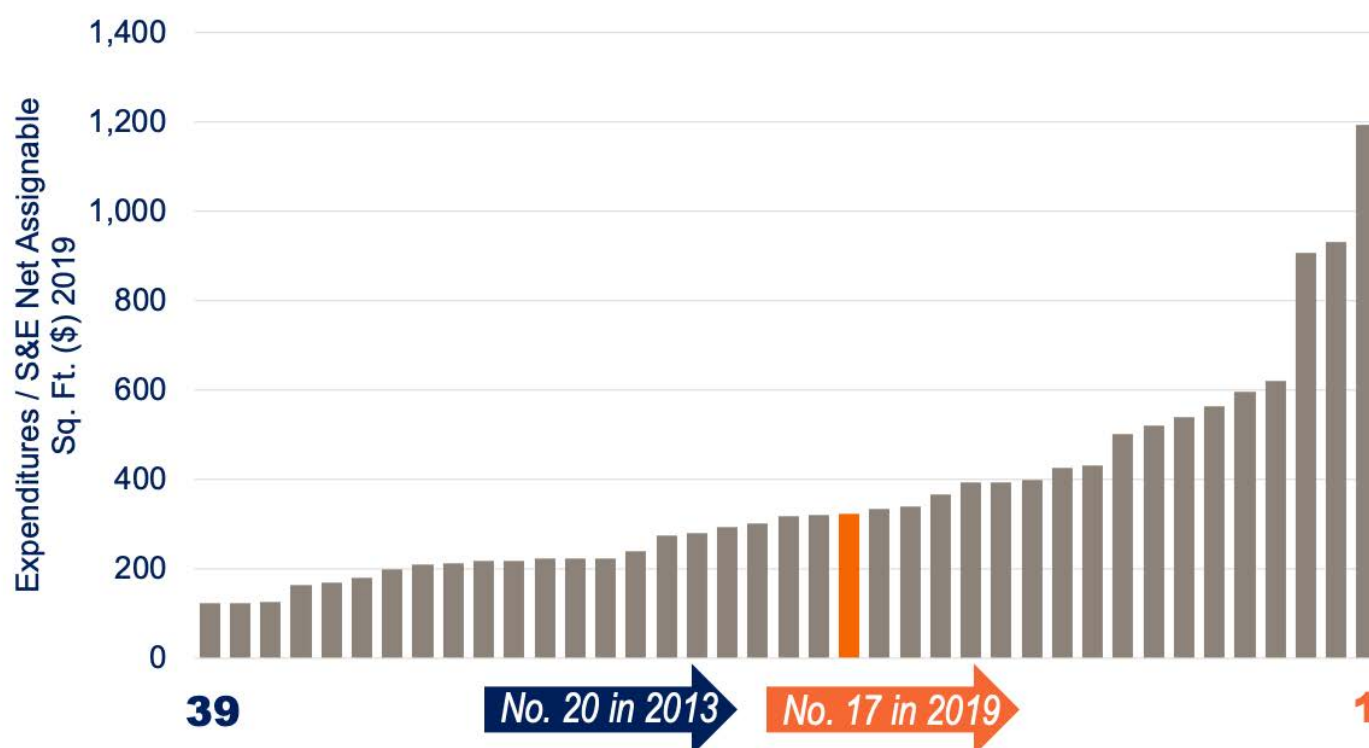
## Operating efficiently compared to peers

To analyze efficiency, we also compare ourselves to our peers institutions, which we define as public R1 universities without medical schools. The chart below includes expenditures per square footage of space assigned for Clemson (the orange bar) and our 39 peer R1 institutions.

As the chart below shows, we are slightly above average in expenditures per available space. Clemson is middle of the pack in this category, ranking No. 17. This was up three spaces from 2013 (No. 20) as our total expenditures have increased substantially.

To dig deeper, we plotted these institutions based on the size of the research workforce and the amount of available space to see if there was a correlation to production, or research expenditures (see the chart on the next page).

**Total Expenditures per Science & Engineering Net Assignable Space**



Source: NSF Higher Education Research and Development (HERD) Survey

# Productivity at available capacity

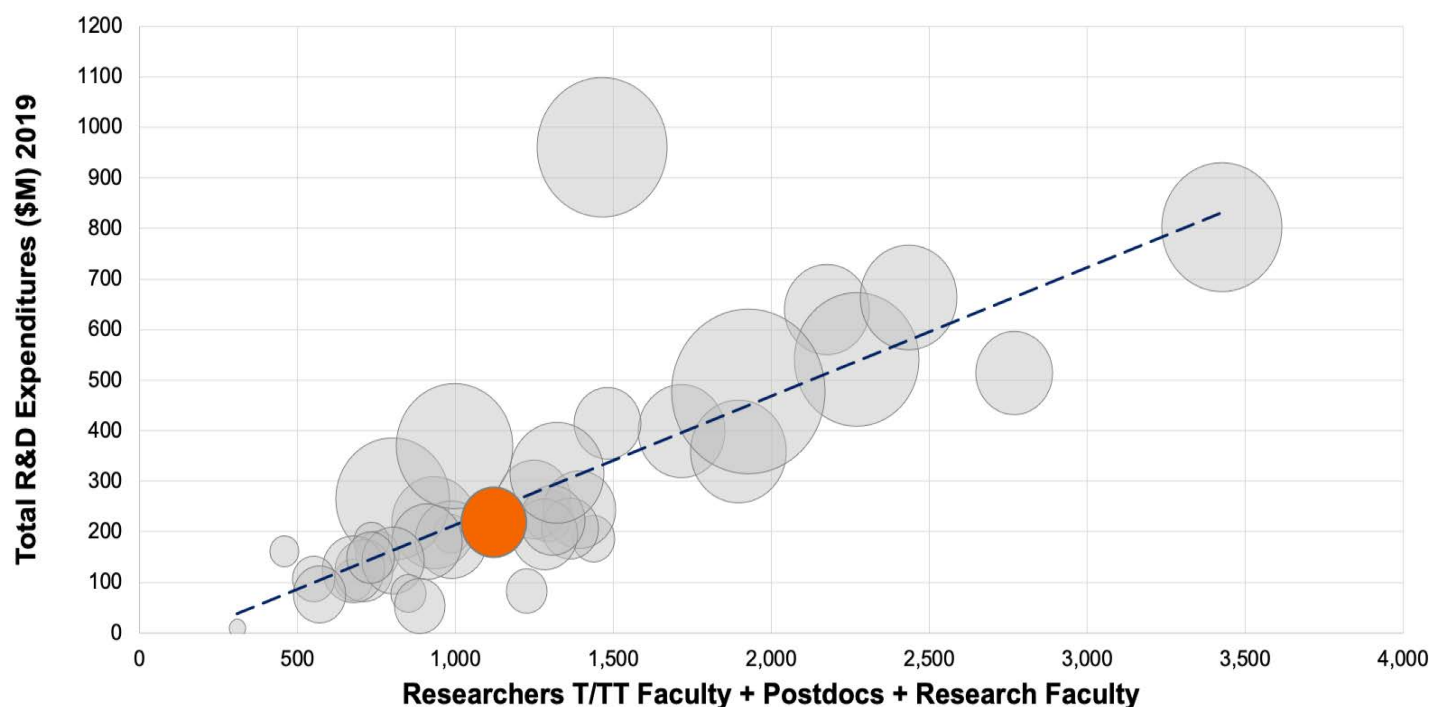
Growth in Clemson's research enterprise has been extraordinary and largely accomplished without an increase to the size of the faculty body or the number of researchers available to do the work. To estimate where Clemson can go from here, we can compare research activity (in this case signified by expenditures), the size of the research workforce and the space available to that of our peer institutions.

The chart below plots Clemson's peer R1 universities (similar public universities without medical schools) and Clemson (the orange bubble) based on number of researchers, amount of space available and total expenditures. The size of the bubble depicts research space available: the bigger the bubble, the more space.

When plotting universities this way, we see that universities with higher levels of expenditures also have larger faculty bodies and/or more available space. This suggests that Clemson is operating at its research capacity, so further research growth would require bold investments in space and faculty hiring.

## Total Expenditures by Researchers Per Science and Engineering Space:

The size of the bubble depicts amount of space; Clemson is the orange bubble



## Relevant research is highly cited

Citations of peer-reviewed journal articles typically accumulate over time. Some papers, however, grab the scholarly community's immediate attention. Web of Science, an independent database of scholarly activity, tracks publications and citations and denotes papers that received an unusually high number of citations shortly after publication as "Hot Papers." These articles are viewed as the key papers in their fields. In 2021, Clemson authors or co-authors were credited with publishing eight "Hot Papers," according to Web of Science. Brief descriptions of the articles are included below. Only Clemson authors are listed; to view the full article, including the full list of authors, click the links for each article.

### Hot Papers

These papers have been cited enough times to place them in the top 0.1% when compared to papers in the same field.

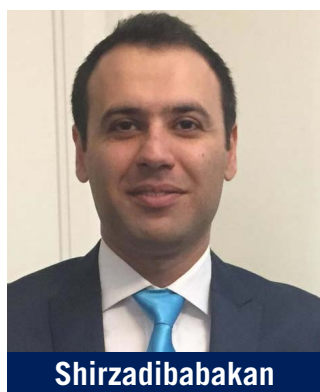


Browning

*Psychological impacts from COVID-19 among university students: Risk factors across seven states in the United States*

**Matthew Browning, assistant professor, College of Behavioral, Social and Health Sciences**

**Abstract:** The objectives of this study are to 1) identify the array of psychological impacts COVID-19 has on students, 2) develop profiles to characterize students' anticipated levels of psychological impact during the pandemic, and 3) evaluate potential sociodemographic, lifestyle-related, and awareness of people infected with COVID-19 risk factors that could make students more likely to experience these impacts. [Full Text](#)



Shirzadibabakan

*Urban expansion modeling using an enhanced decision tree algorithm*

**Ali Shirzadibabakan, PhD student, College of Business**

**Abstract:** Decision tree (DT) algorithms have been applied for classification and change detection in various geospatial studies and more recently, for urban expansion and land use/land cover (LULC) change modeling. The focus of this study is to enhance the performance of classification and regression tree (CART), one of the most efficacious DT algorithms, for urban expansion modeling. [Full Text](#)

*Cell-like-carbon-micro-spheres for robust potassium anode*

**Apparao Rao, endowed professor, College of Science**

**Abstract:** Large-scale low-cost synthesis methods for potassium ion battery (PIB) anodes with long cycle life and high capacity have remained challenging. Here, inspired by the structure of a biological cell, biomimetic carbon cells (BCCs) were synthesized and used as PIB anodes. This study represents a new strategy for boosting battery performance, and could pave the way for the next generation of battery-powered applications. [Full Text](#)

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# Relevant research is highly cited

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Rao

*Sulfur-assisted large-scale synthesis of graphene microspheres for superior potassium-ion batteries*

**Apparao Rao, endowed professor, College of Science**

**Abstract:** Large-scale low-cost preparation methods for high quality graphene are critical for advancing graphene-based applications in energy storage, and beyond. This papers presents a process that not require substrates and is scalable for continuous or semi-continuous production of graphene, paving the way for graphene-based energy storage devices. [Full Text](#)

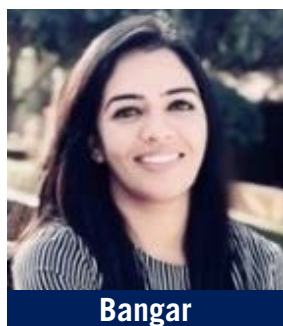


Zheng

*Recent advances in cellulose and its derivatives for oilfield applications*

**Ting Zheng, postdoctoral fellow, College of Engineering, Computing & Applied Sciences**

**Abstract:** The purpose of this review is to summarize and discuss the recent developments in exploring cellulose and its derivatives in the applications of oilfield chemicals for petroleum drilling and exploiting. [Full Text](#)



Bangar

*Development and Characterization of Fenugreek Protein-Based Edible Film*

**Sneh Punia Bangar, graduate research assistant, College of Agriculture, Forestry and Life Sciences (CAFLS)**

**Abstract:** The study demonstrated that the fenugreek protein concentrate film has influential characteristics and can be used as an edible packaging film. [Full Text](#)

*Evaluation of Nutritional, Phytochemical, and Mineral Composition of Selected Medicinal Plants for Therapeutic Uses from Cold Desert of Western Himalaya*

**Sneh Punia Bangar, graduate research assistant, CAFLS**

**Abstract:** The aim of this study was to determine the elemental and nutritive values of leaf parts of 10 selected wild medicinal plants collected from the high hills of the Chitkul range in district Kinnaur, Western Himalaya. [Full Text](#)

*Delineating the inherent functional descriptors and biofunctionalities of pectic polysaccharides*

**Sneh Punia Bangar, graduate research assistant, CAFLS**

**Abstract:** This review highlights various parameters considered important for describing the inherent properties and biofunctionalities of pectins in food systems. [Full Text](#)

# Patenting Relevant Innovations

Last year, the Clemson University Research Foundation (CURF) was able to assist faculty with securing 13 patents for technologies in areas ranging from chemistry to architecture, in an effort to advance innovation through protecting and developing university intellectual property. CURF connects Clemson researchers to external collaboration opportunities and manages the University's technology transfer.

Below is a complete list of inventors who received a patent in 2021.

**1. Rhett Smith (chemistry) and Andrew Tennyson (chemistry)** received a patent for their environmental technology that repurposes sulfur and lignocellulose waste. Their composite materials chemically modify covalent bonds for increased mechanical strength, chemical resistance, and reduced environmental contamination.

**2. Kyle Brinkman (material science and engineering)** secured a patent for his hydrogen separation technology that uses graphene-ceramic sheets for separation membranes. The graphene sheets lower membrane production costs, provide higher operating temperatures than palladium, and demonstrate greater resistance to oxidation and expansion than nickel.

**3. Goutam Koley (electrical and computer engineering), Md Saiful Islam (electrical engineering), and Hongmei Li (electrical engineering)** received a patent for their graphene-based ion sensitive field effect transistors that can selectively detect K<sup>+</sup> ions.

**4. Joseph Kolis (chemistry)** obtained a patent for his crystal growth method that utilizes a hydrothermal process to produce single crystals for use in high-power industrial lasers.

**5. Ying Mei (bioengineering)** received a patent for his research on introducing trace amounts of novel electrically conductive nanowires into cardiac spheroids. This approach advances the maturation of stem cells or progenitor cells to produce functional, biocompatible cardiomyocytes for the repair of damaged cardiac tissue.



**Chemistry Professor Joseph Kolis earned a patent for developing a method to produce crystals for use in industrial lasers.**



**Ramakrishna Podila, associate professor of physics and astronomy, earned a patent along with colleagues Herbert Behlow and Apparao Rao for the development of a portable, self-powered wireless sensor.**

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# Patenting relevant innovations

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**6. Leslie Sierad (bioengineering) and Dan Simionescu (bioengineering)** received a patent for their systems and methods that decellularize aortic valve roots and other smaller blood vessels. This innovation can lead to the creation of a tissue engineered heart valve root or blood vessel replacement.

**7. Joseph Choma (architecture)** secured a patent for his sequential manufacturing process of composites that can fabricate unique structures without the use of molds. This approach to the manufacturing of fiberglass eliminates the time and additional cost associated with traditional mold-making by selectively coating flat sheets of fiberglass with resin.

**8. Jeffrey Adelberg (horticulture)** obtained a patent for his development of a plant and tissue cassette that allows maize embryos to form calluses, be genetically transformed and accepted, and regenerate and form shoots in a liquid medium. This mechanical isolation helps to decrease labor costs in tissue transfers.

**9. Ying Mei (bioengineering)** received a patent for a bi-functional RGD peptide that helps identify ligands and improve functions of endothelial cells, allowing for the development of biomaterials to treat ischemic diseases.

**10. Jeremy Gilbert (bioengineering)** has secured a patent for his method of determining the complete frequency-dependent electrode impedance response. This method will make it easier to measure impedance of electrode systems in real-time and will significantly extend the range of frequencies beyond the range measured.

**11. Herbert Behlow (physics and astronomy), Ramakrishna Podila (physics and astronomy), and Apparao Rao (physics)** obtained a patent for their portable, self-powered wireless sensor that enables wireless transmission over a range of tens of meters without a motor or active power supply.

**12. Leslie Sierad (bioengineering), Dan Simionescu (bioengineering), Agneta Simionescu (bioengineering), and William "Bill" Delaney (electrical and computer engineering)** have secured a patent for their development of a device used to hold natural or synthetic valves under constant force by a self-adjustable spring. This provides a means to transfer a heart valve product safely and securely from device to device by holding that heart valve tissue under constant pressure without risk of tearing.

**13. Igor Luzinov (materials science and engineering) and Lurii Bandera (center for optical materials science and engineering technologies)** have secured a patent for an innovative polymer that can be programmed to decaffeinate a beverage manually or automatically within one minute or less or select a level of decaffeination by controlling the exposure time to said devices.

## Innovation By The Numbers

Numbers below include data from  
FY2017-2022

# 328

Invention Disclosures

# 98

Patents  
Issued

# 77

Licenses/  
Options

# \$2.3M

Licensing  
Revenue

# Relevant projects impacting communities

*The articles on the following pages provide examples of research projects at Clemson that aim to impact the community.*

## **Clemson's Historic Preservation program empowering African American communities to present and protect their stories**

Clemson University's Master of Science in Historic Preservation program is the recipient of two grants that will support local community organizations working to preserve African American history in South Carolina.

"In both cases, we're leveraging our expertise to help communities to protect their own heritage," said Jon Marcoux, associate professor and director of Clemson's graduate program in Historic Preservation. "This is a collaboration. We're going to build capacity for people to tell their own stories."

The first grant, from the Gaylord and Dorothy Donnelly Foundation, will support a partnership between Clemson's Historic Preservation program and Warren Lasch Conservation Center (WLCC) and the Seashore Farmer's Lodge on Sol Legare Island.

The Seashore Farmers Lodge is a historic site for South Carolina's Gullah Geechee community. In the early 1900s, the Farmer's Lodge was an important social center. The lodge has been restored and repurposed as a museum in recent years. The \$100,000 grant from the Gaylord and Dorothy Donnelly Foundation will support the development of an education program for volunteers and community members at the Seashore Farmer's Lodge to preserve historical artifacts. It will also support the conservation of high-priority historical items by the WLCC.

"The Seashore Farmers Lodge will benefit from this partnership because it will allow us to train and educate the community at large," said Ernest Parks, chief curator of the Seashore Farmer's Lodge. "Part of the program is to have the community members come in and be educated on how to preserve historical artifacts, organize and take stock of their collections, thus empowering the Seashore Farmers Lodge Museum and Cultural Center to take care of itself through community involvement."

The second grant, from the Vernacular Architecture Forum and the Andrew W. Mellon Foundation, will support the John's Island Community Field School. The \$250,000 grant will provide scholarships for approximately ten undergraduate college students or residents with cultural ties to Gullah Geechee communities to attend a three-week summer field school, learning to document historic structures from the Reconstruction and Civil Rights eras on John's Island. [READ MORE](#)



**The Seashore Farmers Lodge is a historic site for South Carolina's Gullah Geechee community. In the early 1900s the Farmer's Lodge was an important social center. The lodge has been restored and repurposed as a museum in recent years.**

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# Relevant projects impacting communities

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## Clemson counseling program infuses curriculum with addiction-focused learning

The counselor education program at Clemson University has received grant funding to infuse its curriculum with content that will enhance counselors' knowledge and awareness of substance use disorders. The funding comes from the Substance Abuse and Mental Health Services Administration (SAMHSA), a branch of the U.S. Department of Health and Human Services.

The six Upstate counties surrounding Clemson University fall within the top 10 counties in the state with the highest need for treatment related to alcohol, marijuana, opioid, cocaine or amphetamine. Four of the counties also fall within the top five counties in the state for the highest need for treatment related to these substances.

Use of state-funded treatment services increased 135% in South Carolina between 2006 and 2016. According to Corrine Sackett, principal investigator on the grant and associate professor in the College of Education that houses the program, this increase in demand for services combined with the historically large presence of Clemson graduates working in the counseling field in the Upstate meant an augmented curriculum was needed and would be immediately effective.



**Sackett**

"These alarming numbers support the need for counselors in the region who are trained to deliver high-quality screening, assessment, referral and treatment," Sackett said. "Around 70% of graduates from our programs practice in the Upstate, and a large portion of them practice in settings that treat substance use disorders, so we know our graduates will put this knowledge to use immediately."

The addiction focused learning has been infused into the core curriculum of the counselor education program, benefiting both clinical mental health counseling and school counseling students.

Students in the counselor education program have worked to increase their capacity to identify and treat substance use disorders through the integration of instructional video modules into core curriculum courses.

Megan Quackenbush, a student and graduate assistant in the program, works to film and edit role-plays and interviews that are used in the curriculum's modules. She has worked as an educator and counselor as well as a children's yoga and mindfulness instructor, but she decided to pursue the counseling program because she sees it as a marriage of both mindfulness training and education.

[READ MORE](#)



**Nelson Jones (left) from the Phoenix Center facilitates a process group with members of his supervision team.**

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# Relevant projects impacting communities

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## Researchers to fight online disinformation by creating digital literacy tools

Faculty from the Clemson University College of Behavioral, Social and Health Sciences and College of Business are part of a multidisciplinary team of researchers developing digital literacy tools to help curb the negative effects of online disinformation.

Darren Linvill, associate professor in the Department of Communication, and Patrick Warren, associate professor in the Department of Economics, join a team of researchers led by Siwei Lyu, Empire Innovation Professor of Computer Science and Engineering at the University of Buffalo. They have received a \$750,000 grant from the National Science Foundation's Convergence Accelerator, a program that builds upon basic research and discovery to accelerate solutions toward societal impact.

Linvill and Warren will aid in the creation of content and lessons that help all audiences identify online disinformation. While others on the research team will focus on delivering the content to younger audiences, Linvill and Warren will spearhead its delivery to an older audience once the tools are ready to be disseminated. He said the data concerning online disinformation clearly shows that both groups are equally important and should be addressed in different ways.

"Even many experts who study disinformation haven't internalized the fact that older Americans spread disinformation seven or eight times more often than younger Americans," Linvill said. "Essentially, my students' grandparents need these tools more than my students do."

The research team includes experts in artificial intelligence, the humanities, information science and other fields. In addition to the University of Buffalo and Clemson, they hail from the University of Illinois Urbana-Champaign, Lehigh University and Northeastern University.

The project — titled Disinformation Range to Improve User Awareness and Resilience to Online Disinformation — centers on developing a suite of digital literacy tools and advanced educational techniques to reduce the harmful effects of online disinformation. Researchers plan to have a prototype ready this summer when they will share it with senior citizens and teenagers.

"Just as a vaccine inoculates individuals from a virus, we want to inoculate media consumers from disinformation," Lyu said. "Inoculated users form the first line of defense against the spread of corrupted and misleading information." [READ MORE](#)



**Patrick Warren (left) and Darren Linvill's research have been featured in numerous international publications for their expertise on online disinformation.**

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# Relevant projects impacting communities

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## Clemson releases MyIPM for Row Crops app

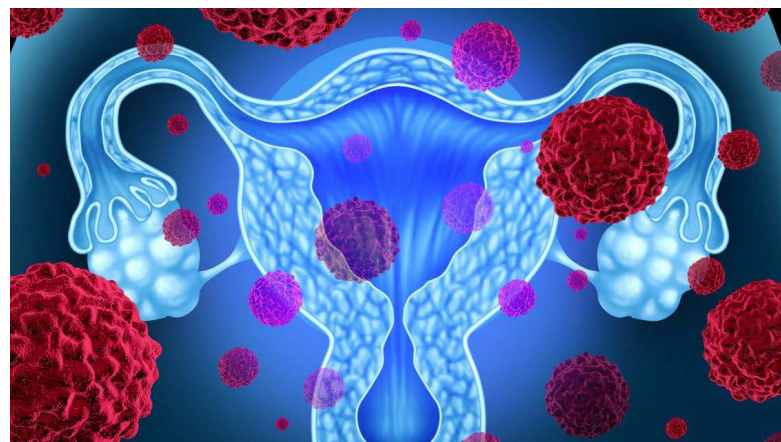
Farmers have a new tool this year to help identify and defeat diseases and pests in their row crops. A MyIPM for Row Crops app was developed at Clemson University in collaboration with specialists from a number of Land-Grant universities and the Southern IPM Center.

This free smartphone app is available for Android smartphones in the Google Play Store and for iPhones in the Apple Store. It includes descriptions and photos of key pests and diseases of row crops, as well as information on integrated pest management strategies, including registered pesticides for each pest.

“The app currently includes sections on insects in corn, cotton, grain sorghum, peanut and soybean,” said Tim Bryant, assistant coordinator for the Clemson Integrated Pest Management (IPM) Program. “It also includes information about diseases in peanut.”

Additional sections on other pests and crops will be added in the future.

This new app is part of the MyIPM Smartphone App series originally developed in 2012 by Clemson professor Guido Schnabel and released by the Clemson College of Agriculture, Forestry and Life Sciences for management of diseases in several fruit crops. [READ MORE](#)



## Identification of gene networks involved in uterine cancer could lead to better treatment options

No single gene causes uterine cancer, the fourth most common cancer among women, which is on the rise in the U.S.

That’s why Clemson University geneticist Allison Hickman’s research focused on identifying networks of genes involved in uterine cancer that could be potential targets for more effective drug therapies.

The American Cancer Society estimates that nearly 66,000 women in the U.S. receive uterine cancer diagnoses this year. More than 12,500 women will die from the disease in 2022.

Using data from publicly available genomic databases, a mathematics-based distribution algorithm and Knowledge Independent Network Construction (KINC) software developed by her professor Alex Feltus in collaboration with Clemson alumnus and current Washington State University Assistant

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# Relevant projects impacting communities

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Hickman

Professor Stephen Ficklin, Hickman built condition-specific biomarker systems for normal uterine tissue and two subtypes of uterine cancer — endometrial cancer, the most common type, and uterine carcinosarcoma, which is more rare, aggressive and deadly.

These systems allow for a more comprehensive look into the biological networks and pathways affected in uterine cancer than single-gene analyses done in previous studies.

“We’re looking for patterns. In this study, we were able to distinguish genes that had different relationships in uterine cancer than they did in normal uterine tissue,” said Hickman, who earned her Ph.D. in genetics from Clemson in December. “The ultimate goal is to gain a better understanding of what’s happening biologically at the cellular level in these cancers so it can lead to better treatment in the future.”

No one gene determines whether a person will develop cancer. Rather, it’s a complex system of genes.

Hickman’s study found 11 high priority genes associated with uterine cancer. Those genes are potential targets for drug therapies. [READ MORE](#)

## New simulators could help medical professionals prepare for the day it really counts

Doctors, nurses and patient care technicians have incredibly important jobs. They relieve suffering, nurture people back to health and literally save lives.

It’s no question they should have the highest quality education, but some of their skills have been taught the same way for years, even though technology offers new opportunities for enhanced learning.

For Joseph Singapogu of Clemson University, the gap was an opportunity.

Singapogu, an assistant professor of bioengineering, works with a team of graduate students and collaborators from around the country to develop new simulators aimed at taking medical education to the next level.

The simulators are outfitted with cameras and sensors to collect data that provide students and their instructors with meaningful metrics about how well they are learning the skills they need to treat patients effectively.

Among those simulators is one that would help vascular surgeons learn to suture blood vessels and two that could help patient care technicians find fistulas, the vein-and-artery combination that serves as lifelines for dialysis patients. [READ MORE](#)



Joseph Singapogu (left) works with master’s student Devansh Shukla.

# RESEARCH METRICS

This section covers institutional research productivity with data on proposal submissions, awards and expenditures.

## Executive Summary

- *Information in this section covers research activity through the first three quarters of Fiscal Year 2022, the latest period for which data was available.*
- *Total R&D expenditures, which include funds from all research revenue, have increased 56% since 2013 ([page 22](#)).*
- *Competitive expenditures, which include funds from competitively bid awards, are up 28% compared to the same period a year ago ([page 23](#)).*
- *Proposal submissions remain strong as faculty continue to pursue high-value projects ([page 24](#)).*
- *Research awards were \$97 million through the first three quarters ([page 25](#)).*
- *Clemson faculty have earned numerous high-value grants. Descriptions of the 10 highest value grants are on [pages 26-27](#).*
- *The research report card provides additional information, including research metrics per college, innovation cluster and business unit ([pages 28-31](#)).*

# Total R&D expenditures continue to increase

The latest National Science Foundation Higher Education Research and Development (HERD) Survey has been released, providing total R&D expenditure data for 2021.

Clemson's total R&D expenditures continued to increase in 2021, as shown in the chart below. This data includes expenditures on all research revenue, including state support, gifts, external research services, competitive awards, and other sources.

The HERD Survey is the primary source of information on research and development expenditures at U.S. colleges and universities. The survey collects information on R&D expenditures by field of research and source of funds and also gathers information on types of research, expenses, and headcounts of R&D personnel.

Total R&D expenditures from the HERD Survey are used in the Carnegie Classification and allow for an apples-to-apples compares of research expenditures at peer Carnegie R1 institutions.

## ► FY2013-2021 Total Expenditures



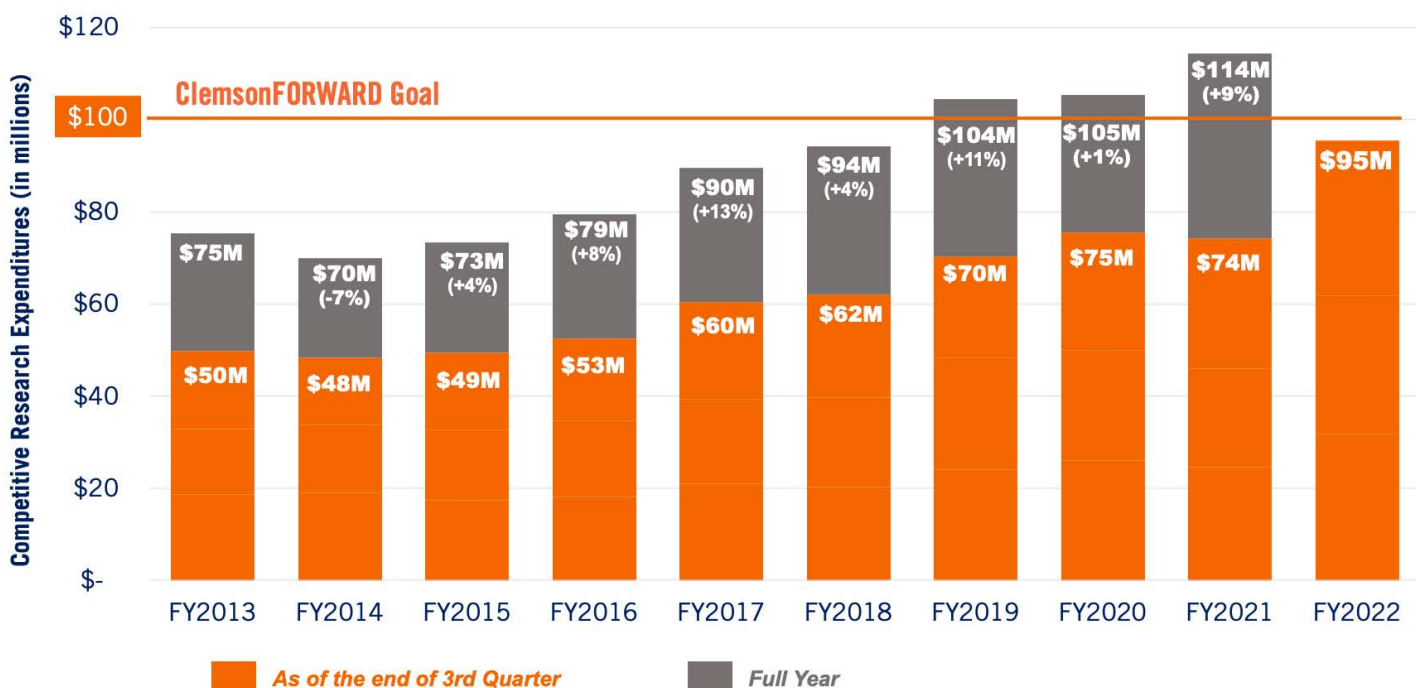
**SOURCE: NSF Higher Education Research and Development (HERD) Survey**

# Competitive expenditures up from prior year

Clemson recorded its highest level of competitive expenditures of the past decade during the first three quarters of the fiscal year 2022. Competitive expenditures are up nearly 28 percent at \$95 million when compared to the same three quarters of the prior fiscal year. The chart below displays competitive expenditures for the first three quarters of each year in the orange bar. The gray bar displays full year-end data.

Competitive expenditures include funds only from competitively bid projects, such as highly competitive federal grant awards. In the ClemsonForward strategic plan, Clemson University aimed to surpass \$100 million in annual competitive expenditures by 2026. Clemson achieved that goal (marked on the graph below with an orange line) seven years ahead of schedule in 2019 and notched more than \$100 million in competitive expenditures again in fiscal years 2020 and 2021. FY2022 is off to a strong start.

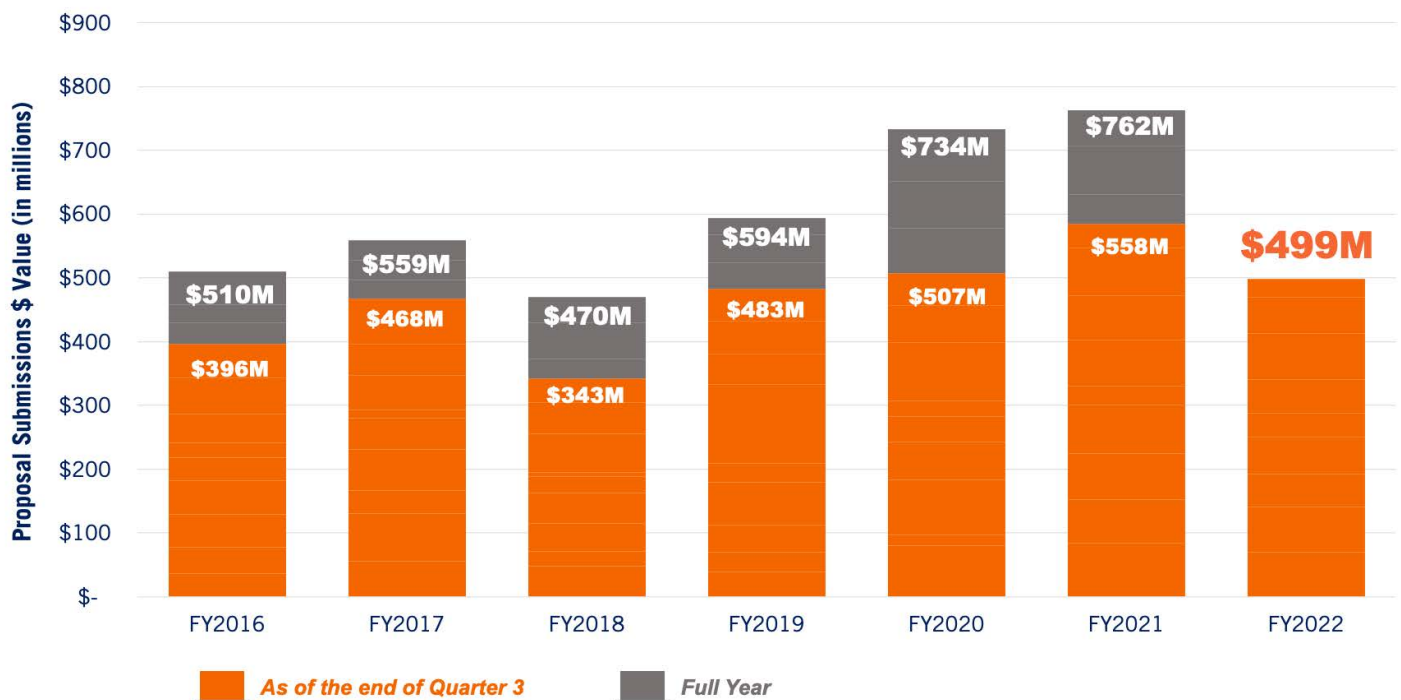
## FY2013-2022 Competitive Research Expenditures



# Proposal submissions

The orange bar in the first chart below displays proposal submissions through the first three quarters of each fiscal year. The gray bar displays year-end data.

## ► FY2016-2022 Proposal Submissions

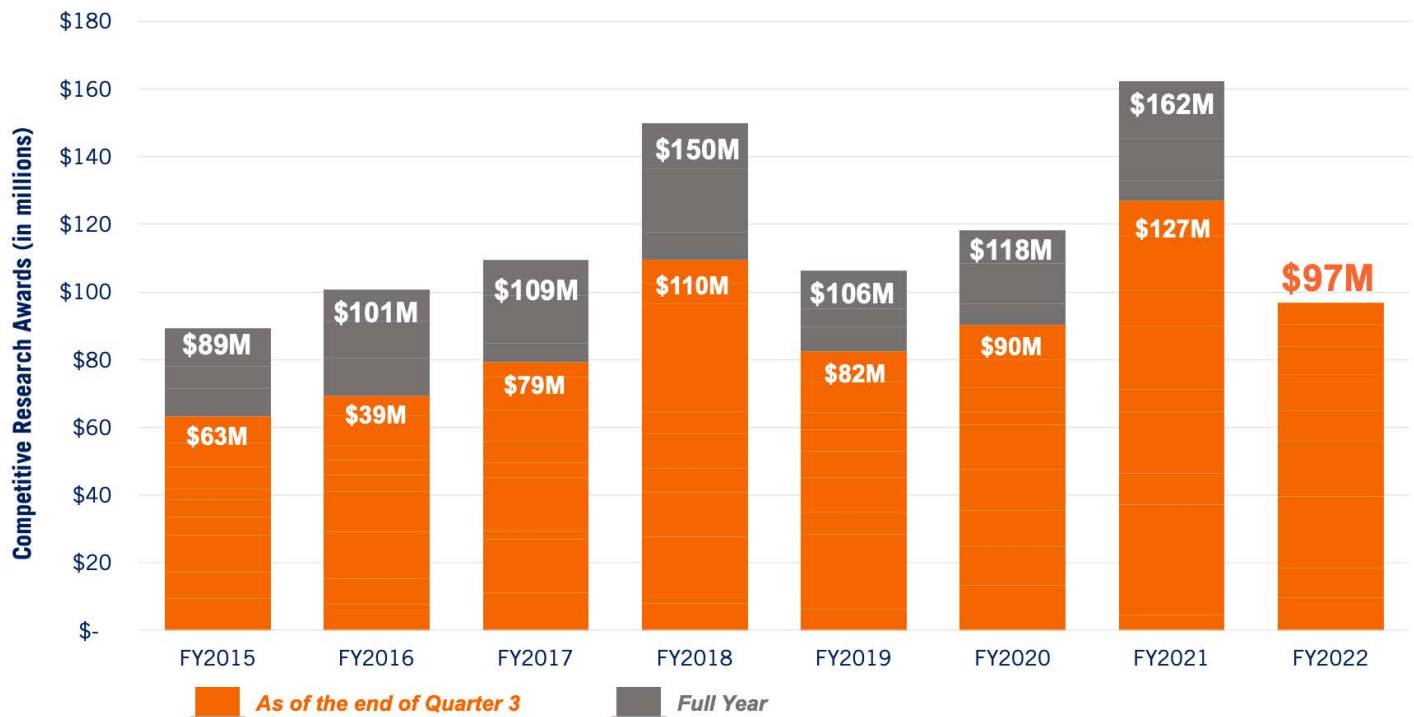




# Competitive Research Awards

Funding agencies continue to reward relevant, high-quality proposals and ideas from Clemson faculty. In particular, Clemson faculty are earning higher value awards of \$2 million and more, as shown in the graphic at the bottom of the page. This is fueling an ongoing upward trajectory in research awards received, as shown in the chart below. FY2021 was particularly strong with awards up 37 percent from the prior year. The orange bar displays awards received during the first three quarters of each fiscal year. The gray bars display year-end data.

## FY2015-2022 Competitive Research Awards



## Earning High-Dollar Awards

**71**

**RESEARCH AWARDS  
OF AT LEAST \$2M  
WON SINCE 2015**

**THE TOTAL  
VALUE OF THESE  
PROJECTS IS**

**\$312  
MILLION**

## Top Competitive Awards (received March 5-June 5, 2022)



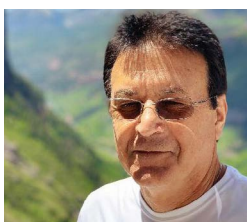
Timmons

**Shirley Mae Timmons, professor of nursing, received \$2.7 million from the S.C. Department of Health and Environmental Control** for a project aimed at growing the state's public health workforce. The project will be housed in the School of Nursing's Student Nurses Association and will assess curricula to better incorporate emergency preparedness and response training for healthcare professionals and students.

**Trudy Mackay, endowed chair and director of the Center for Human Genetics, received \$2.5 million from the National Institutes of Health (NIH)** for a project to help uncover the genetic causes of addiction. Illegal use of cocaine and other drugs is a worldwide health problem. In humans, susceptibility to the effects of cocaine and other drugs has a strong genetic component, but little progress has been made in identifying the underlying variants and genes.



Mackay



Alexov

**Emil Alexov, professor of physics and astronomy, received \$1.5 million from the NIH** for research on novel methods of modeling macromolecular thermodynamic properties, such as stability, dynamics and interactions, which is essential for revealing details of biochemical processes occurring in the cell and further for figuring out what molecular effects are causing diseases. Understanding the major disease-causing effects facilitates development of therapeutic solutions.

**Paige Rodeghero, assistant professor of computer science, received \$1.1 million from the National Science Foundation (NSF)** for a project to prepare and motivate autistic students to build career paths in software development. This project provides autistic students with opportunities to engage in informal STEM learning activities outside of regular school offerings. Learning activities will be designed to be remote to investigate important concerns for workforce development.



Rodeghero



Madathil

**Kapil Madathil, associate professor of industrial and civil engineering, received \$1 million from NSF** to support a workforce development initiative to support the electric vehicle industry. This collaborative projects involves Trident Technical College, Spartanburg Community College, Greenville Technical College, and the NSF ATE Center for Aviation and Automotive Technological Education using E-Learning.

continued on next page ►

# Top Competitive Awards (received March 5-June 5, 2022)

► continued from previous page



Mobley

**Catherine Mobley, professor of sociology, received \$867,066 from NSF** for a project to support the success and retention of social and behavioral scientists in STEM. The study addresses the growing societal need for a STEM social and behavioral science workforce trained to collaborate in efforts to address society's complex challenges, such as climate change, public health threats and technological vulnerabilities.

**Vidya Suseela, assistant professor of soil ecology, received \$789,857 from the U.S. Department of Agriculture (USDA)** for research on more sustainable fertilizer production. The high-energy consumption for fertilizer manufacturing, coupled with the rapid depletion of raw materials for fertilizer production, undermines the sustainability of current agricultural practices. The symbiosis of plants with arbuscular mycorrhizal fungi (AMF) could enhance the overall productivity of crops by aiding in plant resource foraging.



Suseela



Chen

**Huan Chen, a research assistant professor of environmental engineering and earth sciences, received \$749,612 from the USDA** for research on growing microalgae in livestock wastewater as method of nutrient recycling, antibiotic removal and potential biofuel production. This project will identify effective microalgae strains, optimize the controlling factors for nutrient and antibiotic removals, and develop process models for prediction and optimization.

**Vidya Suseela, assistant professor of soil ecology, also received \$649,898 from the USDA** for research on enhancing drought resilience of crops. The study seeks to identify and transfer the beneficial microorganisms from the roots of native grasses to corn. The microbial communities around plant roots can stimulate plant growth and enhance plant tolerance to environmental stress such as drought.



Suseela



Melgar

**Juan Carlos Melgar, associate professor of pomology, received \$615,466 from the USDA** to develop tools to assist plant breeders in rapidly combining climate-resilient traits into new cultivars of stone fruits. This project will also provide evidence to support stakeholder decisions to establish new orchards or maintain existing orchards.

# Research Report Card (through Third Quarter FY2022)

INDEX

**CAAH:** College of Architecture, Arts & Humanities

**CAFLS:** College of Agriculture, Forestry & Life Sciences

**CBSHS:** College of Behavioral, Social & Health Sciences

**CECAS:** College of Engineering, Computing & Applied Sciences

**COE:** College of Education

**COB:** College of Business

**COS:** College of Science

**CCIT:** Clemson Computing & Information Technology

**PSA:** Public Service & Agriculture

|   |                             | 2013   | 2014   | 2015    | 2016    | 2017    | 2018    | 2019     | 2020    | 2021     | 2022<br>3rd Quarter |                           |
|---|-----------------------------|--------|--------|---------|---------|---------|---------|----------|---------|----------|---------------------|---------------------------|
| a. Proposal Submissions by Number                     |                             | 1,414  | 1,443  | 1,489   | 1,478   | 1,529   | 1,451   | 1,417    | 1,729   | 1,583    | 1,069               |                           |
| 1   | CAAH                        | 38     | 51     | 65      | 62      | 69      | 64      | 69       | 76      | 61       | 32                  |                           |
| 2   | CAFLS                       | 235    | 230    | 224     | 222     | 241     | 229     | 377      | 473     | 401      | 275                 |                           |
| 3   | CBSHS                       | 81     | 93     | 102     | 104     | 112     | 101     | 105      | 143     | 151      | 106                 |                           |
| 4   | CECAS                       | 549    | 555    | 582     | 617     | 618     | 587     | 562      | 672     | 596      | 420                 |                           |
| 5   | COE                         | 51     | 54     | 39      | 45      | 46      | 37      | 39       | 42      | 37       | 38                  |                           |
| 6   | COB                         | 7      | 15     | 13      | 15      | 7       | 10      | 5        | 11      | 14       | 9                   |                           |
| 7   | COS                         | 242    | 247    | 263     | 239     | 230     | 227     | 186      | 219     | 229      | 137                 |                           |
| 8   | CCIT                        | 12     | 12     | 6       | 3       | 5       | 1       | 1        | 1       | -        | 1                   |                           |
| 9   | PSA                         | 88     | 90     | 118     | 97      | 170     | 163     | 33       | 37      | 26       | 18                  |                           |
| 10  | VP for Res & Interdisc Inst | 31     | 17     | 7       | 17      | 14      | 12      | 25       | 29      | 29       | 19                  |                           |
| 11  | All Other                   | 80     | 79     | 70      | 57      | 17      | 20      | 15       | 26      | 39       | 14                  |                           |
| b. Proposal Submissions by Dollar Value (in millions) |                             | \$386M | \$547M | \$507M  | \$510M  | \$559M  | \$470M  | \$594M * | \$734M  | \$762.4M | \$499M              | <b>FY2022<br/>Targets</b> |
| 12  | CAAH                        | N/A    | N/A    | \$9.4   | \$8.6   | \$3.1   | \$5.7   | \$4.4    | \$5.9   | \$5.6    | \$6.3               | <b>\$7.7</b>              |
| 13  | CAFLS                       | N/A    | N/A    | \$42.6  | \$23.8  | \$43.4  | \$37.1  | \$68.4   | \$92.9  | \$84.1   | \$59.6              | <b>\$70.9</b>             |
| 14  | CBSHS                       | N/A    | N/A    | \$28.4  | \$40.1  | \$41.4  | \$25.9  | \$87.5   | \$41.1  | \$64.3   | \$49.8              | <b>\$53.1</b>             |
| 15  | CECAS                       | N/A    | N/A    | \$260.5 | \$281.2 | \$306.4 | \$235.5 | \$255.3  | \$405.9 | \$342.9  | \$243.2             | <b>\$338.7</b>            |
| 16  | COE                         | N/A    | N/A    | \$13.8  | \$14.7  | \$18.1  | \$19.1  | \$10.1   | \$18.9  | \$22.4   | \$27.0              | <b>\$16.5</b>             |
| 17  | COB                         | N/A    | N/A    | \$7.5   | \$4.3   | \$2.8   | \$1.8   | \$2.1    | \$2.9   | \$4.2    | \$2.8               | <b>\$2.5</b>              |
| 18  | COS                         | N/A    | N/A    | \$100.2 | \$111.3 | \$95.9  | \$100.4 | \$73.8   | \$129.3 | \$175.4  | \$90.6              | <b>\$106.5</b>            |
| 19  | CCIT                        | N/A    | N/A    | \$4.3   | \$2.0   | \$4.0   | \$0.9   | \$4.6    | \$3.0   | \$0.02   | \$0.1               | -                         |
| 20  | PSA                         | N/A    | N/A    | \$23.3  | \$10.4  | \$31.3  | \$25.8  | \$11.4   | \$6.4   | \$5.6    | \$6.9               | <b>\$17.2</b>             |
| 21  | VP for Res & Interdisc Inst | N/A    | N/A    | \$5.6   | \$7.7   | \$6.0   | \$12.7  | \$68.5   | \$19.8  | \$22.3   | \$9.5               |                           |
| 22  | All Other                   | N/A    | N/A    | \$11.4  | \$5.6   | \$6.0   | \$5.0   | \$7.4    | \$7.7   | \$35.7   | \$3.3               |                           |

\*This figure includes a large \$107M proposal

# Research Report Card (through Third Quarter FY2022)

|                                       |  | 2013    | 2014    | 2015    | 2016     | 2017     | 2018     | 2019     | 2020     | 2021   | 2022<br>3rd Quarter |
|---------------------------------------|--|---------|---------|---------|----------|----------|----------|----------|----------|--------|---------------------|
| c. Research Awards (in millions)      |  | \$78.0M | \$79.7M | \$89.3M | \$100.9M | \$109.5M | \$149.8M | \$106.3M | \$118.3M |        | \$96.7M             |
| 23                                    | CAAH   | \$0.2   | \$0.6   | \$0.7   | \$1.4    | \$0.5    | \$1.9    | \$2.0    | \$1.4    | \$1.4  | \$0.9               |
| 24                                    | CAFLS  | \$7.3   | \$6.7   | \$14.1  | \$8.6    | \$10.9   | \$13.9   | \$14.2   | \$22.3   | \$24.2 | \$13.3              |
| 25                                    | CBSHS  | \$2.7   | \$3.4   | \$4.8   | \$5.1    | \$4.6    | \$8.1    | \$5.9    | \$7.7    | \$17.4 | \$4.8               |
| 26                                    | CECAS  | \$34.2  | \$37.7  | \$48.2  | \$45.5   | \$54.0   | \$80.8   | \$50.4   | \$48.0   | \$75.0 | \$50.7              |
| 27                                    | COE  | \$2.6   | \$4.1   | \$3.2   | \$2.9    | \$2.8    | \$4.5    | \$3.3    | \$2.3    | \$5.1  | \$3.8               |
| 28                                    | COB  | \$2.0   | \$1.1   | \$1.3   | \$0.8    | \$1.2    | \$1.1    | \$0.8    | \$1.2    | \$0.2  | \$0.9               |
| 29                                    | COS  | \$10.3  | \$7.8   | \$9.9   | \$15.6   | \$19.9   | \$14.7   | \$18.7   | \$14.2   | \$25.4 | \$10.3              |
| 30                                    | CCIT   | \$1.6   | \$5.7   | \$0.7   | \$0.8    | \$0.5    | \$1.3    | \$0.1    | \$0.3    | \$0.7  | \$0.2               |
| 31                                    | PSA  | \$14.8  | \$12.3  | \$9.6   | \$13.0   | \$7.9    | \$6.6    | \$4.0    | \$4.1    | \$5.8  | \$5.9               |
| 32                                    | VP for Res & Interdisc Inst                        | \$1.8   | \$0.3   | \$0.6   | \$5.1    | \$5.0    | \$15.1   | \$6.2    | \$14.6   | \$5.1  | \$5.2               |
| 33                                    | All Other  | \$0.3   | \$0.2   | \$1.2   | \$2.0    | \$1.2    | \$1.7    | \$0.7    | \$2.2    | \$1.9  | \$0.6               |
| d. National Young Investigator Awards |  | 4       | 3       | 4       | 7        | 9        | 8        | 6        | 10       | 10     |                     |
| 34                                    | NSF CAREER Awards (by start date)                  | 4       | 1       | 3       | 5        | 7        | 7        | 4        | 6        | 9      | 1                   |
| 35                                    | NIH KO1  | -       | -       | -       | -        | 1        | 1        | -        | 1        | -      | -                   |
| 36                                    | Air Force Young Investigator Awards                | -       | -       | 1       | 2        | 1        | -        | 1        | -        | -      | -                   |
| 37                                    | Army Young Investigator Awards                     | -       | -       | -       | -        | -        | -        | -        | 1        | -      | -                   |
| 38                                    | DARPA Young Investigators Awards                   |         |         | -       | -        |          | -        | -        | 1        | -      | -                   |
| 39                                    | EPA Early Career Awards                            | -       | -       | -       | -        | -        | -        | 1        | -        | -      | -                   |
| 40                                    | DOE Early Career Awards                            | 1       | -       | -       | -        | -        | -        | -        | -        | 1      | -                   |
| 41                                    | Department of Homeland Security                    | -       | 1       | -       | -        | -        | -        | -        | -        | -      | -                   |
| 42                                    | Dept. of Ed. Inst. of Educational Sciences         | -       | -       | -       | -        |          | -        | -        | 1        | -      | -                   |
| e. Supporting Workforce               |  |         |         |         |          |          |          |          |          |        |                     |
| 43                                    | Graduate Student Enrollment                        | 4,206   | 4,372   | 4,670   | 4,664    | 4,425    | 4,985    | 5,282    | 5,627    | 5,538  | 5,448               |
| 44                                    | Sponsored Graduate Research Assistants             | 822     | 745     | 707     | 693      | 696      | 761      | 558      | 637      | 546    | 650                 |
| 45                                    | Postdoctoral Fellows                               | 48      | 64      | 83      | 85       | 90       | 97       | 98       | 98       | 106    | 103                 |
| 46                                    | Research Faculty: Permanent 100%<br>Non-E&G Funded | 6       | 6       | 6       | 11       | 17       | 14       | 11       | 18       | 12     | 2                   |
| 47                                    | Research Faculty: Temporary 100%<br>Non-E&G Funded | 18      | 18      | 15      | 14       | 24       | 27       | 29       | 54       | 45     | 32                  |

# Research Report Card (through Third Quarter FY2022)

|  |  | 2013    | 2014    | 2015    | 2016    | 2017    | 2018    | 2019     | 2020     | 2021     | 2022<br>3rd Quarter |
|--|--|---------|---------|---------|---------|---------|---------|----------|----------|----------|---------------------|
| f. Sponsored Research Expenditures by Business Unit (in millions)      |  | \$75.4M | \$70.0M | \$73.3M | \$79.5M | \$89.5M | \$94.2M | \$104.5M | \$105.3M | \$114.4M | \$95.5M             |
| 48   | CAAH                                     | \$0.5   | \$0.4   | \$0.4   | \$1.1   | \$1.3   | \$1.4   | \$1.7    | \$1.6    | \$1.1    | \$0.8               |
| 49   | CAFLS                                    | \$8.8   | \$7.7   | \$6.8   | \$8.6   | \$11.1  | \$11.0  | \$14.1   | \$16.4   | \$15.0   | \$11.4              |
| 50   | COB                                      | \$1.2   | \$1.2   | \$1.1   | \$1.0   | \$0.9   | \$0.8   | \$0.8    | \$0.7    | \$0.7    | \$0.5               |
| 51   | CECAS                                    | \$35.0  | \$35.0  | \$35.0  | \$37.5  | \$42.9  | \$45.1  | \$50.3   | \$46.4   | \$54.4   | \$48.9              |
| 52   | CBSHS                                    | \$3.1   | \$2.8   | \$3.7   | \$4.1   | \$4.4   | \$4.9   | \$5.3    | \$6.7    | \$9.0    | \$7.7               |
| 53   | COE                                      | \$3.3   | \$3.3   | \$3.8   | \$2.5   | \$2.6   | \$2.2   | \$2.5    | \$2.4    | \$2.3    | \$2.4               |
| 54   | COS                                      | \$13.2  | \$10.5  | \$9.3   | \$11.3  | \$14.8  | \$16.7  | \$17.2   | \$17.3   | \$15.9   | \$12.3              |
| 55   | CCIT                                     | \$2.0   | \$1.6   | \$3.4   | \$2.8   | \$0.4   | \$0.6   | \$0.2    | \$0.1    | \$0.2    | \$0.3               |
| 56   | PSA                                      | \$4.7   | \$4.9   | \$5.8   | \$5.6   | \$5.7   | \$5.9   | \$3.7    | \$3.9    | \$5.5    | \$5.4               |
| 57   | VP for Res & Interdisc Inst              | \$1.9   | \$1.3   | \$1.9   | \$3.5   | \$3.9   | \$3.9   | \$7.1    | \$9.5    | \$9.6    | \$5.3               |
| 58   | All Other                                | \$1.7   | \$1.7   | \$2.2   | \$1.5   | \$1.5   | \$1.6   | \$1.5    | \$0.4    | \$0.7    | \$0.6               |
| g. Sponsored Research Expenditures by Innovation Cluster (in millions) |  | \$75.4M | \$70.0M | \$73.3M | \$79.5M | \$89.5M | \$94.2M | \$104.5M | \$105.3M | \$114.4M | \$95.5M             |
| 59   | Advanced Materials                       | \$14.3  | \$11.3  | \$10.7  | \$10.4  | \$10.7  | \$12.1  | \$15.4   | \$13.5   | \$14.3   | \$13.3              |
| 60   | Cyberinfrastructure & Big Data Science   | \$10.3  | \$10.5  | \$10.1  | \$8.9   | \$8.1   | \$9.6   | \$6.9    | \$4.4    | \$5.5    | \$5.5               |
| 61   | Energy, Trans. & Advanced Manufacturing  | \$4.7   | \$5.7   | \$7.2   | \$7.6   | \$17.8  | \$16.8  | \$17.1   | \$14.5   | \$19.9   | \$18.5              |
| 62   | Health Innovation                        | \$13.1  | \$10.2  | \$10.2  | \$12.5  | \$16.3  | \$17.8  | \$23.8   | \$27.1   | \$27.1   | \$18.3              |
| 63   | Human Resilience                         | \$8.2   | \$7.7   | \$9.7   | \$9.8   | \$7.8   | \$8.6   | \$9.0    | \$9.7    | \$12.7   | \$9.4               |
| 64   | Sustainable Environments                 | \$18.3  | \$16.9  | \$17.9  | \$21.7  | \$18.9  | \$19.5  | \$20.6   | \$23.9   | \$21.3   | \$17.7              |
| 65   | Other                                    | \$6.5   | \$7.6   | \$7.4   | \$8.6   | \$9.9   | \$9.6   | \$11.7   | \$12.1   | \$13.6   | \$13.3              |
| h. Sponsored Research Expenditures by Funding Source (in millions)     |  | \$75.4M | \$70.0M | \$73.3M | \$79.5M | \$89.5M | \$94.2M | \$104.5M | \$105.3M | \$114.4M | \$95.5M             |
| 66   | Federal Government                       | \$62.9  | \$56.9  | \$58.5  | \$65.1  | \$74.6  | \$78.2  | \$85.1   | \$85.2   | \$95.1   | \$84.7              |
| 67   | Foundations, Societies, and Associations | \$4.2   | \$4.3   | \$4.7   | \$4.1   | \$4.7   | \$5.1   | \$7.4    | \$6.9    | \$6.2    | \$3.3               |
| 68   | Industry/Other                           | \$4.9   | \$5.6   | \$6.1   | \$6.9   | \$6.8   | \$6.3   | \$5.3    | \$5.5    | \$4.8    | \$3.2               |
| 69   | International                            | \$0.8   | \$0.6   | \$0.8   | \$0.8   | \$0.5   | \$0.4   | \$0.3    | \$0.3    | \$0.4    | \$0.3               |
| 70   | Local Government                         | \$0.6   | \$0.6   | \$0.6   | \$0.5   | \$0.5   | \$0.5   | \$0.5    | \$0.5    | \$0.8    | \$0.6               |
| 71   | State Government                         | \$1.9   | \$1.9   | \$2.7   | \$2.0   | \$2.4   | \$3.7   | \$5.7    | \$6.8    | \$7.3    | \$4.0               |

# Research Report Card (through Third Quarter FY2022)

|   |  | 2013      | 2014      | 2015      | 2016      | 2017      | 2018      | 2019      | 2020      | 2021      | 2022<br>3rd Quarter |
|---|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------------------|
| <b>i. Sponsored Research Expenditures per T/TT Faculty by College</b> |  |           |           |           |           |           |           |           |           |           |                     |
| 72  | CAAH   | \$3,299   | \$2,264   | \$2,343   | \$5,841   | \$8,177   | \$8,945   | \$10,159  | \$10,003  | \$6,912   | \$4,992             |
| 73  | CAFLS  | \$88,570  | \$81,120  | \$69,612  | \$84,618  | \$105,396 | \$103,814 | \$134,555 | \$137,438 | \$131,195 | \$91,895            |
| 74  | COB  | \$14,415  | \$13,047  | \$11,510  | \$9,683   | \$8,855   | \$8,269   | \$8,200   | \$6,991   | \$7,132   | \$4,439             |
| 75  | CECAS  | \$169,754 | \$160,698 | \$163,406 | \$163,685 | \$194,323 | \$214,280 | \$225,620 | \$201,553 | \$223,843 | \$198,000           |
| 76  | CBSHS  | \$27,982  | \$26,853  | \$33,764  | \$42,376  | \$34,751  | \$39,532  | \$40,301  | \$50,495  | \$67,202  | \$56,995            |
| 77  | COE  | \$54,779  | \$51,688  | \$62,195  | \$38,037  | \$44,483  | \$40,197  | \$47,371  | \$47,742  | \$48,805  | \$52,106            |
| 78  | COS  | \$95,724  | \$72,421  | \$61,912  | \$77,589  | \$95,956  | \$110,206 | \$118,600 | \$116,020 | \$107,258 | \$78,614            |
| 79  | Clemson Average                                    | \$83,858  | \$75,089  | \$78,826  | \$85,753  | \$84,297  | \$103,706 | \$99,125  | \$96,497  | \$103,187 | \$95,078            |
| <b>j. Additional information</b>                                      |  |           |           |           |           |           |           |           |           |           |                     |
| 80  | NIH R01-Equivalent Awards (by start date)          | -         | -         | 2         | 2         | 2         | 3         | 6         | 1         | 3         | -                   |
| 81  | Doctorates Awarded (August, December and May)      | 187       | 217       | 237       | 233       | 231       | 234       | 301       | 249       | 225       | 144                 |
| 82  | STEM Doctorates Awarded (August, December and May) | 118       | 153       | 165       | 138       | 156       | 171       | 174       | 162       | 159       | 108                 |
| 83  | Disclosures  | 102       | 129       | 70        | 60        | 65        | 51        | 62        | 68        | 44        | 38                  |
| 84  | Patents  | 16        | 15        | 15        | 14        | 18        | 11        | 18        | 12        | 15        | 24                  |
| 85  | Licenses/Options                                   | 9         | 7         | 7         | 5         | 10        | 11        | 19        | 13        | 13        | 11                  |
| 86  | Licensing Revenue                                  |           | \$762,811 | \$360,131 | \$354,827 | \$539,490 | \$461,755 | \$398,136 | \$315,578 | \$239,074 | \$333,846           |
| 87  | Start-up Companies (based on licenses/options)     | 1         | 4         | 4         | 2         | 3         | 3         | 5         | 1         | 1         | 1                   |

# RESEARCH NEWS

This section highlights research news and accomplishments of Clemson faculty and students

## Executive Summary

- *Clemson announced its junior and senior Researchers of the Year during the annual Research Symposium in May ([pages 33-34](#)).*
- *12 Clemson faculty members earned University Research, Scholarship and Artistic Achievement Awards in recognition of rare career milestones ([pages 35-36](#)).*
- *A Clemson faculty member has won the 2022 Governor's Young Scientist Award for Excellence in Scientific Research ([page 37](#)).*
- *Four Clemson students were awarded the prestigious National Science Foundation Graduate Research Fellowship ([page 38](#)).*
- *Two Clemson exhibits were put on display at the Smithsonian's National Museum of American History ([page 41](#)).*
- *Clemson and Prisma Health have expanded a collaboration in aging research, education and community outreach programs ([page 42](#)).*
- *The state has awarded funding for Clemson to create a center of excellence to support rural and high-poverty schools that have higher-than-average teacher turnover ([page 43](#)).*
- *Two Clemson doctoral students have earned prestigious national fellowships ([page 44](#)).*





From left: Vice President for Research Tanju Karanfil, Joseph Ryan, Brian Powell, Luke Rapa, Vidya Suseela, Nathan McNeese, Andreea Mihalache, President Jim Clements, Kaileigh Byrne, Chris Saski, Bryan Miller, and Matt Hersel. Not pictured: Vernon Burton and Scott Swain.

## Researcher of the Year

A Clemson researcher applying cutting-edge technologies to improve teamwork and another working to protect the environment from contamination were named Clemson Researchers of the Year.

Brian Powell, the Fjeld professor in nuclear environmental engineering and science, was named senior Researcher of the Year, and Nathan McNeese, assistant professor in the School of Computing, was named junior Researcher of the Year.

Awards were announced at the annual Clemson University Research Symposium on Tuesday.

“Dr. Powell and Dr. McNeese exemplify the spirit of university research, which is to generate and share knowledge that will impact lives and improve the world,” said Tanju Karanfil, Clemson vice president of research. “I am proud of their work and excited to see their future accomplishments.”

Powell’s research focuses on the understanding and prediction of the physical, chemical and biological processes which govern the mobility of radionuclides in natural and engineered systems. He has conducted sponsored research in a wide range of projects dealing with topics of nuclear forensics; evaluation of nanoparticle behavior; sorption and environmental transport of plutonium; development of radiation detection and radiation detection laboratory courses; iodine, radium, strontium geochemistry in wetland and subsurface sediments; radionuclide geochemistry of saltstone and solid waste performance assessments at the Savannah River Site; measurement of thermodynamic parameters supporting advanced fuel cycle chemistry; and related topics.



Brian Powell receives the Researcher of the Year award from President Jim Clements.

“Knowing how diverse and impactful our entire research enterprise is at Clemson University, I am very humbled to win this award and thank my students and colleagues for their support,” Powell said.

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# Researcher of the Year

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McNeese's research mainly focuses on teamwork, artificial intelligence (AI), and collaborative technology in a variety of different contexts, such as command and control, manufacturing, emergency crisis management and health care. His current research interests span human-AI teaming, human-centered AI, and the development/design of human-centered collaborative tools and systems.

"This is such an incredible honor and one that I'll always remember," McNeese said. "I'm filled with so much gratitude after receiving this award. There are so many people that have helped me over the years that deserve thanks and I can't wait to reach out to them to show my appreciation. I'm very thankful to my colleagues for their continual support. I also want to thank my family for their never-ending support. Finally, a huge thanks to my students, current and past, who deserve so much credit for the successes I have achieved with them."

Powell and McNeese are faculty members in the College of Engineering, Computing and Applied Sciences. Dean Anand Gramopadhye said the awards are well-deserved.

"Brian Powell and Nathan McNeese are exemplary researchers and scholars who are pushing the frontiers of knowledge while helping develop the leaders and innovators of the future," Gramopadhye said. "Brian is helping create a sustainable environment and Nathan is breaking new ground in human-AI teams. I offer them my wholehearted congratulations and thank them for their efforts."



**Nathan McNeese receives the Researcher of the Year award from President Jim Clements.**

For Researcher of the Year, colleges nominate a junior faculty member who received their terminal degree within the past 10 years and a senior faculty member. Winners were selected by an interdisciplinary faculty committee.

Nominees for junior Researcher of the Year in addition to McNeese were: Vidya Suseela, assistant professor, Department Plant and Environmental Sciences, College of Agriculture, Forestry and Life Sciences; Andreea Mihalache, assistant professor, School of Architecture, College of Architecture, Arts and Humanities; Kaileigh Byrne, assistant professor, Department of Psychology, College of Behavioral, Social and Health Sciences; Matt Hersel, assistant

professor, Department of Management, The Wilbur O. and Ann Powers College of Business; and Luke Rapa, associate professor, Department of Education and Human Development, College of Education.

Nominees for senior Researcher of the Year in addition to Powell were: Christopher Saski, associate professor, Department of Plant and Environmental Sciences, College of Agriculture, Forestry and Life Sciences; Vernon Burton, professor, Department of History and Geography, College of Architecture, Arts and Humanities; Bryan Miller, associate professor, Department of Sociology, Anthropology and Criminal Justice, College of Behavioral, Social and Health Sciences; Scott Swain, professor, Department of Marketing, The Wilbur O. and Ann Powers College of Business; and Joseph Ryan, professor, Department of Education and Human Development, College of Education.

Additional information on nominees is [posted online](#).





From left: Shelia Cotten, Srikanth Pilla, Stephen Foulger, Mashal Saif, President Jim Clements, Elizabeth Rivlin, Chris Saski, Ye Luo and Vice President for Research Tanju Karanfil. Not pictured: Trudy Mackay, Eric Johnson, Feng Luo and George Palacios.

## University Research, Scholarship and Artistic Achievement Awards (URSAAA)

Twelve Clemson University faculty members received University, Research, Scholarship and Artistic Achievement Awards (URSAAA) at the annual Research Symposium in May. URSAAA designation is reserved for those few faculty members who have achieved the highest levels of national and international recognition in their fields. Including this year's honorees, only about 10% of Clemson faculty have received the URSAAA designation, which is earned by meeting one of these criteria:

- authoring a publication that has amassed more than 1,000 citations;
- earning exclusive fellowships and national and international honors, awards and recognitions; or
- exceeding research expenditures of \$1 million in a fiscal year.

This year's URSAAA recipients are listed below, along their URSAAA achievement.



Cotten

### Shelia Cotten

*Associate Vice President for Research Development and Provost's Distinguished Professor*

**Sociology, Anthropology and Criminal Justice; and Communication**

Publication with 1,000 citations



Johnson

### Eric Johnson

*Comporium and PalmettoNet Endowed Chair in Optoelectronics*

**Electrical and Computer Engineering**

Annual expenditures exceeding \$1 million



Foulger

### Stephen Foulger

*Greg-Graniteville Endowed Chair and Professor*

**Materials Science and Engineering**

Fulbright award recipient



F. Luo

### Feng Luo

*Marvin Pinson Jr. Distinguished Professor*

**School of Computing**

Publication with 1,000 citations

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# University Research, Scholarship and Artistic Achievement Awards (URSAAA)

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Y. Luo

**Ye Luo**

*Professor*

**Sociology, Anthropology and Criminal Justice**

Publication with 1,000 citations and fellow, Gerontological Society of America



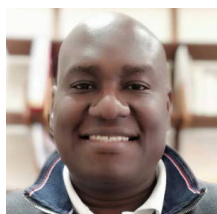
Mackay

**Trudy Mackay**

*Self Family Endowed Chair*

**Human Genetics**

Publication with 1,000 citations; and numerous fellowships



Palacios

**George Palacios**

*Associate Professor*

**Languages**

Asociacion de Colombianistas Prize for best research book on Colombia



Saif

**Mashal Saif**

*Associate Professor*

**Philosophy and Religion**

Senior Fellow, American Institute of Pakistan Studies



Pilla

**Srikanth Pilla**

*Robert P. Jenkins Endowed Professor*

**Automotive Engineering**

Annual expenditures exceeding \$1 million



Saski

**Christopher Saski**

*Associate Professor*

**Plant and Environmental Sciences**

Publication with 1,000 citations



Rivlin

**Elizabeth Rivlin**

*Associate Professor*

**English**

National Endowment for the Humanities Award



Wang

**James Wang**

*Professor*

**School of Computing**

Publication with 1,000 citations

# Impacts, Honors and Achievements

## Jessica Larsen wins Governor's Young Scientist Award for Excellence in Scientific Research

Gov. Henry McMaster is honoring Jessica Larsen of Clemson University with an award that recognizes the research she is conducting to better understand and treat diseases of the central nervous system.

Larsen, a Dean's Assistant Professor of chemical and biomolecular engineering, has won the 2022 Governor's Young Scientist Award for Excellence in Scientific Research.

"It's exciting, almost validating in a way," she said. "I've got five Ph.D. students and 25 undergraduates, and it feels good to be recognized for all the work we're putting in."

Larsen and her students conduct research in the field of polymeric nanotechnology. They work to develop materials that respond to diseases in the central nervous system, which includes the brain and spinal cord.

The research can lead to new materials to better diagnose disease, deliver drugs and regenerate tissue, she said.

The group has a special focus on GM1 gangliosidosis, an inherited disorder that progressively destroys nerve cells in the brain and spinal cord. The disorder affects 1 in 100,000 to 200,000 newborns, Larsen said. [READ MORE](#)



Larsen



Duckett

## Duckett receives 2022 Godley-Snell Award for Excellence

For her work in science productivity and focusing on problems impacting animal and human health and productivity, Clemson University professor Susan Duckett has received the 2022 Godley-Snell Award for Excellence in Agricultural Research.

This award is Clemson's highest agricultural research award. Duckett, who works in the animal and veterinary sciences (AVS) department in the College of Agriculture, Forestry and Life Science, focuses her research on understanding how toxins found in tall fescue negatively impact the growth and development of lambs during and after pregnancy, cow-calf performance and beef cattle production. Fescue toxicosis costs the beef, small ruminant and equine industries more than \$1 billion dollars in

annual losses.

She also is the Ernest L. Corley Jr. Trustees Endowed Chair in the AVS department. Duckett is sought after as a graduate advisor, undergraduate mentor and instructor. Her courses, which are elective, routinely draw 60-80 students.

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# Impacts, Honors and Achievements

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Fellow professor, James Strickland, said the impact she has had on the field of animal and veterinary sciences has resulted in improvements in efficiency of production and value of products in animal agriculture.

“Dr. Duckett also has directly benefited stakeholders via her direct engagement with stakeholder groups both domestically and internationally through numerous invited presentations on the application of her research findings,” Strickland said. “Her scientific work has gained the trust of a wide swath of the public worldwide and advanced agricultural efficiency for the betterment of society and our environment.”

Duckett has served as major professor for 13 master’s and doctoral students. Many of these students have gone on to leadership roles as research scientists in national organizations, as scientists and directors in major companies, veterinarians, and college and Cooperative Extension Service educators.

[READ MORE](#)

## Four Clemson students awarded the prestigious National Science Foundation Graduate Research Fellowship

Four Clemson University students have been awarded 2022 National Science Foundation Graduate Research Fellowships, and one has received Honorable Mention.

The National Science Foundation Graduate Research Fellowship Program (GRFP) is one of the nation’s oldest and most prestigious programs, dedicated to ensuring the vitality and diversity of the country’s science and engineering leaders by recognizing and supporting outstanding graduate students in NSF-supported science, technology, engineering and mathematics disciplines who are pursuing research-based master’s and doctoral degrees. Since the GRFP’s beginnings in 1952, 42 recipients have gone on to become Nobel laureates, and more than 450 have become members of the National Academy of Sciences. These Clemson students were among 2,000 selected from more than 12,000 applicants nationwide. The students are listed below. [READ MORE](#)



**Venkata “Anish” Chaluvadi**

*Department of Materials Science and Engineering*

**College of Engineering, Computing and Applied Sciences**

**Chaluvadi**



**Miranda Grice**

*Glenn Department of Civil Engineering*

**College of Engineering, Computing and Applied Sciences**

**Grice**



**Nicholas Deas**

*School of Computing*

**College of Engineering, Computing and Applied Sciences**

**Deas**



**Courtney Tharp**

*Department of Plant and Environmental Sciences*

**College of Agriculture, Forestry and Life Sciences**

**Tharp**

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# Impacts, Honors and Achievements

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## Narayanan wins 2022 Distinguished Young Alumni award from Kansas State

Sruthi Narayanan, a Clemson assistant professor of crop physiology, has been named a recipient of Kansas State University's 2022 Distinguished Young Alumni Award.

This award was established in 2012 and recognizes two Kansas State University graduates (35 or younger) who are using their leadership and service experience to excel in their professions and contribute to their communities.

Narayanan earned her master's and doctoral degrees from Kansas State in 2011 and 2015. She has an undergraduate degree in agriculture from Kerala Agriculture University in India.

Narayanan is an assistant professor in the Clemson Department of Plant and Environmental Sciences. Her research focuses on abiotic stress tolerance of crops. She studies plant responses to climate extremes and collaborates with crop breeders for developing climate-resilient varieties. She is known for her findings on applications of lipidomics for improving heat tolerance of plants. [READ MORE](#)



Amy Button Renz (left), president and CEO of the Kansas State University alumni association, presents Sruthi Narayanan, a Clemson assistant professor of crop physiology, with the university's 2022 Distinguished Young Alumni Award.



Blackburn

## CAAH celebrates two Fulbright Scholars

The College of Architecture, Arts and Humanities is proud to announce two new Fulbright Scholars, both of whom are majors in the Department of Languages.

Elise Blackburn is a language and international health major concentrating in Spanish, and Nicholas Longo is a language and international business major concentrating in Mandarin Chinese. They have been accepted into the Fulbright Program for English Teaching Assistantships English in Spain and Taiwan, respectively.

Blackburn has distinguished herself at Clemson as a National Scholar and student of the Clemson University Honors College. After completing her English Teaching Assistantship, Blackburn says she plans to pursue a master's degree in public health and then enter either government or non-profit work, using her language skills to increase healthcare access for Spanish-speaking Americans.

Throughout his high school and college career, Longo has taken opportunities



Longo

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# Impacts, Honors and Achievements

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to build bridges with a wide array of organizations ranging from non-profits to high fashion. He has been active in Greek life as a member of the Phi Sigma Kappa Fraternity, a member of the Chinese Language Club, an assistant at The Harbor School for the Multiply Disabled, a volunteer for the South Carolina Special Olympics and an intern for Christian Louboutin in New York.

The Fulbright U.S. Student Program sponsored by the U.S. government is designed to increase mutual understanding between the people of the United States and the people of other countries. The recipients, depending on their fields, will be serving as teaching assistants, enrolling in graduate degree programs, or actively pursuing independent research. [READ MORE](#)

## Clemson student discovers the architectural link between South Carolina and the White House

A Clemson University graduate student is making his mark on Charleston's historic landscape with a discovery that connects Charleston to the design of the White House.

James "Shea" McEnerney, a graduate student in Clemson's master of science in historic preservation program (MSHP), researched and discovered that James Hoban, the architect best known for designing the White House,

was a leading figure in the establishment of the Catholic Parish at St. Mary's of the Annunciation, the first Catholic parish in the Carolina's and Georgia. He was a founding Parish Vestryman and was an inaugural tither upon the parish's formal incorporation in 1791.

McEnerney has now been invited to write the literature of a historical marker recognizing Hoban's involvement in the Catholic communities of both Late Colonial Charleston and the new Federal City at Washington, D.C. The marker is the result of a partnership between The White House Historical Association, The Preservation Society of Charleston, and St. Mary of the Annunciation.

"The White House Historical Association is honored to partner with the Preservation Society of Charleston to present a plaque honoring James Hoban's legacy in Charleston," said Stewart McLaurin, president of the White House Historical Association. "Without Charleston and St. Mary's, the White House and its history could literally have looked quite different."

McLaurin invited McEnerney to Washington in November 2021 to continue his research. He was able to meet with a team of historians and colleagues in the field of architecture and historic preservation that helped him further his research of Hoban's limited known history. He was able to join McLaurin again in Washington for the 2022 James Hoban wreath laying ceremony at his gravesite in Mt. Olivet Cemetery this past March. McEnerney was also invited to join the White House Historical Association as an inaugural Next-Generation Committee Ambassador. [READ MORE](#)



Shea McEnerney (left) and Stewart McLaurin (right).

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# Impacts, Honors and Achievements

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## Two Clemson exhibits put on display at Smithsonian's National Museum of American History

Two Clemson University experiential-learning installations existed both at the Smithsonian's National Museum of American History in Washington, D.C., and on the University's main campus in South Carolina on the weekend of April 8-10, 2022. The hands-on, interactive displays were part of an exhibit hosted by the 2022 ACCelerate Creativity + Innovation Festival presented by the Smithsonian and Virginia Tech.

An estimated 30,000 visitors to the American history museum explored some of the most innovative research happening at the intersection of science, engineering, art and design, including Clemson's installations. Twelve schools from across the Atlantic Coast Conference (ACC) participated in the event.

Clemson's exhibits were selected for their ability to establish a shared environment between researchers and young explorers, and to connect people in the District of Columbia with researchers in Clemson. One of the exhibits explored brain function and the other connected people and places digitally. [READ MORE](#)



Building Brains: Neuronal Circuits on a Microscope Slide was installed at the Smithsonian to teach visitors about brain research.



## Li selected as Minority Research Scientist

Miao Li, assistant professor of Sociology, Anthropology and Criminal Justice, has been selected as a Carolina Center on Alzheimer's Disease Minority Research (CCADMR) Scientist. The distinction includes a \$30,000 competitive grant award from the Center to examine childhood adversities, race, and late-life cognition via socio-behavioral pathways.

In this role, Li will support the mission of the Research Education Component of the CCADMR is to recruit, train, and establish a mentor network for a talented cadre of diverse faculty at participating institutions to advance the science on the sociocultural, behavioral, and environmental determinants of ADRD-related health disparities through population-based research using secondary data analysis.

Li's research focuses on how socio-environmental factors affect health and health behaviors over the life course and across generations.

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# Impacts, Honors and Achievements

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## Garst earns prestigious fellowship

Barry Garst, professor of youth development program in the College of Behavioral, Social and Health Sciences, was elected as a Fellow in The Academy of Leisure Sciences in recognition of his contributions to the intellectual advancement of the field of leisure sciences. To be named a Fellow, one must be nominated by an Active Fellow and receive a two-thirds majority of votes cast by Active Fellows. Garst joins an exclusive group of 135 Fellows.

Garst's applied research focuses on critical and emerging issues facing the youth out-of-school time community of children, adolescents, staff, parents, alumni, and program providers. He also serves as Research Chair for the Association of Camp Nursing, examining factors impacting health and safety outcomes for youth and staff within the context of summer camp. Recent research has explored overparenting among parents of early adolescents, parent anxiety associated with summer camp experiences, and effective camp health care practices following the onset of the COVID-19 pandemic.



Garst



## Clemson University, Prisma Health expand collaboration in aging research, education and community outreach programs

Clemson University and Prisma Health celebrate the expansion of their research and clinical collaborations with the opening of new space to accommodate the expanding community research and clinical programs of the Clemson University Institute for Engaged Aging. The institute now occupies the top floor of the Prisma Health Oconee Memorial Hospital in Seneca, South Carolina.

Leadership from both organizations, researchers, faculty and staff launched the institute in its new comprehensive center specializing in aging, cognition research and outreach.

According to Clemson University President Jim Clements, the partnership between the University and Prisma Health in aging research has already yielded important outcomes. He sees a dedicated space for this work as necessary to increase the positive impact on citizens in South Carolina and beyond.

"Aging, and the challenges that may accompany it, can affect us all, and is something many loved ones and caregivers face every day," Clements said. "That makes the work being done by Clemson University and Prisma Health timely and vital considering the ever-increasing proportion of older adults across our state and nation."

The Institute for Engaged Aging is a program of the Clemson University College of Behavioral,

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# Impacts, Honors and Achievements

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Social and Health Sciences' Department of Psychology. It was created to discover, develop and disseminate best practices for engaged aging through research, education and community outreach. Current institute initiatives focus on the brain, mobility and technologies that enable older adults to be engaged in family and community living regardless of their social, economic or health status.

As part of the expanded collaboration, Clemson University and Prisma Health Oconee Memorial Hospital are partnering to explore a new advanced 3T MRI unit to be housed at Oconee Memorial Hospital for research as well as patient diagnostics. 3T technology differs from standard MRI units (1.5 T) in that it allows more refined imaging detail, particularly related to changes in the brain, and is a critical tool for research related to aging. A Certificate of Need application for the MRI was filed with the state on Feb. 18, 2022 and is currently under review. [READ MORE](#)

## Clemson center of excellence aims leadership development at rural educators

The South Carolina Commission on Higher Education has awarded Clemson University a three-year grant to create a center of excellence to positively affect rural and high-poverty schools which have higher-than-average teacher turnover.

The Leading Educational Administrator Development for Excellent Rural Schools (LEADERS) Center of Excellence aims to develop current and future leaders and equip them with the means to improve processes in their schools.

According to Hans Klar, the center's director and chair of the Clemson University Department of Educational and Organizational Leadership Development, the center seeks to ultimately create conditions in schools where teachers stay and thrive, improving student outcomes.

"Year over year, we hope to equip educators who are proven problem solvers with the means to improve their leadership abilities and, more importantly, coach others to solve problems," Klar said. "It's all about educators building the capacity to address their own challenges and the challenges their schools face, and then sharing what works with others."

The districts involved in the project all come from the Western Piedmont Education Consortium, an association of school districts in upper Western South Carolina who work collaboratively to accomplish specific goals. Participating schools have been identified as rural, underperforming on some measure, or high-poverty schools with greater-than-average teacher turnover levels.

The center has already formed a steering committee of district representatives, which will recruit and select 20 practicing or recently retired principals and district leaders to serve as leadership coaches. During the summer of the project's first year, the coaches will enroll in a three-credit



Center of Excellence leaders include Co-Director Angie Carter, Director Hans Klar and Co-Director Noelle Paufler (left to right).

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# Impacts, Honors and Achievements

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graduate course on coaching for school improvement and attend an educational leadership summit.

Coaches will then be paired with 20 school leaders from participating schools. During the 2022-2023 academic year, the pairs will engage in professional development while implementing data-driven improvement efforts in their schools. [READ MORE](#)



Eagle

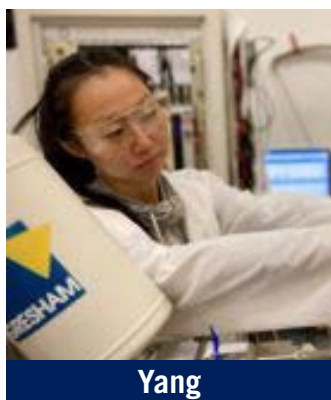
## Ph.D. student receives NASA postdoctoral fellowship to explore origins of cosmic rays

Clemson University astrophysics graduate student Jordan Eagle has two key priorities as a scientist — research and outreach.

Eagle has spent the last two years at the Harvard & Smithsonian Center for Astrophysics (CfA) in Cambridge, Massachusetts, on a Chandra X-ray Center pre-doctoral fellowship. Eagle is completing her Ph.D. thesis on pulsar wind nebulae, which are descendants of massive stellar explosions, and the role they play in creating cosmic rays.

After she receives her Ph.D. from Clemson in August, Eagle will continue her studies at the NASA Goddard Space Flight Center as a NASA postdoctoral fellow.

Cosmic rays are charged particles moving at nearly the speed of light, mostly generated from outside the solar system. They are detected here on Earth and can cause electronic problems in satellites and other space instruments. [READ MORE](#)



Yang

## Clemson physics doctoral student earns prestigious astrophysics fellowship

Clemson University graduate student Yang Yang will spend the next three months doing laboratory research in Cambridge, Massachusetts, thanks to a pre-doctoral fellowship from the Harvard & Smithsonian Center for Astrophysics.

She is the fourth Clemson Department of Physics and Astronomy student to earn the prestigious award in the past several years.

Yang's research is laboratory astrophysics, an area of physics that reproduces extreme physical environments found in astrophysical objects such as stellar coronae, merging stars and supernova remnants. A member of Professor Endre Takacs' research group at Clemson, she had been a visiting student at the Smithsonian Astrophysical Observatory before being invited to apply for the pre-doctoral fellowship, which will run through August.

During the fellowship, she will use an electron beam ion trap (EBIT) to generate atomic data for AtomDB, a database of X-ray spectra that provides essential information for studying conditions in many astrophysical environments, including those near black holes, stars and neutron stars.

[READ MORE](#)

# FOCUS ON FACULTY

This section highlights achievements of three faculty members from each college. Entries were submitted by the colleges.

## Executive Summary

- *Click the links below to read about faculty from the respective college.*
  - » *College of Agriculture, Forestry and Life Sciences ([pages 46-48](#))*
  - » *College of Architecture, Arts and Humanities ([pages 49-51](#))*
  - » *College of Behavioral, Social and Health Sciences ([pages 52-54](#))*
  - » *Wilbur O. and Ann Powers College of Business ([pages 55-57](#))*
  - » *College of Education ([pages 58-60](#)).*
  - » *College of Science ([pages 61-63](#)).*



College of  
**AGRICULTURE, FORESTRY  
AND LIFE SCIENCES**

## **Matthew Cutulle, PhD**

*Assistant Professor*

**Plant and Environmental Sciences**



Cutulle is an assistant professor of weed science who studies integrated weed management strategies in multiple fruit and vegetable crops. Cutulle works out of the Coastal Research and Education Center. A large portion of his funding focuses on biological soil disinfestation for control of problematic nutsedge weed species. He also is involved in projects monitoring weed ecology in partial salt water rice agroecosystems and was part of the first ever USDA grant awarded to South Carolina that focused on organic rice production.

His current research projects are supported by Southern Sustainable Agricultural Research and Education (SSARE), NIFA programs, USDA-Crop Protection and Pest Management, USDA Organic Transitions, USDA-Specialty Crop Research Initiative and USDA-Organic Research and Extension Initiative. Cutulle also has an extension appointment and typically gives a dozen extension talks a year that include grower pre-plant meetings, field days, agent trainings, and podcasts. Growers are able to access references for weed identification and management through his Clemson Vegetable Weed Science [website](#). In his lab, he currently has two technicians and two PhD students.

### **Select Accomplishments**

- Received five grants focused on Anaerobic Soil Disinfestation in vegetables for a total of \$950,893 going to Clemson scientists.
- Received a \$50,000 planning grant from the USDA-SCRI to organize a national team focused on robotic weed control in leafy green crops.
- Part of a regional team that was awarded \$325,000 to study weed management in hemp crops.
- Research on the beneficial impact of herbicides and safener compounds on nutrition in sweetcorn was highlighted in The Economist (Spraying herbicides changes the flavour and nutritional value of crops | The Economist) 20 publications accepted since 2017.
- Over 150,000 unique views on his Clemson vegetable weed control website as of September 2021.



College of  
**AGRICULTURE, FORESTRY  
AND LIFE SCIENCES**

## **Brandon K. Peoples, PhD**

*Assistant Professor*

**Forestry and Environmental Conservation**



Peoples studies the natural and human factors that influence freshwater biodiversity, with an emphasis on riverine fishes. His research is focused mainly in the Southeastern U.S., a global hotspot for fish biodiversity. Some projects are specific to the fishes of South Carolina, while others cover the entire conterminous U.S. He has also worked in the cloud forests of Honduras.

Current research projects are supported by the National Science Foundation, the National Oceanic and Atmospheric Administration, the U.S. Fish and Wildlife Service, the S.C. Department of Natural Resources, and the Nature Conservancy.

Peoples teaches undergraduate courses in Ichthyology (fish ID) and fisheries techniques, as well as graduate-level courses in ecological statistics and writing. He has also been involved with the Creative Inquiry (CI) program, leading or co-leading two CI classes in the past five years. Peoples' CI students have presented their research at conferences across the U.S., and many of them have gone on to succeed in graduate school and in the workforce. He serves as faculty advisor for the student chapter of the American Fisheries Society. His research lab consists of four PhD students, for MS students, a lab manager, and a rotating crew of a dozen or so seasonal undergraduate employees.

### **Select Accomplishments**

- Excellence in Public Outreach award from American Fisheries Society.
- Jack Bayless award from SC Chapter of the American Fisheries Society.
- Voted Faculty of the Year by Clemson Natural Resources Graduate Student Association.
- Seven Best Student Paper awards at regional international conferences by his mentees.
- Published 31 peer-reviewed manuscripts and one book chapter since starting at Clemson.
- Published more than 50 non-technical articles with The Fisheries Blog.
- Received \$320,000 grant from NSF to study continental-scale patterns of fish invasions.
- Received \$300,000 grant from USFWS/SARP to study fish passage across the Southeast.
- Received \$256,000 grant from NOAA/SCDNR to study endangered Atlantic Sturgeon.
- Received \$250,000 grant from USFWS/SCDNR to study Bartram's Redeye Bass.
- Served as associate editor for North American Journal of Fisheries Management.



College of  
**AGRICULTURE, FORESTRY  
AND LIFE SCIENCES**

## **Vidya Samadi, PhD**

*Assistant Professor*

**Agricultural Sciences**



Samadi is an assistant professor and director of the Hydrosystem and Hydroinformatics Research (HHR) group in the Department of Agricultural Sciences. She is trained as a water resource engineer and focuses on developing hydroinformatics software to address water systems modeling problems. Much of her current research is focused on surface water modeling, flood/stormwater computing, and impacts of flooding on critical infrastructure. She currently conducts her research in the southeast watersheds, as well as in several study watersheds in Wales and England. Her research lab includes three PhD students and two master's students.

Samadi serves on the World Meteorological Organization (WMO)-Global Energy and Water Exchanges (GEWEX) Hydrometeorology Panel (GHP). She currently leads a global, crosscutting, flood research initiative that allows GHP to propagate flood modeling and research knowledge from one region to another and synthesizes results at the global scale. At the national level, she chairs the Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI, an NSF-funded nonprofit organization) Informatics Committee and oversees the CUAHSI informatics and data service activities, Informatics Blog, etc.

### **Select Accomplishments**

- Published 7 peer-reviewed journal articles, 1 book chapter, 1 article in WMO-GEWEX Quarterly Newsletter, and 17 conference proceedings.
- Received a \$210,000 research grant from the National Science Foundation (lead PI).
- Received a \$425,000 research grant from the National Science Foundation (lead PI).
- Received a \$30,000 research grant from the US Geological Survey (sole PI).
- Established a graduate student exchange program with IHE Delft Institute for Water Education, The Netherlands.
- Selected participant for the NSF Engineering CAREER Workshop, 2021.
- Selected Scientific Committee member for 2022 International Environmental Modelling and Software conference, Brussels, Belgium.
- Organized and chaired scientific sessions concerning hydroinformatics and flood modeling at 5 international and 4 national conferences.





College of  
**ARCHITECTURE, ARTS  
AND HUMANITIES**

## Claire Kirwin, PhD

*Assistant Professor*

**Philosophy**



Kirwin's research focuses on the nature of value (ethical, aesthetic, and beyond) and the nature of our relationship to it as minded creatures. Currently, she is writing about moral knowledge, value pluralism, alienation, and whether value is real (it is). Kirwin's work on these contemporary topics is informed and influenced throughout by several figures from the history of philosophy, especially Plato, Kant, and Nietzsche.

Excerpt from Elucidations interview with Claire Kirwin: "Value realism is a catch-all expression for the belief that all these things are objectively in the objects themselves. Peanut butter cup ice cream deliciousness is in the ice cream itself, not in the person experiencing it, and classical music greatness is in the music itself, not in the audience member listening to it at Carnegie Hall. Kirwin espouses value realism across all these cases, but we focus on ice cream in this episode because, uh, hopefully it's a little less of a hot button thing than some other topics. We'd like to be able to talk about it without raising an undue amount of ire." Hear the full interview [here](#).

### Select Accomplishments

- Awarded runner-up for the Marc Sanders Prize in Metaethics, and published a longform review of Andrew Huddleston's Nietzsche on the Decadence and Flourishing of Culture in Mind.
- Nominated to submit for the NEH Summer Stipend program.
- Published a longform review of Andrew Huddleston's Nietzsche on the Decadence and Flourishing of Culture in Mind.
- Review of Andrew Huddleston's Nietzsche on the Decadence and Flourishing of Culture, Mind. Advance online access, 2021.
- 'Pulling Oneself up by the Hair: Understanding Nietzsche on the Freedom of the Will', Inquiry, vol 61, pp. 82-99, 2017.



College of  
**ARCHITECTURE, ARTS  
AND HUMANITIES**

## Lisa Sain Odom, PhD

*Assistant Professor*

**Performing Arts**



Odom is a professor of music (voice and musical theatre) in the Department of Performing Arts and is an opera and musical theatre singer and actor. She holds a Doctor of Musical Arts degree in Vocal Performance from the University of South Carolina, as well as B.M. and M.M. degrees in Vocal Performance. As an opera and concert singer, Odom has appeared with various orchestras and opera companies throughout the U.S. and Europe. Some of her roles include Papagena (Die Zauberflote), Isabelle/Madeline (The Face on the Barroom Floor), Musetta (La Boheme), Anne Page (The Merry Wives of Windsor), Monica (The Medium) and Miss Pinkerton (The Old Maid and the Thief). An accomplished concert soloist, some of Odom's appearances include soprano soloist in Mozart's Missa Brevis with the American Institute of Musical Studies in Graz, Austria; Ophelia in a concert version of Thomas' Hamlet with the South Carolina Philharmonic; featured soloist in the New Year's Eve Pops Concert with Foothills Philharmonic; featured soloist in an all-Gershwin concert with Fountain Inn Symphony Orchestra; and in the role of Anna in Kurt Weill's Seven Deadly Sins with USC Symphony and Ballet. Dr. Odom enjoys performing new music and has premiered a variety of new works in concerts throughout South and North Carolina, including a set of gospel song arrangements by Jackie Griffin and several songs by Richard Williamson.

### Select Accomplishments

- Focus of Clemson News article "[Lisa Sain Odom brings increased focus to musical theater at Clemson.](#)"
- Recipient of NATS Foundation 2021 Voice Pedagogy Award.
- Founded and performs with the soprano trio, "The Blonde, the Brunette and the Redhead," currently singing opera, musical theater, and jazz in concerts throughout the Southeast.
- 2007 National Association of Teachers of Singing Intern
- Serves as a television and film actor who has appeared in a variety of independent films, and often appears as an actor or spokesperson in industrial films and commercials.



College of  
**ARCHITECTURE, ARTS  
AND HUMANITIES**

## **Arelis Moore de Peralta, PhD**

*Assistant Professor*

**Languages**



Moore is a medical epidemiologist and social scientist with experience in health disparities research in the United States and Latin America. She is a tenure track assistant professor of community health, with an interdisciplinary appointment with the Departments of Languages. Her primary interest is understanding the role of the social determinants of health in the disparities and inequities experienced by minority populations and communities of color in the U.S. and Latin America, as well as developing innovative and culturally relevant community development initiatives to promote health and wellbeing. Her research includes Community-based Participatory Research (CBPR) to address health disparities and to promote partnerships to build healthier communities. Through her public health work, which spans about 25 years, Moore has focused on developing systems and policies that promote health equity, as well as in finding mechanisms to empower low-resource communities in developing partnerships, systems changes, and advocacy to improve their own health and wellbeing. She has assisted, as a community leader and advocate, local and national advocacy groups, and grassroots multicultural coalitions in developing and implementing initiatives and projects to reduce health disparities and to promote health equity.

### **Select Accomplishments**

- Vera Paster Award in 2009 in recognition of her work with Latinx immigrants; the Graduate Student Advising and Mentoring Award in 2015; and Bradley Mentoring Award on Creative Inquiry in 2018.
- Moore de Peralta, A., Eichinger, M., & Hossfeld, L. (2020). Urban health and urbanization: Socio-ecological approaches to address social determinants of nutritional health in urban settings. In Barth, M. & Bell, R. Eds. *Public Health Nutrition: Rural, Urban and Global Community-based Practice*; New York: Springer Publishing Company. ISBN: 978-0-8261-4684-7; DOI: 10.1891/9780826146854.
- Sims, C., Carter, A., Moore de Peralta, A., Hofrova, A., & Brown, S. (2020). Advancing gender equity through mentoring and leadership development: A human performance technology intervention case study. In Van Tiem, D. M., & Burns, N. C. (Eds.). *Cases on Performance Improvement Innovation*. Hershey, PA: IGI Global. <http://doi:10.4018/978-1-7998-3673-5>.
- [Moore's work](#) has appeared in peer-reviewed journals and book chapters on community-engaged research and cross-cultural health.



College of  
**BEHAVIORAL, SOCIAL  
AND HEALTH SCIENCES**

## **Kaileigh A. Byrne, PhD**

*Assistant Professor*

**Psychology**



Byrne is a cognitive psychologist whose research examines mechanisms of decision-making and reward motivation, particularly in the applied health context of aging and mental health conditions. Her research uses a multimodal approach to examine the neurocognitive processes that influence decisions and actions.

One current line of aging-related cognitive research focuses on inclusive digital privacy design tools for older adults. This work focuses on developing decision aids and digital privacy protection interventions to guide older adults to protect their personal information online. A second area of ongoing research involves identifying neurocognitive signatures of individuals with substance use disorder, evaluating the effectiveness of mental health app features and tools on mental health symptoms, and examining how stress and performance pressure influence decision-making.

Byrne teaches courses in Cognitive Psychology, Advanced Experimental Psychology, and Judgment & Decision-Making. Through three Creative Inquiry programs, Byrne has mentored 33 different undergraduate students and four graduate students over the past three years.

### **Select Accomplishments**

- Published 11 peer-reviewed journal articles and three conference proceedings papers between 2020-2021.
- Serves as director of the Clemson Cognition and Decision Science Lab.
- Presented scientific research at three international conferences and three local conferences between 2020-2021.
- Received the Mather Lifeways Institute on Aging Silver Innovative Research on Aging Award.
- Currently funded by Facebook/Meta and the Carolina Center for Alzheimer's Disease and Minority Research Grant.



College of  
**BEHAVIORAL, SOCIAL  
AND HEALTH SCIENCES**

## Vaiva Kalesnikaite, PhD

*Assistant Professor*

**Political Science**



Kalesnikaite's research focuses on public management at the local level of government. More specifically, she studies collaborative governance as a strategy to address complex issues, such as climate change, through local government engagement with public and private stakeholders.

Besides public management, Kalesnikaite also works on issues of good governance and fighting public corruption. Her work examines corruption in municipal governments and how transparency and other tools can help curb both grand and petty corruption. Her research has been supported by the European Union Structural Funds.

### Select Accomplishments

- Published three peer-reviewed journal articles in 2021-2022.
- Presented research at two academic conferences in 2021.
- Co-Principal Investigator of an interdisciplinary grant application of \$500,000 with the U.S. National Oceanic and Atmospheric Administration, entitled 'SC e-LEAD: South Carolina Environmental Literacy LEADership Program.'
- Served as a peer reviewer for five public administration journals between 2020-2022.
- Served as the external doctoral dissertation examiner at Kaunas University of Technology, Lithuania.



College of  
**BEHAVIORAL, SOCIAL  
AND HEALTH SCIENCES**

## **Lu Zhang, PhD**

*Assistant Professor*

**Public Health Sciences**



Zhang is a cancer epidemiologist who studies population-based lung cancer screening, health disparities in cancer control continuum, and personalized cancer treatment. Her research has examined the utilization and disparities of lung cancer screening in Prisma Health and South Carolina, timely surgery for lung cancer histologic subtypes, and the association between residential segregation and mortality in the U.S. Her current and recent research has been supported by Prisma Health, Clemson University Mary Lohr Foundation, and Dabo's All in Team Foundation.

Zhang teaches Epidemiology, a core course required for public health sciences undergraduate students. She also teaches PhD-level Epidemiology II, with a focus on epidemiological study design and analyses. Her classes are interesting and informative, very popular among public health sciences students.

### **Select Accomplishments**

- Published 14 peer-reviewed journal articles between 2019-2020.
- Presented her research in American Society of Preventive Oncology 2022 Annual Conference.
- Selected as 2021 College of Behavioral, Social and Health Sciences Research Innovation Faculty Fellow.
- Presented her research in IASLC 2020 North American Conference on Lung Cancer.
- Selected as a faculty member of Clemson University School of Health Research.
- Served as a reviewer of several cancer research journals with high impact factor.
- Currently serving on College of Behavioral, Social and Health Sciences research committee.



## Michelle Fox

Lecturer

Graphic Communications



Fox is a lecturer who focuses on instructional methodologies and resources to improve student understanding. She has developed and implemented a Graphic Communications (GC) Technical Outreach and Recruitment course aimed at exposing and educating K-12 students about graphic communications through informal learning experiences with Clemson GC students. She is a co-principal investigator on a CU Seed grant titled *The STEAM of Printmaking and Its Impact on Informal STEM Learning*.

During her time at Clemson, Fox has redeveloped the curriculum structure and class content for the Intro to Graphic Communications for Packaging Science Lab for majors (GC 1031) that focuses on general pre-press skills, application of design and print concepts, basic inks, substrates and color management. She has taught Inks and Substrates (GC 3460/1) and Commercial Printing Lab (GC 4401), integrating new lab projects into both. She is currently lead instructor for Intro to Graphic Communications I (GC 1040/1), which introduces students to screen printing and flexography, process optimization, spectrophotometry, and pre-press functions.

In response to the pandemic, Fox developed extensive home-use kits for the GC 3460, GC 1030 and GC 1040 laboratory sections that allowed online students to have a meaningful, hands-on experience with print making, ink and substrate quality metrics and color measurement. She also worked extensively with the Sonoco Institute to refine its flexographic print process virtual simulator and adapted it for use in GC 1040, 1030 and 4060 hybrid and online teaching environments. She is in the process of developing modules and collateral for the CU Seed Grant to be piloted in schools this fall.

### Select Accomplishments

- Awarded the College of Business Sales Innovation Program November 2020 Innovator of the Month.
- Chaired Clemson Graphic Communications Stay “Home” coming 2020.
- Organized and implemented online virtual simulated presswork coursework and competition modules for High School Phoenix Challenge Foundation for the International High School Phoenix Challenge Flexography Competition.
- Serves as an advisory council member and mentor for high school Graphic Communications programs.
- Serves as a Master’s Thesis and Non-Thesis Committee Member.



## Devon Gorry

Assistant Professor

Economics



Gorry is an assistant professor in the John E. Walker Department of Economics at Clemson University. Prior to joining Clemson, she was an assistant professor at Utah State University. Gorry's research focuses on applied microeconomics, health economics, labor economics, and public economics. Her research interests are wide-ranging and include the impact of vaccinations on mortality rates; Social Security, retirement and well-being in retirement; and the effects of policies such as taxes, retirement programs, and occupational transitions on labor market outcomes. Her research has been published in journals including *Annals of Internal Medicine*, *International Economic Review*, *Demography*, and *Public Finance Review*. Gorry received her Ph.D. and M.A. in economics from the University of Chicago and a B.A. in economics from Dartmouth University.

### Select Accomplishments

- Since arriving at Clemson in 2017, she has published eight papers in highly regarded economics journals.
- One of her most recent papers, "*The Effect of Influenza Vaccination for the Elderly on Hospitalization and Mortality: An Observational Study with a Regression-Discontinuity Design*," published in 2020 shows she was well ahead of the curve in terms of understanding the efficacy of vaccinations on mortality rates for the elderly.
- Overall, has published 11 publications in refereed journals.
- Has two additional published manuscripts, three working papers, and four other papers in progress.
- Has been funded by the National Institutes of Health (NIH).
- Has been cited more than 200 times, according to Google Scholar.
- Has taught courses on health economics, principles of microeconomics, econometrics and industrial organization.





## Gregory P. McPhee, PhD

*Assistant Professor*

**School of Accountancy**



McPhee is an assistant professor in the School of Accountancy. His research investigates the effects of accounting information and incentives on managerial decision making and performance. McPhee's research helps practitioners design more effective compensation and performance feedback systems.

McPhee teaches upper-division undergraduate classes in management accounting, as well as introductory accounting classes for MBA students in the entrepreneurship program. His primary teaching objective is to equip students with the technical skills needed to address a range of real-world accounting challenges in increasingly globalized business settings. Toward this end, McPhee believes that it is important to foster greater technical competency among students, provide opportunities for students to apply their technical knowledge toward solving real-world business challenges, and develop students' ability to effectively communicate their analysis to others.

### Select Accomplishments

- Presented his co-authored paper "*The effects of internal information quality on CSR performance*" at the Management Accounting Section Midyear meeting in 2021.
- Co-authored paper "*Internal information quality and patent-related Innovation*" that was published in the Journal of Business Finance and Accounting in 2020. The paper was presented at the journal's invitation-only conference in Berlin, Germany in 2019.
- Co-authored paper "*The informativeness of relative performance information and its effect on effort allocation in a multi-task environment*" that was published in Contemporary Accounting Research in 2019. The paper was presented at the journal's invitation-only conference in Montreal, Canada in 2017.
- Co-authored paper "*Does stock liquidity affect accrual-based earnings management?*" that was published in the Journal of Business Finance and Accounting in 2017. The paper was presented at the journal's invitation-only conference in Chapel Hill in 2016.
- Co-chaired the Florida Accounting Behavioral Research Symposium in 2017.
- Served on the AICPA Accounting Scholars Leadership Workshop Selection Committee in 2015 and 2017.



## Golnaz Arastoopour Irgens, EdD

*Assistant Professor*

**Education and Human Development**



Arastoopour Irgens's research focuses on: (1) designing immersive, inclusive digital learning environments with a focus on engineering and computer science; and (2) using learning analytics to investigate how learners make cognitive and socio-emotional connections. She uses participatory methods that actively involve teachers, students, and community partners to co-design learning environments that serve their communities. The scholarly contributions of her work are to develop sociocultural models of learning and how to successfully engage youth in programs that promote ethical, culturally responsive, and critical technology-based learning.

She has published in premier journals for her field, such as the *Journal of Science Education and Technology*, *Journal of Learning Analytics*, *Instructional Science*, *Learning, Media and Technology* and the *Journal of Statistics and Data Science Education*. She has been awarded more than \$1.2 million in grant funding, including awards from the Clemson College of Education and National Science Foundation. She has been invited to give research talks at Georgia Tech's Gvu Center Series, The Clemson College of Education REAL Lunch Series, The University of Wisconsin Master's in Learning Analytics Webinar Series, and The International Society for Quantitative Ethnography Webinar Series. In October 2019, she delivered an invited keynote address at the International Conference for Quantitative Ethnography.

Arastoopour Irgens is a member of the International Society of the Learning Sciences (ISLS), International Society for Quantitative Ethnography (ISQE), American Education Research Association (AERA), and the Society of Learning Analytics Research (SoLAR). At Clemson University, she is a member of the Clemson Artificial Intelligence Research Institute for Science and Engineering (AIRISE), a member of the College of Education Inclusive Excellence Implementation team, and was a committee member for the newly developed Human Capital Education and Development undergraduate degree program.

### Select Accomplishments

- Director of the IDEA Research Lab at Clemson University.
- Vice President of the International Society for Quantitative Ethnography.
- Keynote Speaker for the 2019 Conference for Quantitative Ethnography (ICQE19).
- Principal Investigator for BCSE: Modeling and measuring critical data literacies in informal learning environments. National Science Foundation. \$314,271.
- Selected for State of South Carolina K-12 Science Standards Writing Committee.



**Koti L. Hubbard, PhD**

*Lecturer*

**Teaching and Learning**



As a native of South Carolina, Hubbard is passionate about preparing preservice and in-service teachers to serve the needs of children in this state. She teaches courses that focus on social-emotional learning, diversity and critical issues, and curriculum development for children from birth to third grade. Beyond the classroom, Hubbard engages in scholarship focused on early childhood literacy development, social studies teaching, culturally responsive pedagogy, and preservice teacher preparation. Currently, she is investigating the experiences of beginning teachers in schools with significant levels of poverty and the impacts of a culturally responsive summer literacy camp on emergent bilingual children in kindergarten through third grade.

As a College of Education alumna, Hubbard is committed to the College's mission to enhance the education and development of all students and better the lives of South Carolina's citizens. She is the editor of *Literacy Matters*, the state journal for the Palmetto State Literacy Association, which serves the needs of teachers and other literacy professionals in South Carolina. In addition, she co-facilitates a literacy summer camp for young emergent bilingual children in York County. Recently, she worked with colleagues to develop a curriculum to prepare teachers of children of poverty in our state.

## Select Accomplishments

- Editor of *Literacy Matters*.
- College of Education Award for Excellence in Teaching (2019-2020, Winthrop University).
- SC Department of Education African American History Instructional Materials Grant, *Young Children Explore Historical Figures*.
- Publications in state- and national-level journals, including *Social Studies and the Young Learner* and *Education in a Democracy*.
- Re-designed courses in the Early Childhood Education program.



## Sarah Stokowski, PhD

Associate Professor

Educational & Organizational Leadership



Stokowski studies college athlete development, specializing in personal development literacies (e.g., career maturity, athlete identity, athlete transition). In partnership with the Professional Association of Athlete Development Specialist (PAADS), she is the founding Editor-in-Chief of the *Journal of Athlete Development and Experience* (JADE). Stokowski edited the special issue, “Mental Health and College Athlete Well-being” for the *Journal of Issues in Intercollegiate Athletics*, and currently serves on six editorial boards (e.g., *Journal of Student-Athlete Educational Success and Development*, *Journal of Higher Education Athletics and Innovation*, *Journal of Amateur Sport*, *Journal of Intercollegiate Sport*, *Journal of Issues in Intercollegiate Athletics*, *Journal of Leisure and Recreation Patterns*).

Throughout her tenure, Stokowski has secured \$342,000 in grants and gifts, including the 2018-2021 NCAA CHOICES grant, as well as funding through the U.S. Department of Veteran Affairs to implement adaptive sport programming. She is a Robert H. Brooks Sport Science Institute Fellow, which recognizes the top sport scholars at Clemson. Stokowski is also a Renowned Research Fellow at the U.S. Center for Mental Health and Sport, a College Sport Research Institute (CSRI) Research Fellow, and a recipient of the National Association of Academic and Student-Athlete Development Professionals (N4A) research award. She received her doctorate in Kinesiology and Sport Studies from the University of Tennessee. Before joining the Athletic Leadership program at Clemson, Stokowski spent six years as at the University of Arkansas, earning teaching awards at both the departmental and college levels.

### Select Accomplishments

- College Sport Research Institute (CSRI) Research Fellow.
- Robert H. Brooks Sport Science Institute Fellow.
- U.S. Center for Mental Health and Sport Renowned Research Fellow.
- Founding Editor-in-chief *Journal of Athlete Development and Experience*.
- 2018-2021 NCAA CHOICES grant recipient.
- U.S. Department of Veteran Affairs grant recipient.
- NASSM executive committee, member-at-large.



**Miriam Konkel, PhD**

*Assistant Professor*

**Genetics and Biochemistry**



Konkel is an internationally recognized and federally funded scientist in two broad research fields: genomic structural variation with focus on primate “jumping genes” (or “transposable elements”) and human-computer interaction. In her transposable element research, Konkel investigates the impact of transposable elements on the human genome at the DNA and transcriptome (gene expression) levels. She is federally funded through the recently awarded NIH COBRE in Human Genetics grant, on which she is a junior investigator. To enhance interaction with large genomics datasets and promote science communication, Konkel is working on tangible user interface design, and is a co-PI on an NSF MRI (Major Research Implementation) developmental track with graduate student support.

Konkel received her M.D. from the Charité, Humboldt University. During medical school, Konkel pursued HIV research, leading to research at the Dana-Farber Cancer Institute in Boston. She joined Clemson University in 2017, and in 2018 received the University Research, Scholarship and Artistic Achievement Award (URSAAA). Konkel is an author on 45 papers (13 published since her arrival at Clemson).

She has taught several highly regarded core courses in Genetics at undergraduate and graduate level at Clemson. Closest to her heart with regard to formal teaching is Human Genetics, where she strives to bring genetics to life. Mentoring and professional development are major pillars of her lab. Since her arrival at Clemson, Konkel has mentored 23 undergraduate students, with several of them presenting their research at scientific events and conferences.

## Select Accomplishments

- Funding from NSF and NIH (NIH COBRE junior investigator and NSF MRI Co-PI).
- Participant representing Clemson at Smithsonian ACCelerate Festival (April 2022).
- Invited member of two Human Genome Structural Variation Consortium working groups.
- Invited speaker and session chair at the FASEB Mobile DNA Conference (June 2022).
- Presenter and session chair at ACM Pervasive Displays conference (Italy, 2019).
- Invited participant of Leibniz Institute workshop (Dagstuhl, Germany, 2019).
- Inaugural URSAAA awardee and invited presenter at URSAAA banquet (2018).
- Mentored 23 undergraduate students, six graduate students, and one postdoc.



## Brook T. Russell, PhD

*Associate Professor*

**School of Mathematical and Statistical Sciences**



Russell is a leading researcher in the field of environmental extremes in Clemson University's School of Mathematical and Statistical Sciences (SMSS). Whereas typical statistical procedures focus on modeling what occurs 'on average', extreme value methods focus on understanding the far upper tail of a response distribution. Although events in the far upper tail occur infrequently, they typically are highly influential (i.e., hurricanes, droughts, heat waves), and developing statistical methods to better understand them is of critical importance. In recent years, his research focus has primarily been related to the use of satellite data, station data, and reanalysis data products to model precipitation and air pollution extremes. As an example, in recent work, Russell and collaborators developed statistical methodology to analyze precipitation and sea surface temperature (SST) data in the U.S. Gulf Coast region. Using their novel approach, they were able to characterize the ways in which warmer SST in the Gulf of Mexico impact extreme precipitation over this highly populated region, and how the chances of seeing extreme precipitation events could change under different SST scenarios.

Russell has published 20 peer-reviewed manuscripts in prestigious journals. In order to further his research program, he also received support from the NSF funded Statistical and Applied Mathematical Sciences Institute (SAMSI). To better address real-world problems in environmental statistics and beyond, Russell and another Clemson University SMSS faculty member have established a working group, consisting of graduate students and faculty members at Clemson University.

In addition to his cutting-edge research in environmental extremes, Russell regularly collaborates with researchers in other fields on interdisciplinary research projects. For example, he has worked with researchers at Clemson University in Biological Sciences, Civil Engineering, Marketing, Food, Nutrition, and Packaging Sciences, and Parks, Recreation and Tourism Management.

### Select Accomplishments

- Led and participated in four grant projects funded by NIH, USACE, and NOAA (three as PI and one as Co-Investigator).
- Over \$2 million in extramural research funding (~\$180K for personal share).
- Published 20 peer-reviewed manuscripts in prestigious journals.
- Presented more than 20 invited/contributed talks at conferences and colloquia.
- Serves as faculty research mentor to junior faculty.
- Advised/co-advised two PhD students, four MS students, and >10 undergraduate students.
- Advising five graduate students and four undergraduate students.



## Anna Seekatz, PhD

*Assistant Professor*

**Biological Sciences**



Seekatz is a microbiologist at Clemson University. Her research focus is on the gut microbiota, the trillions of microbes inhabiting the gastrointestinal tract. Gut microbes are known to influence human health and are involved in important biological processes, such as energy acquisition, immune development, and resistance to infectious diseases. Seekatz's research program at Clemson investigates interactions between these 'good' gut bacteria that modulate disease development or maintain health. One of the research foci of the Seekatz lab is the role of gut microbes in development of Clostridioides (Clostridium) difficile infection, an important healthcare-associated pathogen that impacts more than 450,000 people annually in the United States. It is known that recovery of a diverse gut microbiota is critical to prevention of recurrent C. difficile infection. Seekatz's research has improved knowledge surrounding which microbes are key to C. difficile resistance, aiding development of non-antibiotic therapeutics to treat infection. Her group also uses bioinformatics and develops new laboratory methods to isolate and characterize beneficial microbes in the gut, many of which remain understudied. Unmasking novel microbial functions and interactions that are necessary for human health can lead to the new ways of manipulating the microbiota for our benefit.

Seekatz currently mentors three PhD students, one MS student, and one Postdoctoral Fellow in her lab. She has also mentored 12 undergraduate students in the lab through Clemson's Creative Inquiry classes or their Honors' Thesis. Five of these students are current or accepted PhD students at various programs across the country. Teaching Bacterial Pathogenesis to senior Microbiology majors also provides another opportunity for Seekatz to mentor undergraduate students toward STEM careers with a focus on microbiology and infectious diseases.

### Select Accomplishments

- Currently funded by the NIH (NIAID, ~\$568K, PI) to investigate how different microbial functions and products contribute to clearance of C. difficile from the gut.
- Currently funded by the NSF as part of a collaborative project of five PIs at Clemson University (~\$2.5, Co-PI) to research how resource complexity in the environment shapes functional redundancy of diverse microbial communities across different habitats.
- Received the 2020 Peggy Cotter Travel Award for the S.C. branch of the American Society for Microbiology.



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