



RESEARCH

*Board of Trustees Report
July 2021*

Dear Board of Trustees Members,

I hope you and your loved ones remain healthy as the world continues to reopen and provide us a much-needed return to some face-to-face interaction. In May, I joined President Clements, Provost Jones and around 200 faculty members at our annual [Research Symposium](#). The event brings together faculty from all colleges, campuses and the libraries to share ideas and form collaborations. This year, we held the Symposium partially on Zoom and partially in person at the Watt Family Innovation Center. I cannot overstate how fulfilling it was to see so many colleagues in person again. The energy in the room was inspiring, and I hope to see some fruitful research collaborations growing from this event. I believe we were all happy to see each other's faces again, even if at that time it was still behind a mask.

At the Symposium, we also named our 2021 Researchers of the Year and recognized our latest recipients of the University Research, Scholarship and Artistic Achievement Awards (URSAAA). As we enhance our research culture, it is important to recognize our successes and inspire others to reach for the top. These awards programs do that. You can read more about our Researchers of the Year and URSAAA recipients on [pages 44-48](#).

Over the past year, we have discussed research quality, efficiency and relevance at each of our respective Research and Economic Development Committee meetings. I have provided a brief overview on [pages 4-12](#) to highlight the quality, efficiency and relevance of our research enterprise. Our Carnegie R1 designation confirms the quality of our research enterprise. Growth in competitive awards confirms the relevance of our research and the quality of our ideas. And, of course, the increasing number of peer-reviewed publications and citations confirms that our research is top quality and relevant to the scholarly community. And finally, the significant growth in research activity has been achieved efficiently, with our per-capita output growing greatly and our research-per-space and per-person comparing favorably to our peers.

Our research enterprise continues to grow, and as we have returned to campus, we continue to compare research metrics before COVID-19 to metrics during the pandemic, as you will see in charts in our Research Metrics section. Some research projects may remain impacted by operational status at partner institutions or industry collaborators, for example. While we monitor COVID-19's impact on research, we continue to see positive signs in our research metrics:

Our research enterprise continues to grow, and as we have returned to campus, we continue to compare research metrics before COVID-19 to metrics during the pandemic, as you will see in charts in our Research Metrics section. Some research projects may remain impacted by operational status at partner institutions or industry collaborators, for example. While we monitor COVID-19's impact on research, we continue to see positive signs in our research metrics:

- Research awards were \$145 million through May, already surpassing prior-year levels ([see page 16](#)).
- Proposal submissions remain strong, reaching \$695 million through May ([see page 20](#)).
- Junior faculty have earned an increasing number of early-career awards, which are career catalysts and among the most prestigious awards young investigators can receive ([see page 11](#)).

Clemson faculty have earned several high-value awards in the past several months. So far this year, Clemson faculty have received 12 research projects valued at or above \$2 million, bringing a total of \$65 million to Clemson. Since 2015, we have earned 58 such awards valued at a total of \$281



Tanju Karanfil

Continued on next page

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million. Behind these numbers are interesting and exciting new endeavors. You can view details on our top recent awards on [pages 17-19](#).

While our research enterprise grows, so does our reputation. Clemson faculty and students are earning significant national and international recognition. A Clemson faculty member earned a prestigious fellowship at the Hutchins Center for African & African American Research at Harvard University ([see page 33](#)). For the first time, a Clemson faculty member has been elected a member of the American Philosophical Society, the oldest learned society in the United States ([see page 34](#)). Seven students earned highly competitive National Science Foundation Graduate Research Fellowships ([see page 39](#)). One of our Ph.D. students was named among the country's 30 young professionals to watch in her field ([see page 37](#)). Numerous examples of significant honors and achievements are provided on [pages 33-42](#).

I encourage you to read our [Research News section](#) for more on these achievements and others, as well as details on recently published books authored by Clemson faculty and examples of Clemson research having a positive impact on society. Clemson research has helped provide innovative new materials for the construction industry ([see page 29](#)). Clemson researchers are using artificial intelligence to improve K-12 education across South Carolina ([see page 31](#)). A Clemson researcher helped to create a new compound that could unlock new forms of electric power ([see page 32](#)). There is so much exciting research to share at Clemson. This is an exciting time to be a Tiger.

Respectfully submitted,



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

Vice President for Research, Clemson University

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VPR letter

1. QER

2. Metrics

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RESEARCH

— QUALITY, EFFICIENCY & RELEVANCE —

This section reviews the relevance, efficiency and quality of Clemson’s research endeavors.

Executive Summary

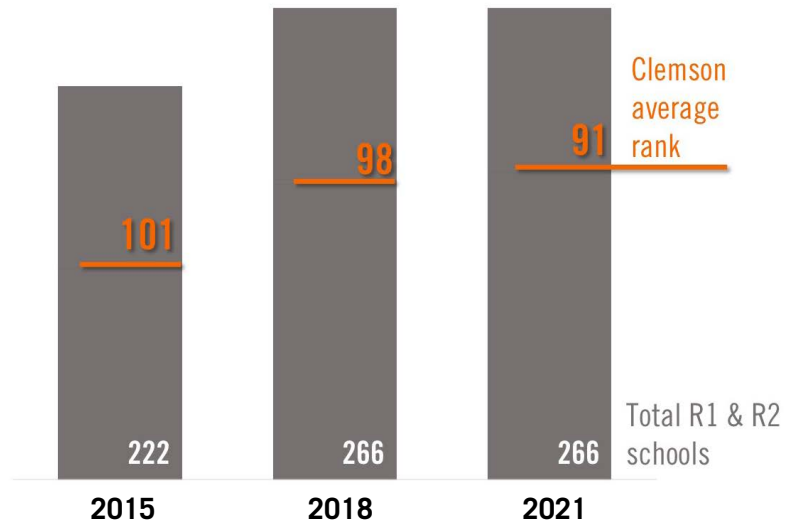
- As a Carnegie R1 institution, Clemson is listed among the nation’s most highly active research institutions. The designation, which is likely to be reconfirmed in 2022, validates the **quality** of Clemson’s research enterprise ([see page 5](#)).
- Federal expenditures at Clemson have increased significantly since 2016 as federal agencies increasingly reward **relevant** research ideas from Clemson faculty ([see page 6](#)).
- Clemson faculty are publishing more peer-reviewed articles and being increasingly cited by the scholarly community, a sign of the **quality** and **relevance** of their research findings ([see page 7](#)).
- Clemson’s research enterprise continues to operate **efficiently**, with per-capita productivity improving greatly since 2013 ([see page 8](#)).
- Clemson operates **efficiently** when compared to peer institutions, performing above average in terms of research activity per available space ([see pages 9-10](#)).
- Clemson junior faculty are increasingly competitive earning early-career awards, a sign of **relevant** ideas and **quality** research proposals. This year, 10 Clemson faculty have earned early-career awards ([see page 11](#)). This is the second consecutive year Clemson has had 10 early-career award winners ([see page 12](#)).

Carnegie R1

 **Clemson’s Carnegie R1 designation confirms the quality of its research enterprise.**

Carnegie is expected to release its latest classification in early 2022. Given Clemson’s progress in the metrics tracked by Carnegie (see chart below), the R1 designation is likely to be reconfirmed.

Carnegie does not rank schools, but the Division of Research has been analyzing Clemson’s performance in Carnegie metrics to estimate its position among Carnegie institutions. Based on that analysis, Clemson’s average rank among Carnegie peers has improved since 2015 (see chart at right).



TRACKING CARNEGIE METRICS

The table below charts Clemson’s performance from 2018 to 2020 among the 10 metrics Carnegie tracks. Clemson has improved in all but two metrics since 2018, when the last Carnegie Classification was released. That classification included Clemson as in R1 institution. Data for the upcoming classification has been submitted. Carnegie is expected to release its classification in 2022.

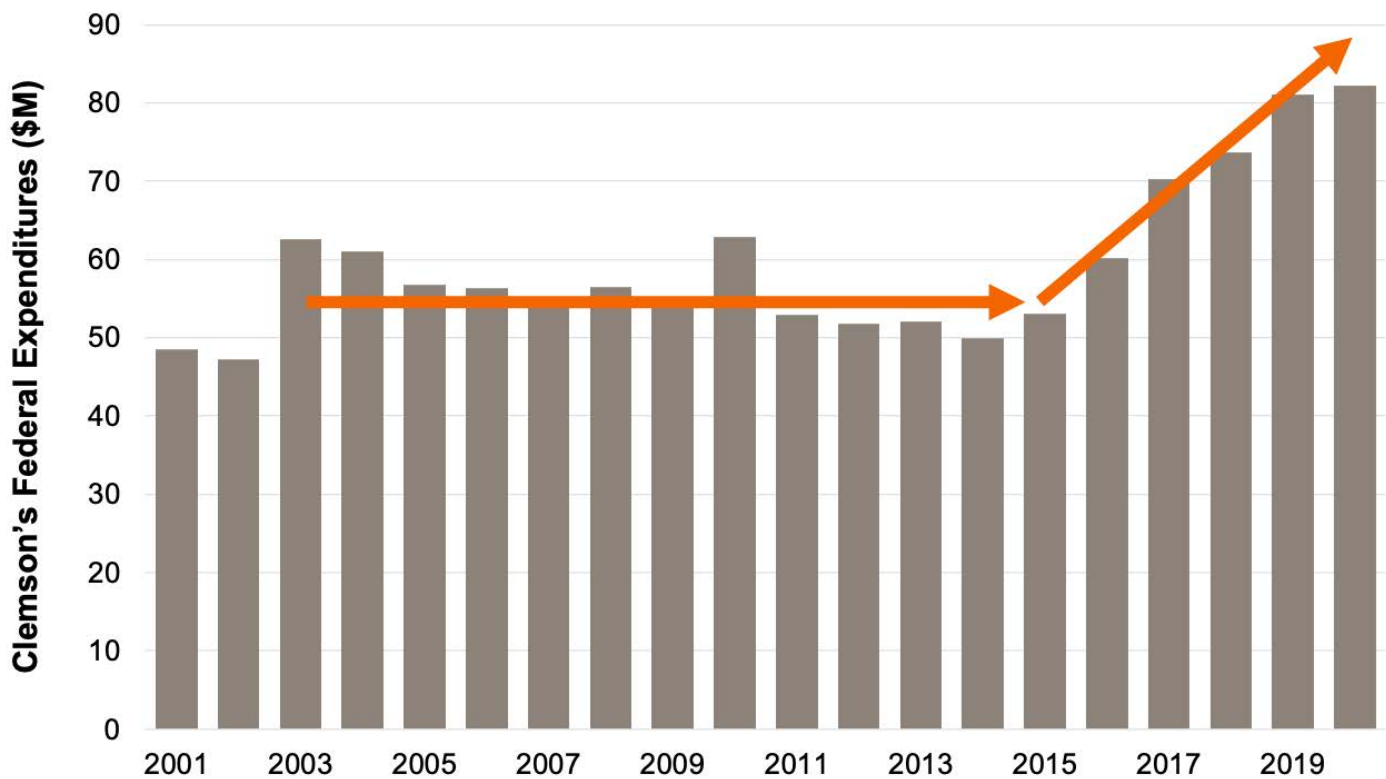
Metrics	Clemson 2018	Clemson 2020	Δ Metric 2018-2020
Science & Engineering Expenditures	\$145M	\$165M	↑ \$20M
Non-Science & Engineering Expenditures	\$49M	\$54M	↑ \$5M
Postdoc & Non-Faculty Researchers	111	162	↑ 51
PhD Humanities	8	7	-1
PhD Social Sciences	20	25	↑ 5
PhD STEM	170	156	-14
PhD Other	33	55	↑ 22
Per Capita Science & Engineering Expenditures	\$159K	\$174K	↑ \$15K
Per Capita Non-Science & Engineering Expenditures	\$53K	\$56K	↑ \$3K
Per Capita Postdoc & Non-Faculty Researchers	0.122	0.170	↑ 0.048

Federal Expenditures

→ Highly competitive federal programs reward relevant ideas

Grants from the federal government are highly competitive, attracting applications from the top academic minds from the top academic institutions across the country.

Clemson faculty have been increasingly successful at winning federal grants, as evidenced by an increase in our federal expenditures (see chart below). Clemson posted big increases in federal expenditures in the early 2000s but then expenditures remained relatively flat until 2016. At that time, we start to see Clemson’s federal expenditures begin to climb. From 2016 to 2020, federal expenditures at Clemson increased 37 percent. Meanwhile, overall federal research and development expenditures in higher education were fairly flat over that time.



*2020 totals preliminary

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

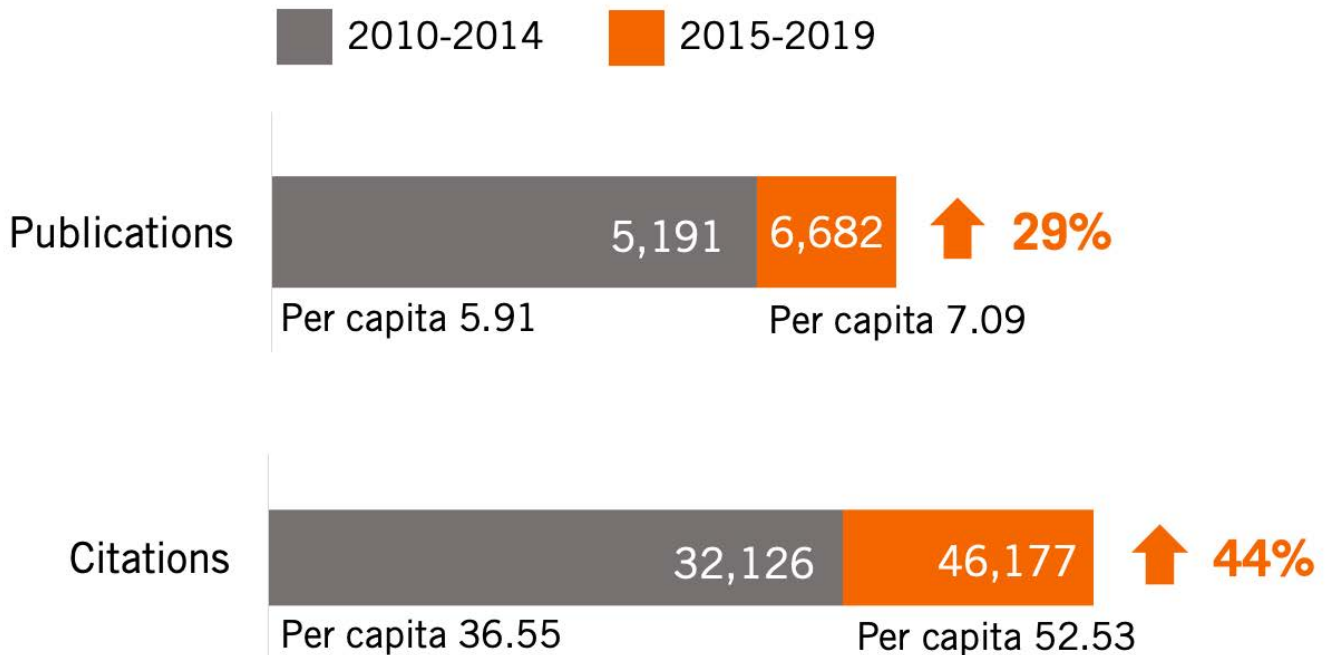
Publications and Citations

→ Journals publishing more Clemson 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 are confirming the relevance of the work and declaring it a worthwhile contribution that others should read. As Clemson has earned more grant awards and increased expenditures, its scholarly output in the form of journal articles has increased also.

The chart below compares the annual average number of publications by Clemson authors over two four-year periods: 2010-2014 and 2015 to 2019.

When researchers publish articles on their findings, other scientists often cite the information in their own research. These citations affirm the relevance of Clemson’s findings and help to advance discovery across the world. Over the past decade, findings from Clemson research have been increasingly cited by the scholarly community. The chart below shows annual average citations for Clemson authors over the same two four-year periods.



SOURCE: Web of Science

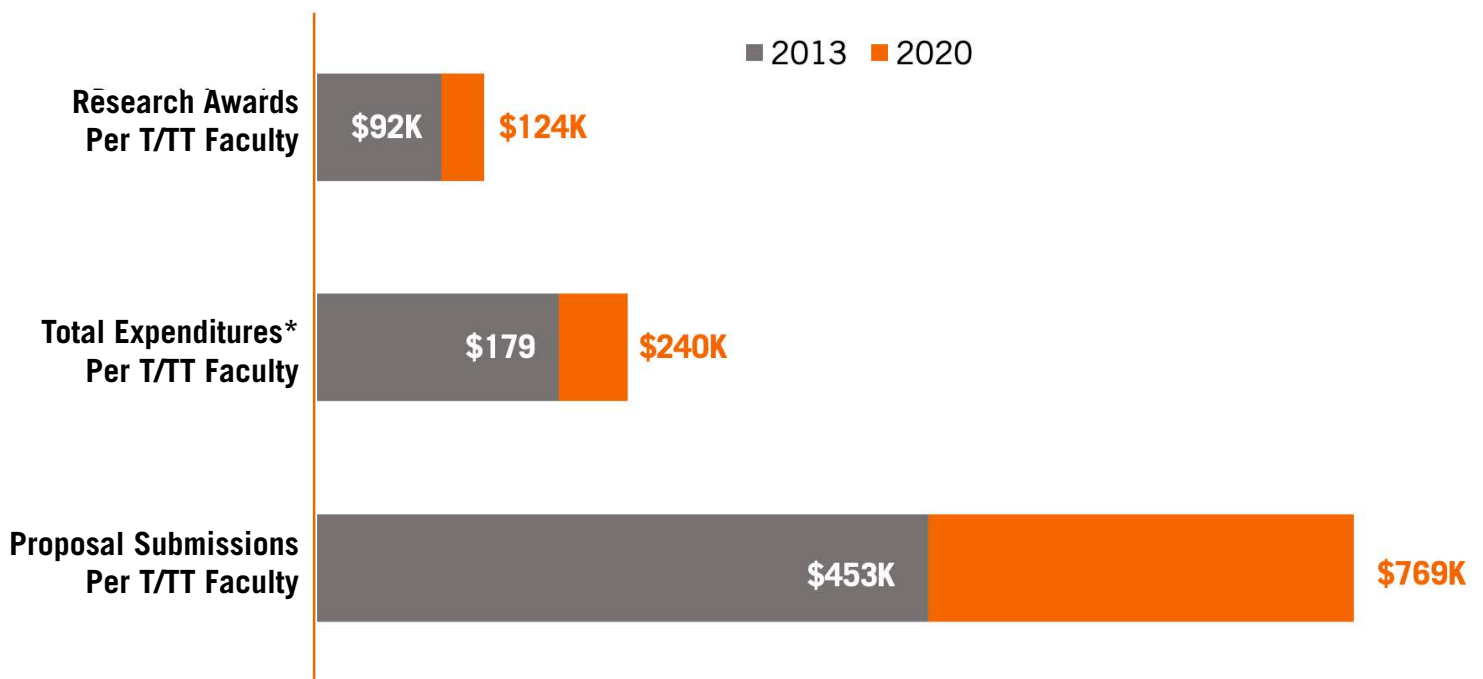
Increasing Productivity

→ Per-capita productivity is increasing

As detailed throughout the [Research Metrics section](#), Clemson’s research enterprise has grown greatly since 2013. Clemson faculty are submitting more proposals and earning more grant awards, and in turn, increasing research expenditures.

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 2020.

Importantly, the Division of Research has managed the increased workload efficiently without significant increases to its staff size or budget. To help with efficiency, the Division added a digital system for managing safety training, lab inventories, inspections, and other safety requirements. This has saved time for both staff and faculty.



* 2019 data most recent available T/TT = Tenure and Tenure-Track

Operating Near Capacity

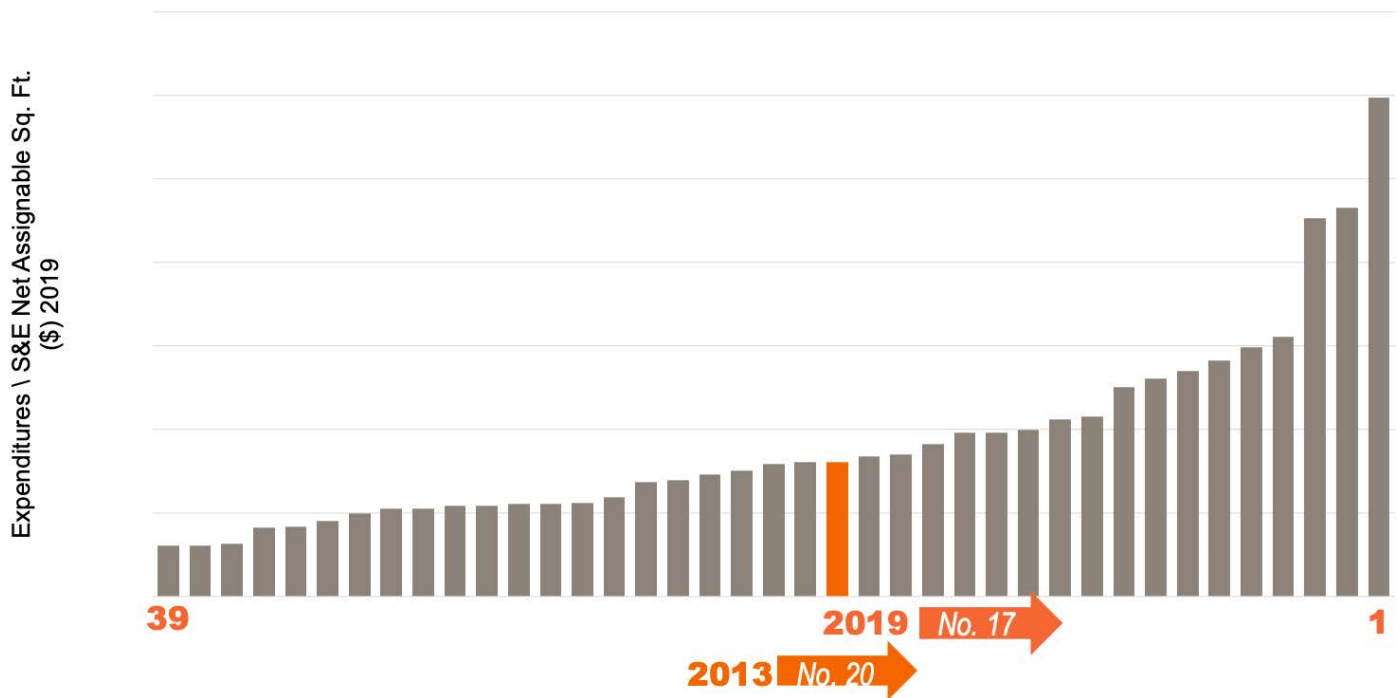
→ Productivity nearing peak given faculty size and available space

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

Operating Near Capacity

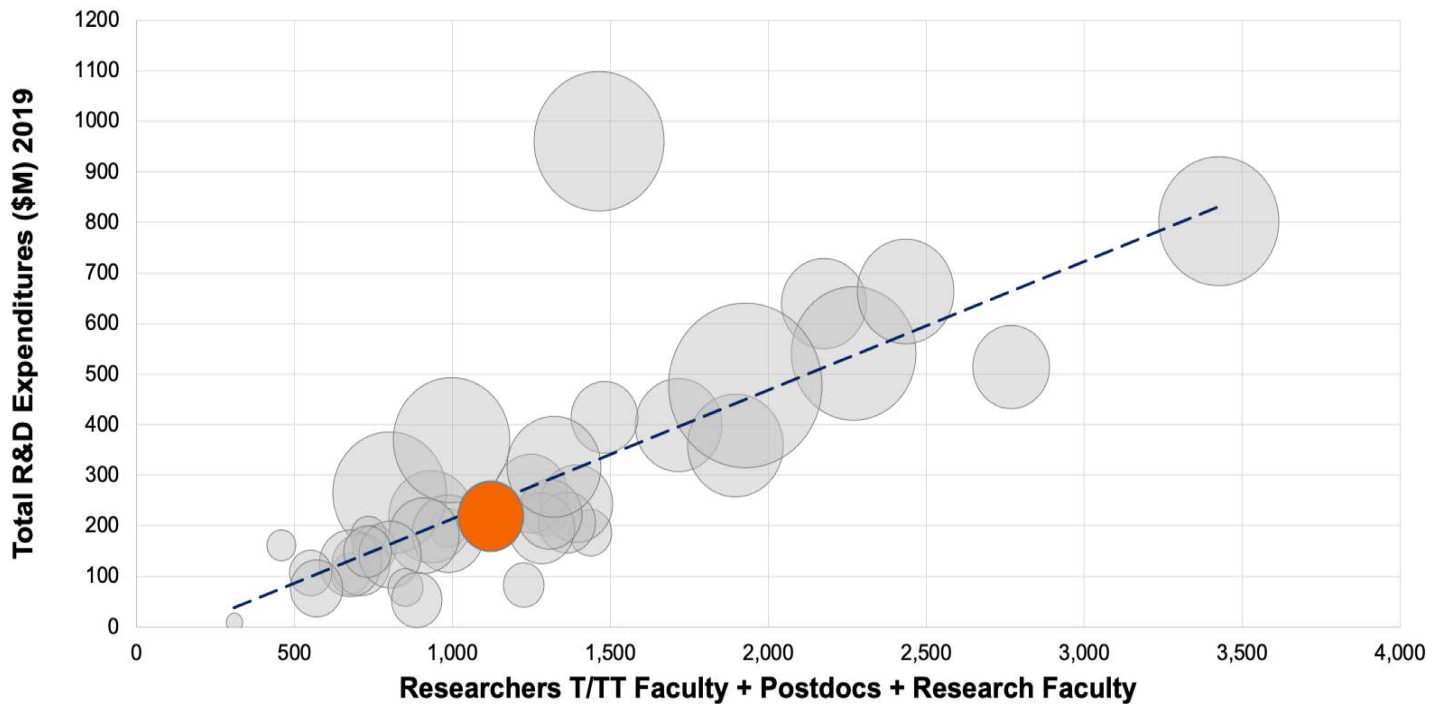
 **Productivity nearing peak given faculty size and available space**

The chart below plots Clemson’s peer R1 universities 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 (greater output) have larger faculty bodies and/or more available space. This suggests that Clemson is operating near its research capacity, so further research growth would require faculty hiring and investments in space.

Total Expenditures by Researchers Per Science and Engineering Space:

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



Early-Career Awards

Numerous funding agencies offer grant programs available to early-career faculty. These highly competitive programs serve as catalysts to jumpstart the careers of the nation’s most promising young faculty. Clemson faculty have earned 10 such awards this year. These programs confirm the quality of Clemson’s young faculty and the relevance of their research pursuits. Clemson’s future is bright.



Angela Alexander-Bryant

Bioengineering

Angela is working to develop new therapeutics and enhance drug delivery.



Kai He

Materials Science & Engineering

Kai is researching nanomaterials for uses in sustainable energy and quantum information technologies.



Ioannis Karamouzas

School of Computing

Ioannis’s research revolves around robotics, interactive virtual worlds, and data science.



Bart Knijnenburg

School of Computing

Bart is researching the principles of human-computer interaction.



Yingjie Lao

Electrical and Computer Engineering

Yingjie is working to protect Artificial Intelligent systems from cyber attacks.



Jessica Larsen

Chemical and Biomolecular Engineering

Jessica is working to develop materials for drug delivery applications in neurodegenerative disease.



Garrett Pataky*

Mechanical Engineering

Garrett’s research supports the development of stronger materials.

* award pending



Judson Ryckman

Electrical and Computer Engineering

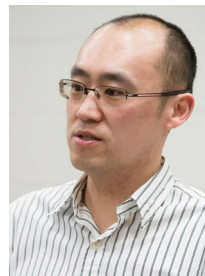
Judson is working on improved sensors for less-expensive diagnostic tests.



Yongjia Song

Industrial Engineering

Yongjia is working to develop optimization technologies to support improved logistics for disaster relief.



Xin Zhao

Mechanical Engineering

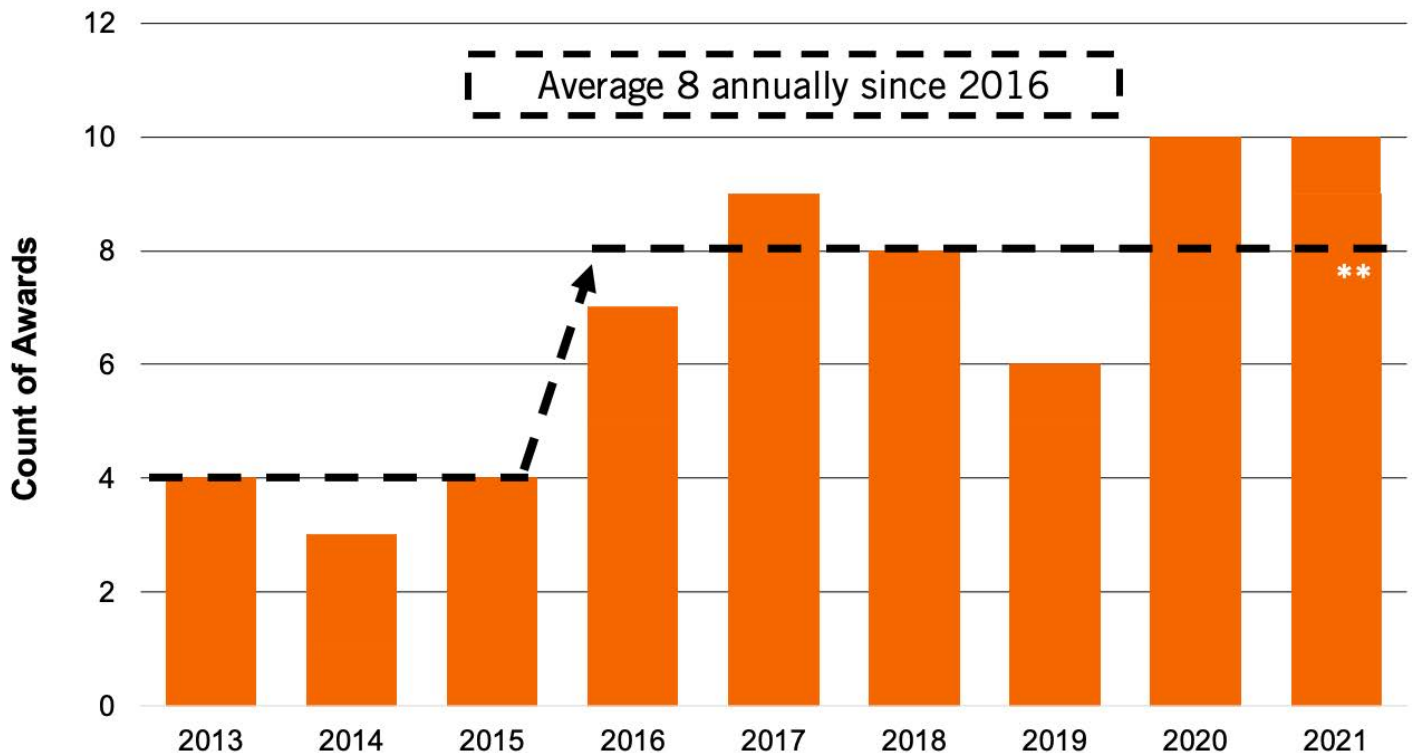
Xin is creating manufacturing techniques for improved materials, such as eyeglasses that won’t fog or windshields that won’t ice over.

Early-Career Awards

 **10 early-career awards earned each of the past two years.**

Clemson’s early-career faculty have become increasingly successful earning these awards. The Office of Research Development offers an annual CAREER Academy that helps faculty craft competitive proposals. The effort is paying dividends. The chart below shows the number of early career awards earned each year since 2013. From 2013-2015, Clemson averaged nearly 4 career awards a year. Since 2016, Clemson has averaged eight per year. These are important awards that provide around five years of research funding to help young investigators establish their research portfolios. Some of Clemson’s most accomplished researchers once earned early career awards to jumpstart their work.

A list of Clemson faculty who have earned career awards is [posted online](#).



**2021 totals preliminary



RESEARCH

RESEARCH METRICS

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

Executive Summary

- Research expenditures continue to increase:
 - » Total research and development expenditures, which include revenue from state support, gifts, external research services and other sources, including competitive awards, have increased 50 percent from 2013 to 2020 ([see page 14](#)). This is an important metric for Carnegie Classification.
 - » Competitive research expenditures, which include funds from competitively bid projects, reached \$94 million through May and are on pace to reach the ClemsonForward goal of \$100 million for the third consecutive year ([see page 15](#)).
- Research awards for FY2021 have already surpassed FY2020 levels, reaching \$145 million through the end of May ([see page 16](#)). That's an increase of 23 percent from FY2020.
- Clemson faculty continue to be successful earning high-value grants. Faculty have earned 12 projects this fiscal year valued at \$2 million or above, bringing a combined \$65 million to the University.
 - » Brief descriptions of the highest-value grants recently received are listed on [pages 17-19](#).
- Proposal submissions remain high with \$695 million in proposals submitted through May of FY2021 ([see page 20](#)).
- Despite positive trends in metrics, COVID-19 has caused disruptions to research activity ([see page 21](#)).
- The Research Report Card includes additional details on awards, expenditures and proposals by college and unit on [pages 22-25](#).

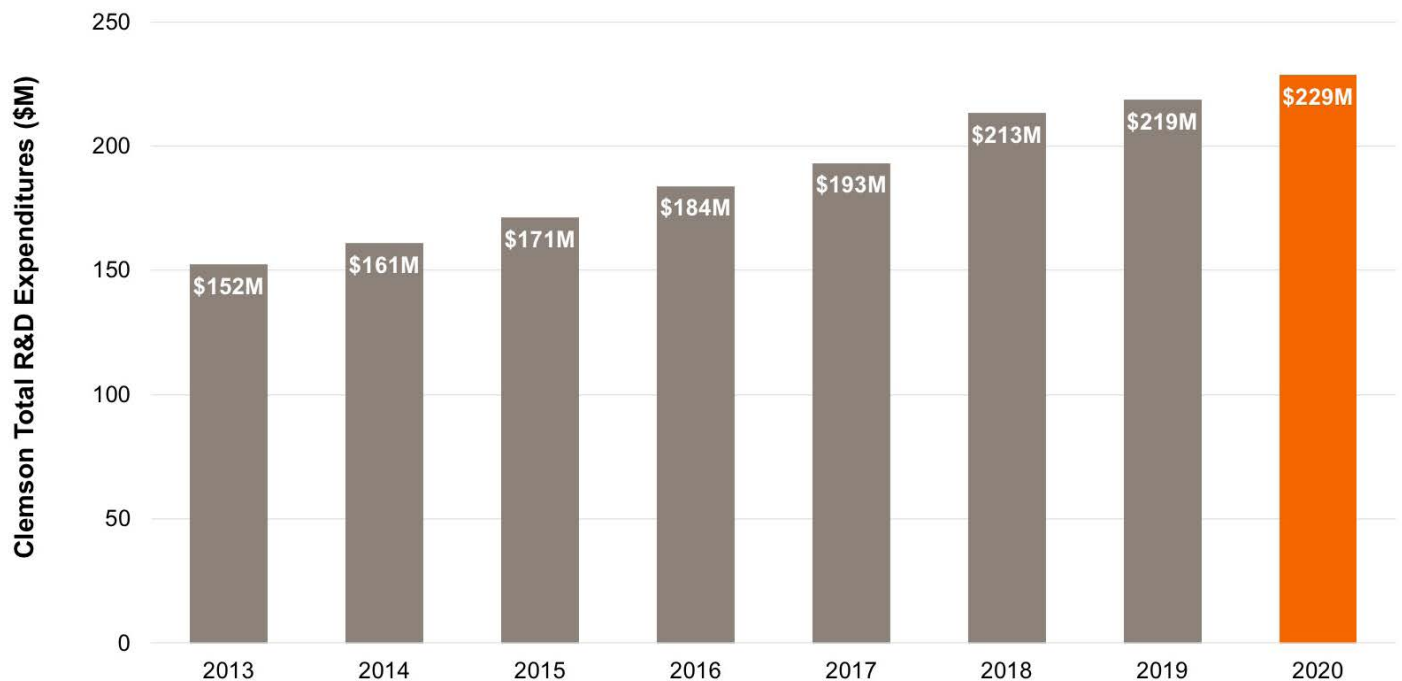
Research Expenditures

→ Total R&D expenditures continue to climb

Reported to the National Science Foundation and used in the Carnegie Classification, total R&D expenditures are important to track and provide apples-to-apples comparisons to peer institutions.

These expenditures include revenue from state support, gifts, external research services and other sources, including competitive awards.

Clemson has posted 6 percent average annual growth in total R&D expenditures since 2013. Total R&D Expenditures have increased more than 50 percent from 2013 to 2020, the latest year for which data is available.



* 2020 total preliminary

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

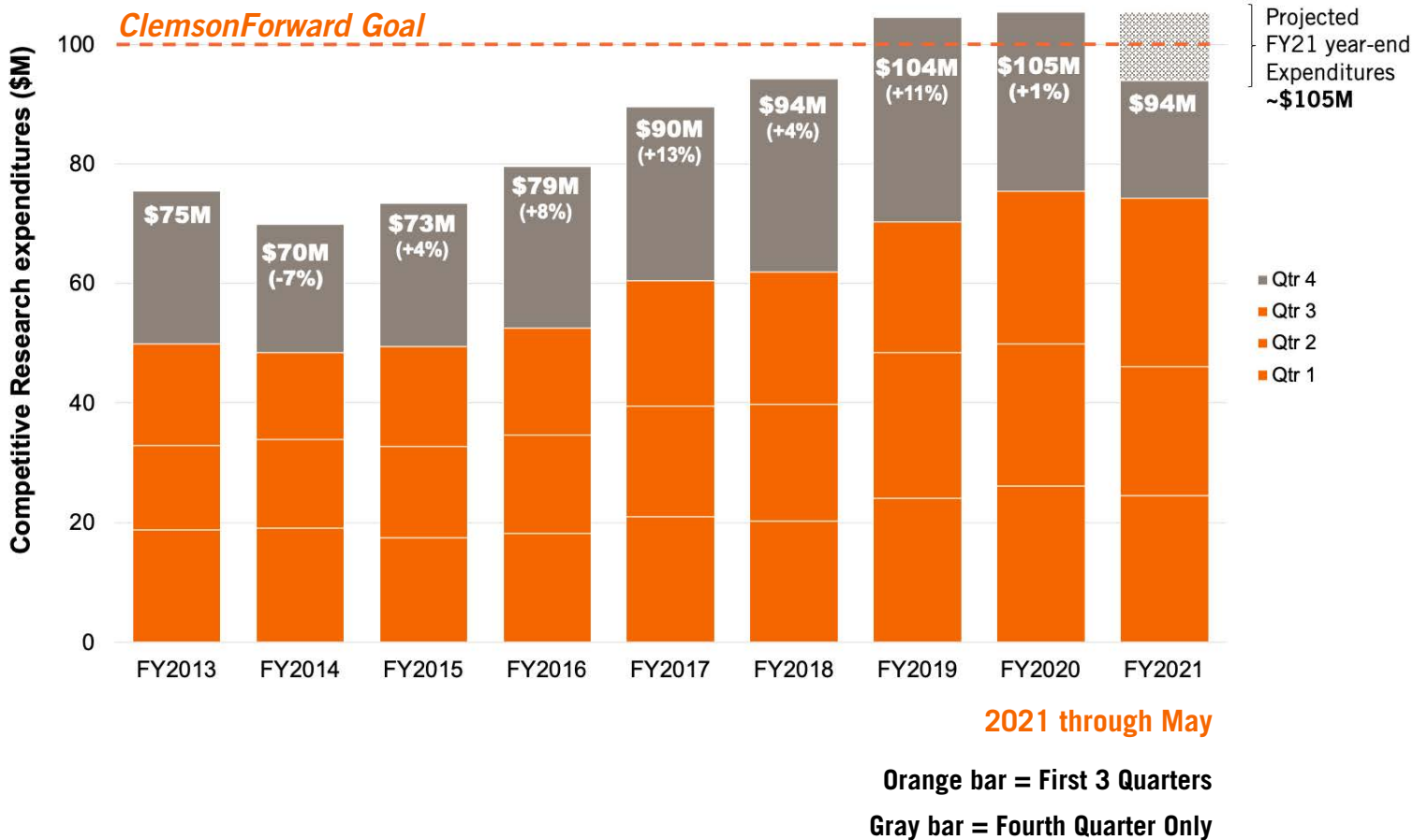
Research Expenditures

→ Competitive expenditures nearing ClemsonForward goal for 3rd year

ClemsonForward set a 10-year goal in 2016 to top \$100 million in annual competitive expenditures. Clemson achieved that goal (marked on the graph with an orange line) seven years ahead of schedule in 2019. In FY2020, Clemson topped \$100 million for the second consecutive year and may again in FY2021.

Competitive expenditures include funds from competitively bid projects, such as federal grant awards.

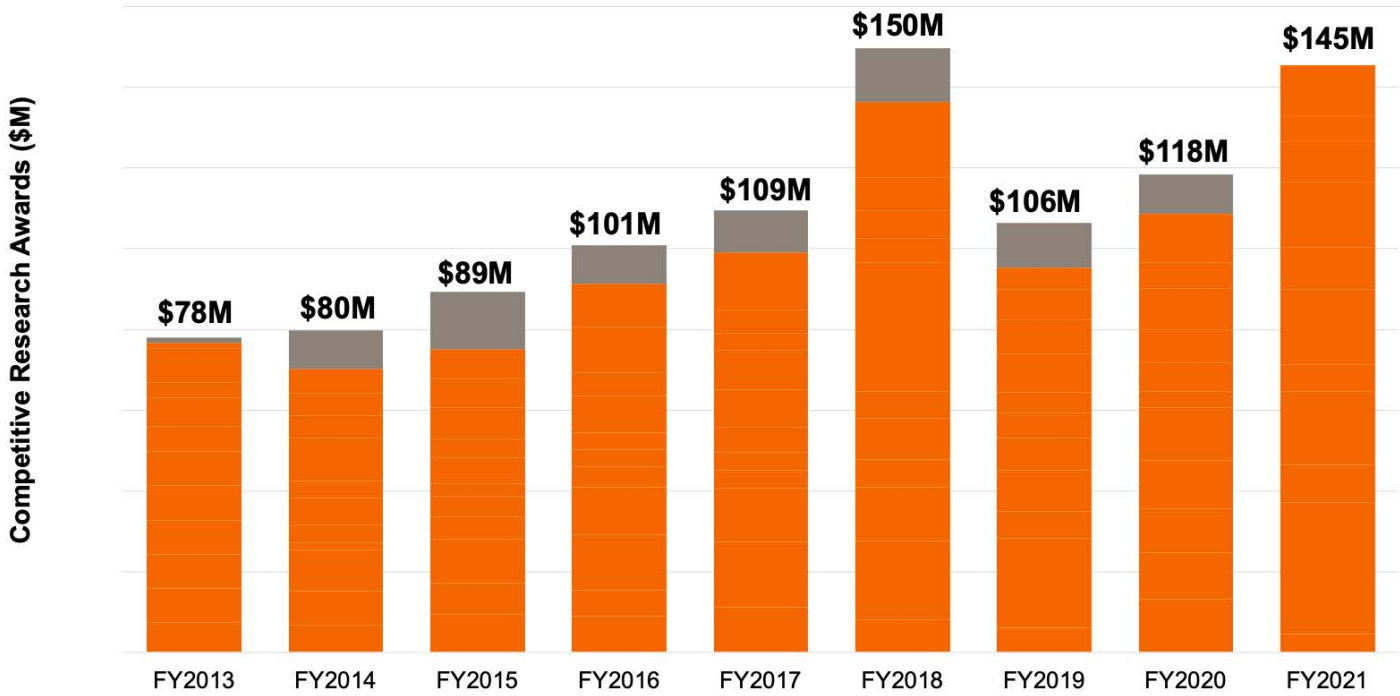
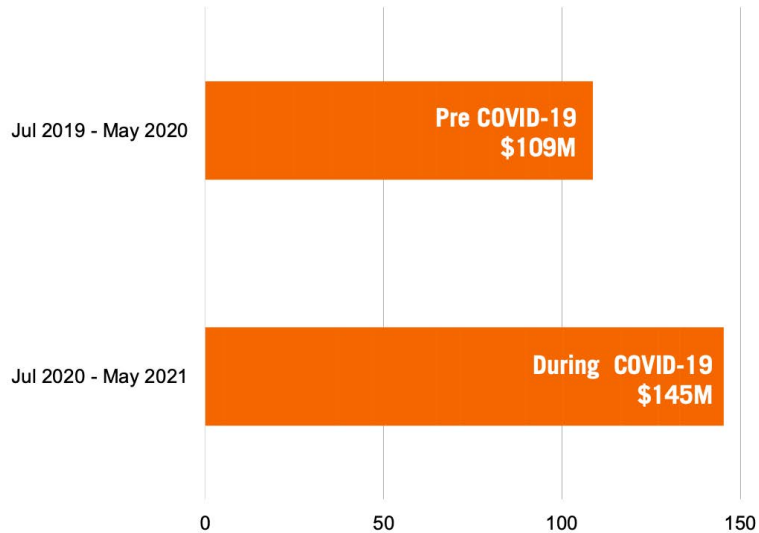
In the chart below, the orange bars show expenditures for the first three quarters of each fiscal year. The gray bar shows fourth-quarter expenditures. Fiscal year 2021 data is through the end of May.



Research Awards

→ Research awards up 23% from prior-year

Clemson faculty continue to be increasingly successful earning competitive research awards. Awards in FY2018 were heightened due to two major industry contracts. Excluding that year, FY2020 was the top year for awards of the past eight years and FY2021 has topped that. The gray bars in the chart below show year-end totals for each year. The orange bar shows awards received through the end of May. The chart at right shows impact from COVID-19.



Orange bar = Through May
Gray bar = Year-end Total

58

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

THE TOTAL VALUE OF THESE PROJECTS IS

\$281 MILLION

VPR letter

1. QER

2. Metrics

3. News

Research Awards

Top Competitive Grants (Received Between March 24, 2021 and June 8, 2021)

Lesley Ross, SmartLife endowed chair in aging and cognition, received \$3.5 million from the National Institutes of Health (NIH) through a collaboration with University of South Florida to evaluate the prevention of Alzheimer's Disease with cognitive training. Cognitive training is a noninvasive and cost-effective intervention aimed at lessening the burden of Alzheimer's Disease by offering a means to improving aspects of cognitive function in those living with the disease. Clemson University will work with colleagues at the University of South Florida and at Prisma Health to study the impacts of cognitive training on older patients with Alzheimer's Disease.



Ross



Yao

Hai Yao, Ernest R. Norville endowed chair and professor in the Department of Bioengineering, received \$2.4 million from the NIH to evaluate temporomandibular disorders. The temporomandibular joint, commonly referred to as TMJ, acts like a sliding hinge, connecting your jawbone to your skull. Temporomandibular disorders affect approximately 35 million individuals in the U.S., disproportionately impacting women. This NIH R01 project explores the physiological and genetic causes of these disorders of the jaw. Florida State University joins this project led by Clemson University.

Marc Birtwistle, associate professor of chemical and biomolecular engineering, received \$1.9 million from the NIH to develop methods to simulate human-drug interaction for health care. While efficacy and safety of new drugs are tested before approval by the FDA, there exists no safe means to test how drugs interact in the human body. This project will develop and improve complex simulation models to better understand drug interactions.



Birtwistle



Pilla

Srikanth Pilla, Jenkins endowed professor of automotive engineering, received \$1.8 million from the South Carolina Research Authority (SCRA) to lead an effort to modernize manufacturing. As advanced data analytics, artificial intelligence and the Internet of Things become more widely used in business practice, manufacturing plants have struggled to keep pace due to the expense of updating equipment. Clemson University leads a team including Greenville Technical College, Trident Technical College, South Carolina State University, Medical University of South Carolina and University of South Carolina to aid the digital evolution of manufacturing plants in the state while concurrently developing the manufacturing workforce.

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VPR letter

1. QER

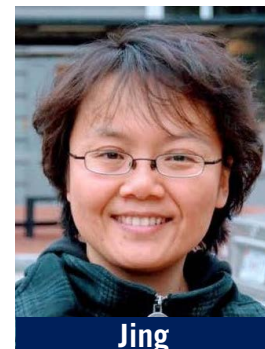
2. Metrics

3. News

Research Awards

Top Competitive Grants **continued** (Received Between March 24, 2021 and June 8, 2021)

Xia Jing, assistant professor of public health sciences, received \$1.7 million from the NIH to develop software tools to support physicians. Most doctor visits for those seeking medical care in the United States happen in physician offices. However, few physician offices are equipped with specialized software that helps alert doctors to a needed immunization or to potential adverse drug interactions. This project will develop a software tool intended to alert doctors when a patient is due for an immunization. This research has the potential to increase immunization rates and decrease harmful prescribed drug interactions.



Stephen Fitzmaurice, associate professor of languages, received \$1.5 million from the S.C. Department of Education to support high-quality interpretation in South Carolina schools. More than half of the K-12 school districts in the United States have unfilled educational interpreter positions. This deficit in locating certified educational interpreters has led school districts to hire underqualified individuals to fill the gap, negatively impacting students who are deaf or hard-of-hearing. Clemson University will partner with the South Carolina Department of Education to provide support to improve the quality of educational interpretation in South Carolina.

Dil Thavaraja, associate professor of pulse quality and nutrition, received \$1.2 million from the U.S. Department of Agriculture (USDA) to develop high-quality pulse crops. Pulse crops like lentils and field peas are not a great source of protein in a plant-based diet. To augment protein content in pulse crops, researchers have developed careful breeding schemes to protein-biofortify these staple foods. This project will develop protein-enriched organic field pea and lentil varieties, develop on-farm education and extension programs and develop improved seeds intended specifically for organic farming.



Ezra Cates, associate professor of environmental engineering and earth sciences, received \$960,000 from the U.S. Army Corps of Engineers to evaluate the removal of PFAS (polyfluoroalkyl substances) contaminants from water. The United States armed forces use PFAS for fire suppression on ships, bases and airfields. While their impacts on human health have not been fully determined, these chemicals, frequently found in drinking water, may have a negative impact on the human immune system. This project examines efficient and effective methods to remove PFAS contamination from water.

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VPR letter

1. QER

2. Metrics

3. News

Research Awards

Top Competitive Grants **continued** (Received Between March 24, 2021 and June 8, 2021)

Dev Arya, professor of chemistry, received \$900,000 from the NIH to develop alternatives to traditional antibiotics. Due to misuse and overuse of antibiotics, bacterial populations are exhibiting resistance to traditional antibiotics. Peptide antibiotic nucleic acids offer an alternative treatment approach when bacterial resistance to antibiotics is present. Clemson University will support the development and purification of promising peptide antibiotic nucleic acids.



Arya



Tallapragada

Phanindra Tallapragada, associate professor of mechanical engineering, received \$811,000 from the U.S. Navy to design swimming robots. Recognizance in shallow or turbid water is a challenge for the U.S. Navy. Clemson University researchers, using nature as inspiration, will design fish-like swimming robots which can use the physical properties of water to enhance locomotion and to sense the surrounding environment.

So far in FY2021...

CLEMSON FACULTY HAVE RECEIVED

12

RESEARCH AWARDS OF AT LEAST \$2M

THE TOTAL VALUE OF THESE PROJECTS IS

\$65M

VPR letter

1. QER

2. Metrics

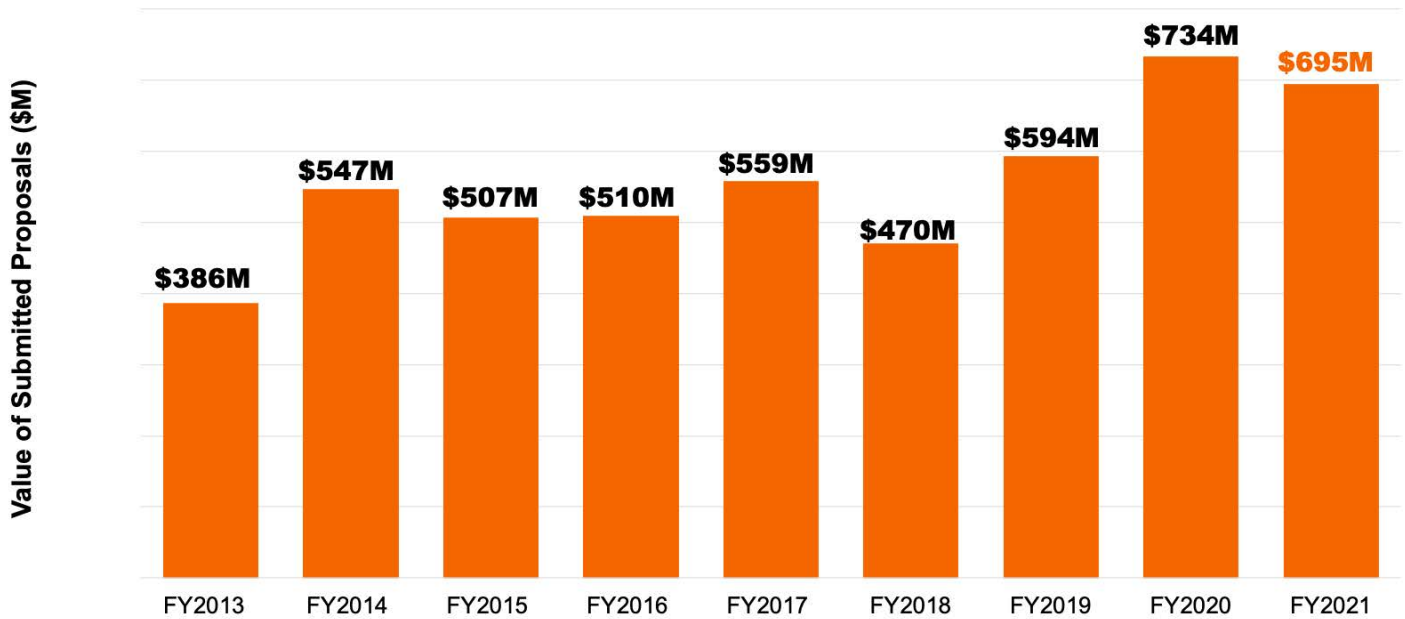
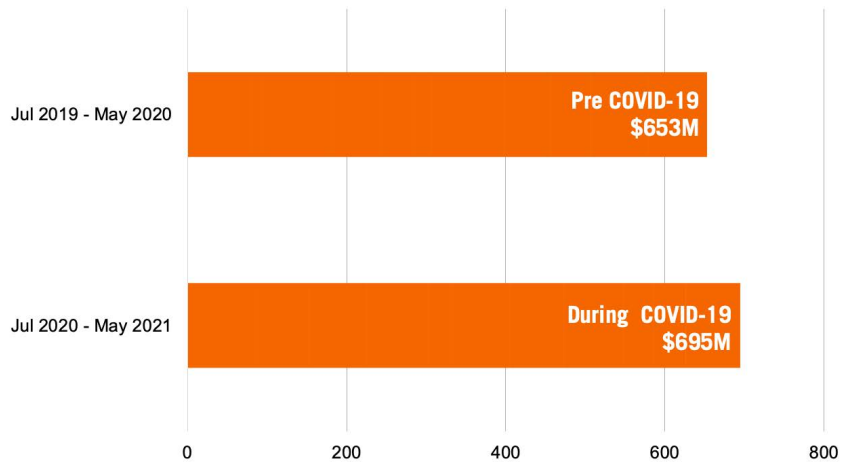
3. News

Proposal Submissions

Proposals spiked in FY2020 as Clemson faculty submitted proposals for several high-value projects, a trend that has continued in FY2021.

The chart below shows FY2021 submissions through the end of May. Data for the other fiscal years is as of year end.

The chart at the right compares proposals before and during COVID-19.



2021 through May

“ COVID-19 Disruptions Reported by Clemson Faculty

While research metrics remain strong, COVID-19 has caused disruptions to research activity. The list below details some of the disruptions reported by Clemson faculty.

Delivery of equipment purchased for a new project was delayed due to broad disruptions in manufacturing/shipping, thus causing delays in system set up. I am now off on my timeline of work completion, and some of the preliminary data we hoped to collect for future grant proposals is delayed.

A major disruption I can identify is a delay in training new personnel (both graduate and staff level) and being able to offer research experience to undergraduate students.

An experiment that would have been started in the fall had to wait due to an inability to be trained by collaborators at another institutions.

Delayed research means delayed publications means delayed grants means more delayed research, which disrupts pre-tenure faculty from building research programs. Additionally, some graduate students have lost months of work.

Hospital partners have put research on hold as a safety precaution.

Students have lost critical opportunities to present work at conferences, which is critical for professional development and networking opportunities.

Industry-funded research has suffered from back logs in the supply chain caused by COVID. Shipping for masonry block has been extremely delayed and lower production levels at the plants necessitated building some elements at the University that would have typically been provided by industry sponsors.

The lack of professional travel hindered professional development of junior faculty, who rely on professional meetings to build their networks. Online meetings are useful but not as good for younger persons still building a reputation.

It has been a struggle to hire lab technicians. Some months you can borrow someone else's technician for a few days or find a grad student willing to volunteer their help, but this is not sustainable.

When K-12 schools closed, school-based education research projects were suspended by school districts. For many education researchers, the school classroom is their “lab.”

Face-to-face research with medical patients was discontinued as a COVID-prevention strategy. Research on the effect of performing exercise on a diabetic patient's blood-sugar level after eating is a face-to-face event between patient and researcher. The blood specimen is tested; observation is made of the exercise performed.

The pandemic has slowed down the review and evaluation process of grant proposals as well the disbursement of the funds for external funding.

Research Report Card (FY2021 through May)

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	
										through May	
a. Proposal Submissions by Number		1,414	1,443	1,489	1,478	1,529	1,451	1,417	1,729	1,446	
1	CAAH	38	51	65	62	69	64	69	76	56	
2	CAFLS	235	230	224	222	241	229	377	473	366	
3	CBSHS	81	93	102	104	112	101	105	143	138	
4	CECAS	549	555	582	617	618	587	562	672	547	
5	COE	51	54	39	45	46	37	39	42	31	
6	COB	7	15	13	15	7	10	5	11	13	
7	COS	242	247	263	239	230	227	186	219	206	
8	CCIT	12	12	6	3	5	1	1	1	-	
9	PSA	88	90	118	97	170	163	33	37	26	
10	VP for Res & Interdisc Inst	31	17	7	17	14	12	25	29	29	
11	All Other	80	79	70	57	17	20	15	26	34	
b. Proposal Submissions by Dollar Value (in millions)		\$386M	\$547M	\$507M	\$510M	\$559M	\$470M	\$594M *	\$734M	\$694.7M	FY2021 Targets
12	CAAH	N/A	N/A	\$9.4	\$8.6	\$3.1	\$5.7	\$4.4	\$5.9	\$5.1	\$6.6
13	CAFLS	N/A	N/A	\$42.6	\$23.8	\$43.4	\$37.1	\$68.4	\$92.9	\$74.5	\$68.6
14	CBSHS	N/A	N/A	\$28.4	\$40.1	\$41.4	\$25.9	\$87.5	\$41.1	\$57.1	\$51.3
15	CECAS	N/A	N/A	\$260.5	\$281.2	\$306.4	\$235.5	\$255.3	\$405.9	\$309.9	\$310.9
16	COE	N/A	N/A	\$13.8	\$14.7	\$18.1	\$19.1	\$10.1	\$18.9	\$19.3	\$14.3
17	COB	N/A	N/A	\$7.5	\$4.3	\$2.8	\$1.8	\$2.1	\$2.9	\$3.6	\$2.3
18	COS	N/A	N/A	\$100.2	\$111.3	\$95.9	\$100.4	\$73.8	\$129.3	\$160.9	\$95.6
19	CCIT	N/A	N/A	\$4.3	\$2.0	\$4.0	\$0.9	\$4.6	\$3.0	\$0.03	
20	PSA	N/A	N/A	\$23.3	\$10.4	\$31.3	\$25.8	\$11.4	\$6.4	\$5.6	\$15.3
21	VP for Res & Interdisc Inst	N/A	N/A	\$5.6	\$7.7	\$6.0	\$12.7	\$68.5	\$19.8	\$23.5	
22	All Other	N/A	N/A	\$11.4	\$5.6	\$6.0	\$5.0	\$7.4	\$7.7	\$35.2	

*This figure includes a large \$107M proposal

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Research Report Card (FY2021 through May)

		2013	2014	2015	2016	2017	2018	2019	2020	2021 through May
c. Research Awards (in millions)		\$78.0M	\$79.7M	\$89.3M	\$100.9M	\$109.5M	\$149.8M	\$106.3M	\$118.3M	\$145.4M
23	CAAH	\$0.2	\$0.6	\$0.7	\$1.4	\$0.5	\$1.9	\$2.0	\$1.4	\$1.4
24	CAFLS	\$7.3	\$6.7	\$14.1	\$8.6	\$10.9	\$13.9	\$14.2	\$22.3	\$21.6
25	CBSHS	\$2.7	\$3.4	\$4.8	\$5.1	\$4.6	\$8.1	\$5.9	\$7.7	\$11.7
26	CECAS	\$34.2	\$37.7	\$48.2	\$45.5	\$54.0	\$80.8	\$50.4	\$48.0	\$71.7
27	COE	\$2.6	\$4.1	\$3.2	\$2.9	\$2.8	\$4.5	\$3.3	\$2.3	\$4.9
28	COB	\$2.0	\$1.1	\$1.3	\$0.8	\$1.2	\$1.1	\$0.8	\$1.2	\$0.2
29	COS	\$10.3	\$7.8	\$9.9	\$15.6	\$19.9	\$14.7	\$18.7	\$14.2	\$21.5
30	CCIT	\$1.6	\$5.7	\$0.7	\$0.8	\$0.5	\$1.3	\$0.1	\$0.3	\$0.7
31	PSA	\$14.8	\$12.3	\$9.6	\$13.0	\$7.9	\$6.6	\$4.0	\$4.1	\$5.4
32	VP for Res & Interdisc Inst	\$1.8	\$0.3	\$0.6	\$5.1	\$5.0	\$15.1	\$6.2	\$14.6	\$5.1
33	All Other	\$0.3	\$0.2	\$1.2	\$2.0	\$1.2	\$1.7	\$0.7	\$2.2	\$1.2
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*
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 Earley 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
44	Sponsored Graduate Research Assistants	822	745	707	693	696	761	558	637	546
45	Postdoctoral Fellows	48	64	83	85	90	97	98	98	106
46	Research Faculty: Permanent 100% Non-E&G Funded	6	6	6	11	17	14	11	18	12
47	Research Faculty: Temporary 100% Non-E&G Funded	18	18	15	14	24	27	29	54	45

* Additional proposals pending

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Research Report Card (FY2021 through May)

		2013	2014	2015	2016	2017	2018	2019	2020	2021
										through May
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	\$93.9M
48	CAAH	\$0.5	\$0.4	\$0.4	\$1.1	\$1.3	\$1.4	\$1.7	\$1.6	\$0.9
49	CAFLS	\$8.8	\$7.7	\$6.8	\$8.6	\$11.1	\$11.0	\$14.1	\$16.4	\$12.5
50	COB	\$1.2	\$1.2	\$1.1	\$1.0	\$0.9	\$0.8	\$0.8	\$0.7	\$0.6
51	CECAS	\$35.0	\$35.0	\$35.0	\$37.5	\$42.9	\$45.1	\$50.3	\$46.4	\$44.1
52	CBSHS	\$3.1	\$2.8	\$3.7	\$4.1	\$4.4	\$4.9	\$5.3	\$6.7	\$7.4
53	COE	\$3.3	\$3.3	\$3.8	\$2.5	\$2.6	\$2.2	\$2.5	\$2.4	\$2.0
54	COS	\$13.2	\$10.5	\$9.3	\$11.3	\$14.8	\$16.7	\$17.2	\$17.3	\$13.0
55	CCIT	\$2.0	\$1.6	\$3.4	\$2.8	\$0.4	\$0.6	\$0.2	\$0.1	\$0.2
56	PSA	\$4.7	\$4.9	\$5.8	\$5.6	\$5.7	\$5.9	\$3.7	\$3.9	\$4.8
57	VP for Res & Interdisc Inst	\$1.9	\$1.3	\$1.9	\$3.5	\$3.9	\$3.9	\$7.1	\$9.5	\$8.0
58	All Other	\$1.7	\$1.7	\$2.2	\$1.5	\$1.5	\$1.6	\$1.5	\$0.4	\$0.5
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	\$93.9M
59	Advanced Materials	\$14.3	\$11.3	\$10.7	\$10.4	\$10.7	\$12.1	\$15.4	\$13.5	\$11.6
60	Cyberinfrastructure & Big Data Science	\$10.3	\$10.5	\$10.1	\$8.9	\$8.1	\$9.6	\$6.9	\$4.4	\$4.7
61	Energy, Trans. & Advanced Manufacturing	\$4.7	\$5.7	\$7.2	\$7.6	\$17.8	\$16.8	\$17.1	\$14.5	\$15.9
62	Health Innovation	\$13.1	\$10.2	\$10.2	\$12.5	\$16.3	\$17.8	\$23.8	\$27.1	\$22.1
63	Human Resilience	\$8.2	\$7.7	\$9.7	\$9.8	\$7.8	\$8.6	\$9.0	\$9.7	\$10.6
64	Sustainable Environments	\$18.3	\$16.9	\$17.9	\$21.7	\$18.9	\$19.5	\$20.6	\$23.9	\$17.9
65	Other	\$6.5	\$7.6	\$7.4	\$8.6	\$9.9	\$9.6	\$11.7	\$12.1	\$11.1
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	\$93.9M
66	Federal Government	\$62.9	\$56.9	\$58.5	\$65.1	\$74.6	\$78.2	\$85.1	\$85.2	\$78.0
67	Foundations, Societies, and Associations	\$4.2	\$4.3	\$4.7	\$4.1	\$4.7	\$5.1	\$7.4	\$6.9	\$4.8
68	Industry/Other	\$4.9	\$5.6	\$6.1	\$6.9	\$6.8	\$6.3	\$5.3	\$5.5	\$3.8
69	International	\$0.8	\$0.6	\$0.8	\$0.8	\$0.5	\$0.4	\$0.3	\$0.3	\$0.3
70	Local Government	\$0.6	\$0.6	\$0.6	\$0.5	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7
71	State Government	\$1.9	\$1.9	\$2.7	\$2.0	\$2.4	\$3.7	\$5.7	\$6.8	\$6.3

Research Report Card (FY2021 through May)

		2013	2014	2015	2016	2017	2018	2019	2020	2021 through May
i. Sponsored Research Expenditures per T/TT Faculty by College										
72	CAAH	\$3,299	\$2,264	\$2,343	\$5,841	\$8,177	\$8,945	\$10,159	\$10,003	\$5,354
73	CAFLS	\$88,570	\$81,120	\$69,612	\$84,618	\$105,396	\$103,814	\$134,555	\$137,438	\$109,415
74	COB	\$14,415	\$13,047	\$11,510	\$9,683	\$8,855	\$8,269	\$8,200	\$6,991	\$6,153
75	CECAS	\$169,754	\$160,698	\$163,406	\$163,685	\$194,323	\$214,280	\$225,620	\$201,553	\$181,567
76	CBSHS	\$27,982	\$26,853	\$33,764	\$42,376	\$34,751	\$39,532	\$40,301	\$50,495	\$54,990
77	COE	\$54,779	\$51,688	\$62,195	\$38,037	\$44,483	\$40,197	\$47,371	\$47,742	\$41,303
78	COS	\$95,724	\$72,421	\$61,912	\$77,589	\$95,956	\$110,206	\$118,600	\$116,020	\$87,966
79	Clemson Average	\$83,858	\$75,089	\$78,826	\$85,753	\$84,297	\$103,706	\$99,125	\$96,497	\$84,358
j. Additional information										
80	NIH R01-Equivalent Awards (by start date)	-	-	2	2	2	3	6	1	3
81	Doctorates Awarded (Aug, Dec, May)	187	217	237	233	231	234	301	249	225
82	STEM Doctorates Awarded (Aug, Dec, May)	118	153	165	138	156	171	174	162	159
83	Disclosures	102	129	70	60	65	51	62	68	41
84	Patents	16	15	15	14	18	11	18	12	12
85	Licenses/Options	9	7	7	5	10	11	19	13	13
86	Licensing Revenue	\$1,134,289	\$762,811	\$360,131	\$354,827	\$539,490	\$461,755	\$398,136	\$315,578	\$226,717
87	Start-up Companies (based on licenses/options)	1	4	4	2	3	3	5	1	1



RESEARCH

RESEARCH NEWS

This section highlights the latest research news and achievements.

Executive Summary

- Clemson faculty continue to disseminate new knowledge and impact society through research:
 - » Examples of recently published books are on [pages 27-28](#).
 - » Clemson research has brought innovation to the South Carolina wood industry ([see page 29](#)).
 - » Clemson researchers are using artificial intelligence to improve K-12 education ([see page 31](#)).
 - » Additional examples of research impacts are on [pages 30-32](#).
- Clemson faculty and students are earning numerous accolades:
 - » A Clemson faculty member earned a prestigious fellowship at the Hutchins Center for African & African American Research at Harvard University ([see page 33](#)).
 - » For the first time, a Clemson faculty member has been elected a member of the American Philosophical Society, the oldest learned society in the United States ([see page 34](#)).
 - » For the second time in as many years, a Clemson student has been named a Truman Scholar ([see page 36](#)).
 - » Seven students earned highly competitive National Science Foundation Graduate Research Fellowships ([see page 39](#)).
 - » More examples of significant honors and achievements are provided on [pages 33-42](#).
- Clemson earned full re-accreditation from the Association for Assessment and Accreditation of Laboratory Animal Care International ([see page 43](#)). AAALAC site visitors commented favorably about Clemson's research programs and culture.
- Clemson presented its Researcher of the Year awards and the University Research, Scholarship and Artistic Achievement Awards at the annual Research Symposium in May ([see pages 44-48](#)).

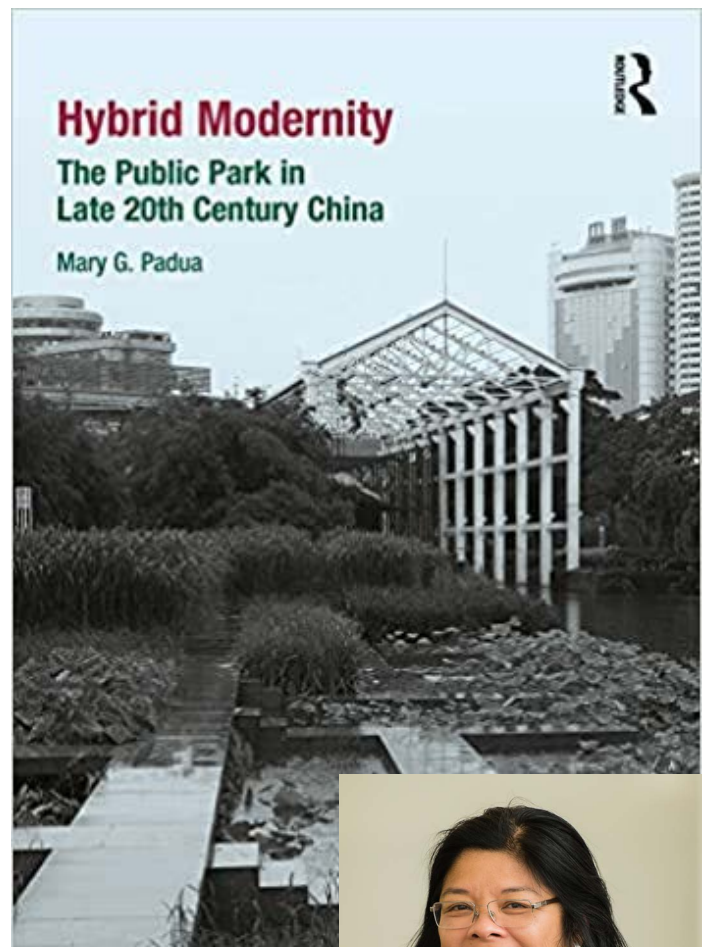
Books in Print

Books provide an essential avenue for university scholars to disseminate research findings and share knowledge with the world. The next two pages include examples of some recently published books authored by Clemson University faculty.

Mary Padua, *Hybrid Modernity: The Public Park in Late 20th Century China* (2020)

Mary G. Padua, professor of landscape architecture, is a design educator, landscape architect and contemporary theorist whose published research focuses on China's post-Mao designed environments, adaptive urbanism and the meaning of public space. Her latest book, *Hybrid Modernity: The Public Park in Late 20th Century China*, provides a detailed historical and design analysis of the development of parks and modern landscape architecture in late 20th Century China.

“Mary Padua has authoritatively chronicled the growth of the landscape architecture profession in China over several decades,” said Ron Henderson, director of the Landscape Architecture and Urbanism Program at Illinois Institute of Technology. “This volume frames recent landscapes within a framework of China’s rich legacy of gardens and cultural landscapes. Eminently, it collects her valuable insights on seminal projects and persons who have shaped landscape investigations of China’s rich history, culture, and ecology within the context of globalization, urbanization, and international design.”



Mary Padua

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Books in Print

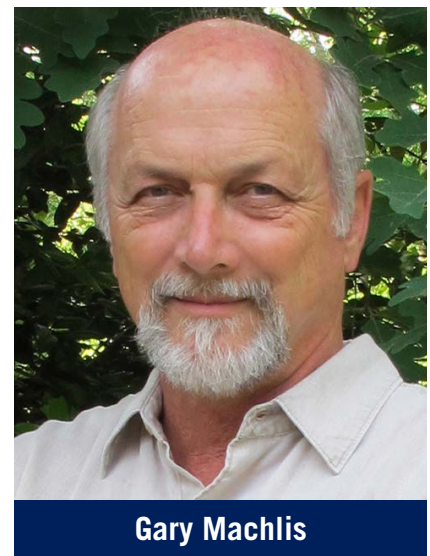
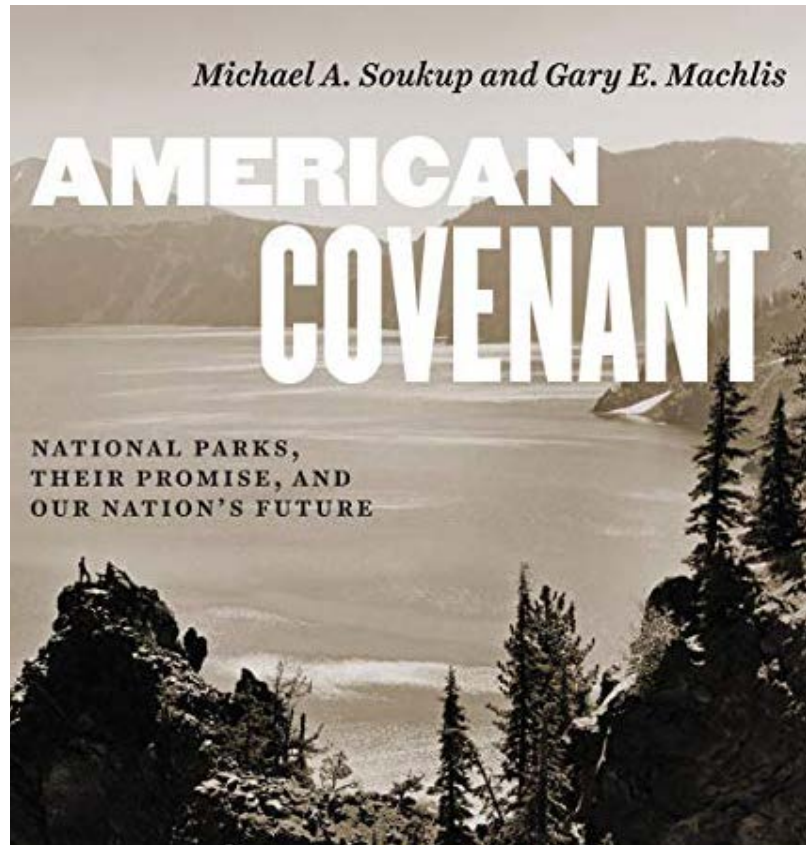
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Gary Machlis, *American Covenant: National Parks, Their Promise, and Our Nation's Future* (2021)

Gary Machlis, university professor of environmental sustainability, co-authored a book titled, *American Covenant: National Parks, Their Promise, and Our Nation's Future*, which was published by Yale University Press in March 2021. The book, co-written with Michael A. Soukup, a former chief scientist for the National Park Service, explores how national parks are essential to maintaining the essence of our national heritage, and key to America's future in a changing climate and political landscape. It is also available as an audiobook.

Sharing real-world examples of both victories and defeats in protecting national parks, this book reminds readers that the national parks are a promise — a covenant — within and between generations of Americans. The book is also a call to revitalize, reconstitute, reconfigure, and reform the National Park Service, which the authors believe is governed too much by outdated management practices and politics instead of a foundation of expertise and science.

“An important [book], . . . essential reading for anyone concerned about the future of America's national parks,” said John Miles, National Parks Traveler, according to Yale University Press.



Gary Machlis

Making an Impact



Clemson continues to impact communities through research. Here are some of the latest examples of impactful research at Clemson.

How Clemson helped innovate the South Carolina wood industry and influence design

When the South Carolina forest products industry desired to grow their timber on longer rotations, they needed a new market for their wood. Although the pulp and paper industries were viable markets, many private landowners wanted to sell their timber as sawlogs in the construction industry and have the lumber live on in buildings, having useful, protected existences.

In 2011, the South Carolina forest products industry asked Clemson University to help expand its market. This was the beginning of how the Andy Quattlebaum Outdoor Education Center came into existence, transforming an industry.

Patricia Layton, professor of forestry at the College of Agriculture, Forestry and Life Sciences (CAFLS) who would later become the director of Clemson University's Wood Utilization + Design Institute, began working on the issue to help the forest landowners.

She invited WoodWorks (who focuses on wood industry initiatives), the American Wood Council (who helps develop and understands the building codes) and a few others to meet with her, Gerald Vander Mey, director of University Planning and Design, and John McIntyre, a capital engineer, to talk about using mass timber and new, engineered wood materials.

The group discussed if there was interest in trying new engineered wood materials in a process similar to post and beam construction, what that might look like and what the engineering and code challenges would be. At the end of the meeting, Vander Mey said Student Affairs was thinking of building a structure at the Y Beach and suggested that might be a place to try it. The area including Y Beach was a part of the master plan for the west campus entrance. The entire area was later named the Snow Family Outdoor Fitness and Wellness Complex.

For the Andy Quattlebaum Outdoor Education Center, the team chose Cooper Carry as the architect; Britt, Peters and Associates as the engineer and Sherman Construction as the contractor to create a



The Andy Quattlebaum Outdoor Education Center

“ We worked together and created something that elevated the industry within South Carolina as much as it benefitted and promoted Clemson.

- **Patricia Layton**
professor of forestry

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showpiece unlike any other building in South Carolina — one that utilized Southern yellow pine. This ground-breaking, multi-purpose facility would eventually be completed in 2019. Students, staff and faculty lovingly refer to it as “Andy’s.”

Andy’s hybrid design elements include Southern yellow pine cross-laminated timber that was tested and developed through Clemson’s Wood Utilization + Design Institute. Since its completion, Andy’s has won several awards, including Best Sports/Entertainment award in ENR Southeast’s 2020 Best Projects and a 2021 Wood Design Awards Regional Excellence Winner.

“At the same time we were developing our research and work on mass timber, some of our early students started to work on and develop Southern yellow pine cross-laminated timber. That’s our local species, and that is the material that ended up being used at the Andy Quattlebaum Outdoor Education Center,” said Layton. “That building really started something.” [READ MORE](#)

Clemson researcher seeks to make peanuts and wheat easier to digest

Peanuts and wheat are nutritional powerhouses but contain protein allergens that can be detrimental for some people. However, a Clemson University researcher believes that if he can target these proteins, he can breed for safer, low-allergenic varieties.

“Wheat and peanut are primary sources of energy and proteins, specifically to populations in the most populated areas of the world,” Sachin Rustgi told scientists during the recent online meeting of the American Society of Agronomy, the Crop Science Society of America and the Soil Science Society of America. “On the flip side, these crops are listed among the ‘Big 8’ major food allergens by the U.S. Food and Drug Administration.”



Sachin Rustgi

Rustgi and his colleagues are using plant breeding and genetic engineering to develop less allergenic varieties of peanuts and wheat. Their goal is to increase options for people with allergies to these foods.

“Our research primarily focuses on the development of genetic resources to breed safe crops for people experiencing these foodborne disorders,” said Rustgi, an assistant professor of molecular breeding for the Department of Plant and Environmental Sciences.

Wheat consumption can cause celiac disease, a gastrointestinal disease that could grow into an autoimmune disorder. For people with peanut allergies, eating peanuts can cause mild symptoms like runny nose, sneezing, or hives, or severe symptoms such as shortness of breath, dizziness, or swelling of the tongue or lips. Individuals with peanut allergies generally are allergic to tree nuts and legume lupin. The only effective therapy known for these foodborne disorders is strictly avoiding eating wheat and/or peanut, as well as products containing these foods. Clemson researchers are using state-of-the-art facilities at the Pee Dee Research and Education Center to develop a wheat variety people with celiac disease can eat. [READ MORE](#)

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Artificial intelligence helps advance personalized learning for South Carolina's K-12 teachers and students

Artificial intelligence already recommends movies to viewers, filters spam out of inboxes and suggests friends on social media. Now the technology and some of its creators are going to work to help teachers and students in South Carolina's K-12 education system.

Two recent projects have given researchers in Clemson University's School of Computing a chance to use their knowledge and experience in artificial intelligence to improve K-12 education in the state and eventually the nation. They are collaborating with researchers from the College of Education.

Nathan McNeese and Bart Knijnenburg and their students are helping create a "recommender system" similar to the one Netflix uses to suggest movies, except theirs will help teachers choose a path for professional development.

In a separate project, Knijnenburg and Kelly Caine and their students are helping develop AI-focused education modules for middle school students. The modules will teach math while also showing how AI's invisible but powerful algorithms track them online.

McNeese and Knijnenburg are assistant professors of human-centered computing, and Caine is Dean's Associate Professor of human-centered computing.

Principal investigators on both projects are faculty members in the College of Education. Jeff Marshall, associate dean of research and graduate programs in the college, is principal investigator on the recommender system research, and Nicole Bannister, associate professor of education, is principal investigator on the module research.

Both projects underscore how artificial intelligence is continuing to evolve to meet a growing number of needs and becoming more deeply ingrained in everyday lives.

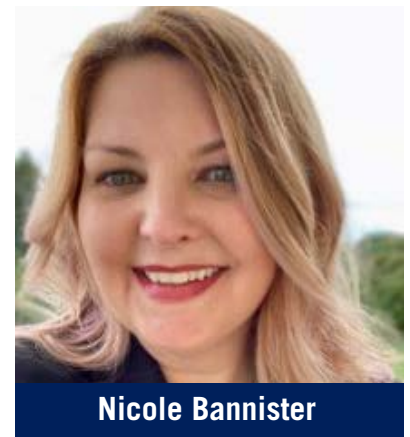
Clemson University's researchers are helping take the technology to the next level with projects that vary from inspecting vehicles as they travel an assembly line to detecting malware in cameras and other devices too small for anti-virus software.

"The College of Education and the College of Engineering, Computing and Applied Sciences are coming together for interdisciplinary research that addresses some of the most critical needs in the state," said George J. Petersen, founding dean of the College of Education. "Innovation is key to tackling education issues, and collaborations like these provide a perfect opportunity to put best-in-class innovation into action for the benefit of students, teachers, schools and communities."

[READ MORE](#)



Jeff Marshall



Nicole Bannister

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Clemson physicist's thermoelectric material discovery sets stage for new forms of electric power

Thermoelectrics directly convert heat into electricity and power a wide array of items — from NASA's Perseverance rover currently exploring Mars to travel coolers that chill beverages.

A Clemson University physicist has joined forces with collaborators from China and Denmark to create a new and potentially paradigm-shifting high-performance thermoelectric compound.

A material's atomic structure, which is how atoms arrange themselves in space and time, determines its properties. Typically, solids are crystalline or amorphous. In crystals, atoms are in an orderly and symmetrical pattern. Amorphous materials have randomly distributed atoms.

Clemson researcher Jian He and the international team created a new hybrid compound in which the crystalline and amorphous sublattices are intertwined into a one-of-a-kind crystal-amorphous duality.

"Our material is a unique hybrid atomic structure with half being crystalline and half amorphous," said He, an associate professor in the College of Science's Department of Physics and Astronomy. "If you have a unique or peculiar atomic structure, you would expect to see very unusual properties because properties follow structure."

The high-profile energy research journal *Joule* published their findings in a paper titled, "Thermoelectric materials with crystal-amorphicity duality induced by large atomic size mismatch."

The researchers created their hybrid material by intentionally mixing elements in the same group on the periodic table but with different atomic sizes. Here, they used the atomic size mismatches between sulfur and tellurium and between copper and silver to create a new compound $(\text{Cu}_{1-x}\text{Ag}_x)_2(\text{Te}_{1-y}\text{S}_y)$ in which the crystalline and amorphous sublattices intertwine into a one-of-a-kind crystal-amorphicity duality. The new compound exhibited excellent thermoelectric performance.

While this discovery doesn't directly impact application now, it is likely to lead to better thermoelectrics in the future.

"The new material performs well, but more important than that is how it achieves that level of performance," He said. "Traditionally, thermoelectric materials are crystals. Our material is not pure crystal, and we show we can achieve the same level of performance with a material with a new atomic structure."

He said he expects the new material will begin affecting applications in 10 to 20 years.

"They definitely can do something current thermoelectric materials cannot do, but not now," He said. "However, the future of this research is bright."



Jian He, left

Honors & Achievements

 **Clemson faculty and students continue to garner significant accolades. Here are some of the latest honors and achievements.**



Susanna Ashton

Ashton Earns Fellowship to Harvard University's Hutchins Center

Susanna Ashton, professor and chair of the Clemson University Department of English, has earned a fellowship at the Hutchins Center for African & African American Research at Harvard University. She joins the 2021-2022 group of scholars that Henry Louis Gates, Jr., Director of the Hutchins Center, describes as an “extraordinary cohort.”

“It’s a tremendous honor to have my research recognized and supported in this way. I look forward to learning from a spectacular collection of international scholars.” Ashton said. “As the only scholar from English in this group of Fellows, I am especially excited to see how the analytical tools from my discipline of textual studies and, well, storytelling, will be honed by interacting with researchers in different fields.”

As the W.E.B. Du Bois Fellow in residence for Spring 2022, Ashton will continue her work on *A Plausible Man: The life of John Andrew Jackson*. A man who escaped slavery in South Carolina, Jackson built a life as an international speaker and author, eventually raising money to buy the plantation on which he was enslaved. Ashton reveals how the story of his life entwines with 19th century luminaries Harriet Beecher Stowe and Charles Haddon Spurgeon.

As Ashton explains, aside from his memoir of 1862, *The Experiences of a Slave in South Carolina*, there has been little attention paid to Jackson. “And yet,” she asserts, “his impact was real and covered by hundreds of newspaper articles during his lifetime. There are many documents about his life but my work is also about what is invisible and undocumented. Where do traditional histories fail us? Jackson’s story begins as the portrait of a man but is also about the archive of the marginal, the folklore of the underground, and the truths of the forgotten networks that make up how we see our histories and our communities.”

“We are so proud of Dr. Ashton and delighted that she has received this level of recognition for her scholarship,” said Nicholas Vazsonyi, dean of the College of Architecture, Arts and Humanities at Clemson University. “It is a significant moment, not just for her, but for the Humanities at Clemson, especially in the area of research on race, which we are now in the process of substantially amplifying with the international search for a Director of the Pan-African Studies program. The visibility and networking opportunities that will result from Dr. Ashton’s time at Harvard are hard to overstate.”

“ It is a significant moment, not just for her, but for Humanities at Clemson.

- **Nicholas Vazsonyi**
Dean, College of Architecture, Art and Humanities

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Trudy Mackay becomes first Clemson member of the American Philosophical Society

Trudy Mackay, director of the Clemson Center for Human Genetics and Self Family endowed chair of human genetics, has been elected to the prestigious American Philosophical Society, the oldest learned society in the United States, founded by Benjamin Franklin in 1743. Mackay is the first professor at Clemson University to become a member.

This year, 36 accomplished individuals are joining the 1,011 existing elected members. Mackay is one of seven in the biological sciences category and she is the only elected member in biological sciences from the Carolinas.

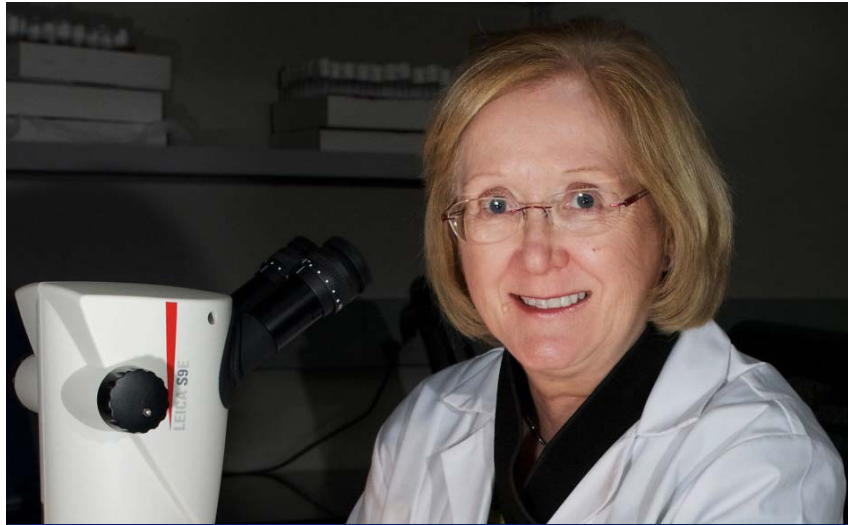
Mackay is recognized as one of the world's leading authorities on the genetics of complex traits and for groundbreaking research that reveals the genetic and environmental basis of human diseases. She pioneered a research model based on the common fruit fly because about 70 percent of the fruit fly genome has a human counterpart. Through collaborations with other institutions, like the National Institutes of Health and the National Institute for Drug Abuse, she uses her model to define pathways that can lead to cures for terminal and mental illnesses that affect people globally and have so far stumped doctors and scientists.

She is a recipient of Trinity College's Dawson Prize in Genetics, which is awarded to geneticists of international prominence, and numerous other accolades, including being a fellow of the American Association for the Advancement of Science, the American Academy of Arts and Sciences, the Royal Society of London and the National Academy of Sciences of the USA. She is a recipient of the 2016 Wolf Prize for Agriculture.

Now, she will join the likes of George Washington, John Adams, Charles Darwin and Thomas Edison, all of whom were early members of the American Philosophical Society.

Founded for "promoting useful knowledge," the American Philosophical Society honors and engages distinguished scientists, humanists, social scientists, and leaders in civic and cultural affairs through elected membership and opportunities for interdisciplinary, intellectual fellowship, particularly in the semi-annual Meetings in Philadelphia.

Only 5,746 members have been elected since 1743. Since 1900, 269 members have received the Nobel Prize.



Trudy Mackay

The American
Philosophical Society
was founded in

1743

by Benjamin
Franklin

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Clemson researcher to lead group driving revival of Southern heirloom crops

A Clemson University research scientist renowned for his role in reviving the original Southern peanut crop from only a handful of seeds has been elected president of the Carolina Gold Rice Foundation.

Brian Ward, based out of Clemson's Coastal Research and Education Center in Charleston and a member of the university's Department of Plant and Environmental Sciences, specializes in sustainable agriculture, organic cultivation, specialty crop production and agricultural biotechnology.

"Dr. Ward brings both real world knowledge of farming and scientific insight to the task of advancing the purposes of the Foundation," Carolina Gold Rice Foundation Chair David Shields said in announcing Ward's election.

The Carolina Gold Rice Foundation has been a driving force in reviving the classic ingredients of southern regional food, crops abandoned in the 20th century when productivity and disease resistance mattered more than flavor and nutrition in agriculture.

Ward is a research scientist with Clemson Coastal Research and Education Center in Charleston. He specializes in increasing historically significant very rare seed for biosecurity and conducting organic research in legume, grain and vegetable rotations.

"My vision for the Carolina Gold Rice Foundation is to build upon what has been accomplished thus far, which is advancing the original goals of repatriation of the southern foodways through the sustainable restoration of rice, grain and other important culinary ingredients vital in southern historical cuisine," he said.

Ward won national attention for his role in bringing the original southern peanut, the Carolina African Runner Peanut, back from virtual extinction. His work with Purple Straw Wheat won notice in "Modern Farmer" magazine. [READ MORE](#)



Brian Ward



Carson Colenbaugh

Rising senior recognized for forest conservation, named Udall Scholar

Already known as a poet, a volunteer firefighter and a wild mushroom forager, a Clemson University rising senior has received national recognition for his environmental advocacy.

Carson Colenbaugh, a National Scholar and Honors College member, has been named a 2021 Udall Scholar for his work in forest conservation and food justice. He is one of 55 students from 42 colleges and universities to receive the honor and the only recipient from a South Carolina institution.

Colenbaugh grew up in Kennesaw, Ga. on the banks of Proctor Creek, a tributary to the Etowah River. When he's not in the classroom or leading the Food Collective, you might find him training with Fire Tigers or foraging for wild mushrooms in Pickens and Oconee counties.

Colenbaugh is a horticulture major with minors in biological sciences and forest resource management. He plans to pursue a Ph.D. in the natural resource sciences as he continues his research

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on forest ecology and management in order to advocate for conservation. “I’ve always had a curiosity for the ecological interactions of the Southern Appalachians, and I knew I wanted to use my voice and time to ensure its stability,” he said. “This award gives me reassurance that the work I’ve been doing has had a positive impact on those around me.” He said he plans to continue bridging the gaps between culture and resource management. [READ MORE](#)

Clemson’s fourth Truman Scholar named, second in two years

Recognized for her commitment to improving food insecurity, a Clemson University Honors College junior was named a Truman Scholar. This marks the second year in a row for a Clemson student to receive the coveted award and Clemson’s fourth recipient in 42 years.

Veronica “Ronnie” Clevestine, an economics major from Greenville, will receive up to \$30,000 for graduate study, along with leadership training, career counseling, and other opportunities within the federal government. She is the only student in South Carolina to be named a Truman Scholar this year.

Clevestine intends to pursue a career working to address food insecurity policy, an issue deeply rooted in her personal experience.

“To become a Truman is something really special and puts you in an elite class with people who have achieved great things,” Clemson University President Jim Clements said when he surprised Clevestine with the announcement during a Zoom call.

In addition to being awarded the Truman Scholarship, Clevestine also received the Matt Locke Leadership Award this Spring. The Locke Award is presented to one Clemson student for outstanding leadership with regard to service and devotion to humankind and the University. [READ MORE](#)



Ronnie Clevestine



Harold Cheatham

Emeritus dean, professor Harold Cheatham receives international honors

The American College Personnel Association (ACPA)-College Student Educators International announced its Innovative Practice Award is now named the Harold E. Cheatham Innovative Practice Award, which recognizes the outstanding work of a campus practitioner who is innovative in their approach and has made a significant impact on student communities on their campus.

Cheatham, a professor of counseling and education leadership, became the first African American academic dean in Clemson University history when he was named founding dean of the University’s College of Health, Education, and Human Development. He served in this post from 1996 until retiring in 2001.

A 1990-91 Senior Fulbright Scholar to India, Cheatham is a distinguished member of the National Society of Collegiate Scholars, the Skull and Bones Society, Sigma Pi Phi and Alpha Phi Alpha fraternities. Cheatham is also a life member of Phi Kappa Phi and the Fulbright Scholars Association. He was named a Fellow of Clemson’s Emeritus College last year.

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Clemson's Sene-Harper featured by international organization

The Society for Conservation Biology North America, an international professional organization dedicated to advancing the science and practice of conserving the Earth's biological diversity, highlighted Aby Sene-Harper as an inspiring woman in conservation.

Sene-Harper, assistant professor of parks, recreation and tourism, works to advance socially just approaches to management of public lands and cultural resources in the United States and Sub-Saharan Africa. Her research is situated at the intersections of protected areas, race and ethnicity, tourism and livelihoods. In the U.S., her work examines how history and culture mediate African American relationships with nature. In Sub-Saharan Africa, her work centers on the potential of integrated conservation and development approaches (e.g. livelihood projects, ecotourism, community-based conservation) to yield positive and sustainable results for community development and protected areas. She was awarded the prestigious National Science Foundation-Interdisciplinary Graduate Education and Research Traineeship (NSF-IGERT) fellowship.



Aby Sene-Harper

You can read her article with the Society for Conservation Biology North America [here](#).

Clemson Ph.D. student one of 30 young professionals to watch

Clemson Ph.D. student Taylor Hooker was named among the top 30 young professionals to watch by the National Recreation and Park Association (NRPA) and *Parks & Recreation* magazine.

Hooker is earning her Ph.D. at Clemson while working as a recreational therapist for the Veterans Healthcare Administration, where she promotes using evidence-based practices for those interested in bringing equine-assisted services to their Veterans Affairs locations.



Taylor Hooker

This NRPA recognition program received more than 100 nominations from 29 different states, one Canadian province and one U.S. Navy aircraft carrier. The selection committee evaluated the nominations on one or more of the following criteria:

- Impacts on the agency's community and service population;
- Contributions to the professional development of the field of parks and recreation;
- And innovative ideas, programs and/or research in the field of parks and recreation.

In a brief profile of Hooker, the magazine noted that she "is a passionate advocate for our veterans and is dedicated to improving their quality of life."

[Read the full article online.](#)

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Two Honors Students Receive Goldwater Scholarships

Two College of Engineering, Computing and Applied Sciences undergraduates are recipients of the 2021 Barry M. Goldwater Scholarship, the premier and highly competitive national award for students who have the potential to advance research in mathematics, natural sciences and engineering.

The selection of computer engineering sophomore Gabriel Cutter and bioengineering junior Lauren Davis brings Clemson's total number of Goldwater Scholars to 52. Both are members of the Clemson University Honors College.

In all, 410 students nationwide received scholarships this year. Recipients receive scholarships of \$7,500 for tuition, fees, books or room and board. They were selected from more than 1,250 nominations from 438 schools. Typically universities may nominate only four students.

“We are preparing students to tackle some of society's most complex and urgent problems, and I look forward to the contributions that Gabriel and Lauren will make in their fields,” said Anand Gramopadhye, dean of the College of Engineering, Computing and Applied Sciences. “I congratulate these outstanding students and their advisers, Pingshan Wang, Sarah Harcum and Melinda Harman, for this national recognition and thank them for helping elevate Clemson's academic prominence.”

Clemson's recipients were among only 68 scholars chosen from engineering fields.

Cutter chose to focus his research on radio frequencies (RFs) because of their broad applications across all research fields. He's interested in how they integrate all sectors of daily life, down to the electronics worn on wrists.

Cutter arrived at Clemson with an interest in computer engineering as a Bosch FIRST Scholar, a 4-year scholarship. He narrowed his focus to the effects of radio frequencies on humans the summer before his first year when he participated in the Honors College EUREKA! undergraduate research program.

Davis aspires to perform research to improve biomaterial properties of medical devices with the goal of creating implants that last a lifetime. From a young age she was fascinated by the idea that human innovation can mimic the body. Her interest was heightened after her 5-year-old cousin was diagnosed with a congenital heart defect. [READ MORE](#)



Gabriel Cutter and Lauren Davis

“We are preparing students to tackle some of society's most complex and urgent problems.”

- Anand Gramopadhye

Dean, College of Engineering, Computing & Applied Sciences

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Custer

7 Awarded NSF Graduate Research Fellowship

Seven Clemson University students have been awarded the 2021 National Science Foundation Graduate Research Fellowship, a highly competitive grant aimed at building future scientific and engineering leaders.

“As an R1 research institution, we are committed to research and excited to see the research endeavors of our students,” said Robert H. Jones, Clemson’s executive vice president for academic affairs and provost.

These students were among 2,000 selected from more than 12,000 applicants nationwide who are pursuing graduate work in the disciplines of science, technology, engineering, and mathematics.

The NSF Graduate Research Fellowship provides three years of support for graduate education, including a \$34,000 annual stipend and a \$12,000 cost-of-education allowance. Fellows have access to a wide range of professional development opportunities over the course of their graduate careers.



Diaz

Daniel Custer, an Honors College graduate with a major in mechanical engineering, will pursue a Ph.D. at Stanford University. He plans to research new materials for energy applications.

Deyrel Diaz is a second year Ph.D. student in the School of Computing at Clemson University. Born in Cuba and raised in Fort Myers, Fla., his research focuses on investigating the effects a virtual surrounding has on users’ short-term memory, spatial cognition and travel techniques.



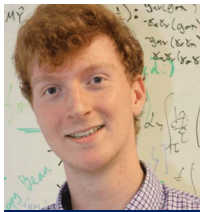
LeMatty

Amanda LeMatty, a senior majoring in biomedical engineering and minoring in nonprofit leadership, will pursue a Ph.D. in biomedical engineering – bioInnovate track at the University of Utah.



Snow

Luke Snow, an Honors College senior majoring in electrical engineering and minoring in mathematics, will pursue a Ph.D. in electrical engineering at Cornell University, where he’ll study the mathematical foundations of signal and information processing systems.



Copeland

Paul “Marston” Copeland, an Honors College senior majoring in physics, will pursue a Ph.D. at Duke University studying theoretical nuclear and particle physics. He is also a 2020 Goldwater Scholar and will graduate with departmental and general honors from the Clemson University Honors College.



Schramer

Tristan Schramer is a biological sciences graduate student from Wheaton, Ill. His research in Christopher L. Parkinson’s lab involves the use of phylogenomics to better understand how processes like gene flow impact the evolution of genomes and speciation, specifically in North American watersnakes.



Sullivan

Cierra Sullivan is a second-year graduate student in the Department of Biological Sciences at Clemson University in the lab of assistant professor Matthew Koski. Her research interests largely center on investigating the ecological and evolutionary reasons why certain plant species can physically appear (e.g. color) or operate (physiological processes) differently, despite being regarded as one, single species.

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Honors College senior to research vaccines in Sweden

An Honors College senior majoring in microbiology and genetics received the American Scandinavian Fellowship and will conduct research in Sweden for a year before enrolling at the John Hopkins School of Medicine.

Harrison “Chris” Moss will receive \$19,100 for post-baccalaureate research at Karolinska Institutet in Stockholm, Sweden. He will research alternative vaccines for the fatal childhood disease known as Whooping Cough.

Moss is Clemson’s first recipient of the American Scandinavian Fellowship, according to Robyn Curtis, director of the Office of Major Fellowships.

The Foundation has awarded more than 4,000 fellowships and grants to Americans and Scandinavians engaged in study, research or creative arts projects during the past 100 years.

While at Clemson, Moss has split his time between the labs of Matthew Turnbull, associate professor, and Lesly Temesvari, alumni distinguished professor, in the Biological Sciences Department.

This spring Moss was admitted to Johns Hopkins School of Medicine to pursue a Ph.D. in Immunology following graduation. Johns Hopkins accepted his request to defer admission until after the fellowship period. [READ MORE](#)



Chris Moss

Clemson Ph.D. student receives prestigious NASA Hubble Fellowship

Lea Marcotulli’s study of supermassive black holes takes her to the farthest reaches of the universe. This fall, it will take her to the Yale Center for Astronomy and Astrophysics as a part of the NASA Hubble Fellowship Program.

Marcotulli is the first Clemson graduate student to receive the fellowship, one of the world’s most prestigious and competitive postdoctoral research prize fellowships in astrophysics. NASA selected 24 fellows out of more than 400 applicants. Each fellow will receive up to three years of financial support to conduct research.



Lea Marcotulli

“I feel deeply humbled and honored to have received this fellowship. This award is truly one of the most amazing achievements of my career. I could have never accomplished it without the help and support of my adviser, my research group, and all the amazing people here at Clemson,” said Marcotulli, who received her Ph.D. from the College of Science’s Department of Physics and Astronomy in May.

“Nearly every young researcher in astrophysics applies to this program and very few succeed,” said Marco Ajello, an associate professor in physics and astronomy who is Marcotulli’s adviser. “Lea’s success testifies to her superb capabilities as a researcher, leader, communicator and mentor to young and fellow students. It also shows that our graduate program can now compete with some of the best graduate programs in the U.S. and can successfully provide the perfect environment for talented young scientists to grow and thrive.” [READ MORE](#)

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Governor honors Clemson faculty for research impact

Gov. Henry McMaster has recognized two Clemson University faculty members for their contributions to scientific discovery, education and public service.

Tanju Karanfil, vice president for research and professor of Environmental Engineering and Earth Sciences, has received the 2021 Governor's Award for Excellence in Scientific Research, and Marco Ajello, associate professor in the Department of Physics and Astronomy, received the 2021 Governor's Young Scientist Award for Excellence in Scientific Research.

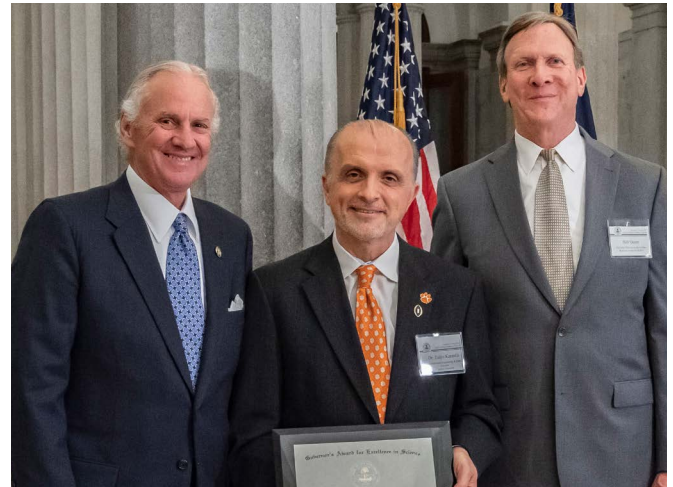
"Dr. Karanfil's success in research is a product of exceptional analytical thinking skills and a deep focus on problem solving," said Robert Jones, executive vice president for Academic Affairs and provost. "Through hard work and dedication to his students and colleagues, he has excelled in his own research program and has served as a model to inspire others. Tanju is truly one of South Carolina's treasures!"

"The exciting research conducted by Dr. Marco Ajello is expanding our understanding of the universe, and connecting Clemson faculty and students with scholars and world-class research facilities across the globe," Jones added. "His brilliant work and new discoveries are propelling Clemson's growing reputation as a center of excellence in astrophysics."

An international expert on water quality, Karanfil has made significant contributions to the scientific understanding of water contaminants and treatment, and as a licensed professional engineer in South Carolina, serves frequently as a consultant to utilities and engineering firms. Karanfil's research has aided the understanding and removal of contaminants from drinking water, wastewater effluents and swimming pools. He also extensively studied the effect of wildfires on water quality and treatability and has supported the development of new technologies for water and wastewater treatment to protect public health.

"I'd like to thank Gov. McMaster for recognizing the role scientific research plays in improving quality of life in South Carolina," Karanfil said. "I am humbled to join the great scientists who have earned this distinction before me, and I congratulate Marco Ajello, a great young scientist with a bright future."

Karanfil has published two books and more than 160 peer-reviewed journal articles during his career. He has mentored more than 100 graduate students, post-doctoral research associates and graduate-level visiting scholars. During his career, Karanfil has earned numerous national and international awards, including a CAREER Award



From left: Gov. Henry McMaster, Tanju Karanfil and Bob Quinn of the South Carolina Research Authority

“ I'd like to thank Gov. McMaster for recognizing the role scientific research plays in improving quality of life in South Carolina.

- **Tanju Karanfil**

Vice President for Research

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from the National Science Foundation. He and his students also have earned several best dissertation/thesis and paper awards in recognition of their scientific contributions. Karanfil has been elected principal member of the Turkish Academy of Sciences in his native Turkey and has earned the Science Special Award in Engineering from the Scientific and Technological Research Council of Turkey.

Karanfil is a registered professional engineer in the State of South Carolina, a board-certified environmental engineer by the American Academy of Environmental Engineers, and a Fellow of the International Water Association. As vice president for research, Karanfil has led the University's research enterprise through a period of tremendous growth, which has solidified Clemson among the nation's top Carnegie R1 universities.



Gov. Henry McMaster presents the Governor's Young Scientist Award for Excellence in Scientific Research to Marco Ajello.

Ajello is an astrophysicist whose research has led to breakthroughs in scientific understanding of the evolution of supermassive black holes and unraveled some of our universe's mysteries. His research interests include high-energy astrophysics, cosmology and particle astrophysics. He led an international research team that measured all the starlight ever produced throughout the observable universe's history.

Ajello was also part of a research team that devised a new measurement of the Hubble Constant, the unit of measure used to describe the rate of

expansion of the universe, and another that captured the first photographic proof that merging galaxies can produce jets of charged particles that travel at nearly the speed of light.

"This is one of the most significant events of my career. I'm truly humbled and honored to receive the Governor's Young Scientist Award for Excellence in Scientific Research," Ajello said.

Ajello has received more than \$2.9 million in research funding since he joined the Clemson faculty in 2014. He has mentored more than 25 postdoctoral researchers and students, including graduate student Lea Marcotulli, who recently received a prestigious NASA Hubble Fellowship, a first at Clemson. Ajello has co-authored 323 peer-reviewed articles during his career. He has won several awards, including the College of Science's Rising Star in Discovery Award for excellence in forefront research and the University Research, Scholarship and Artistic Achievement Award for authoring a paper that has received more than 1,000 citations. He was part of two research teams that received the Bruno Rossi Prize of the American Astronomical Society for significant contributions to high-energy astrophysics. Ajello is also a recipient of the Otto Hahn Medal, an award given by the Max Planck Society in Germany to junior researchers for outstanding scientific achievement.

Governor's Awards are jointly sponsored by the Governor's Office and the South Carolina Academy of Sciences.

AAALAC Accreditation

➔ Full accreditation confirms Clemson's high-quality, world-class animal science programs

Clemson University has earned full re-accreditation from the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC).

AAALAC accreditation confirms an institution's commitment to high-quality, responsible animal science and fosters continuous improvement to programs. The accreditation helps the university attract the best and brightest scientists and provides assurance to potential collaborators and sponsors that Clemson's animal science program is world-class. Clemson is committed to ensuring the highest standards of animal care in both biomedical and agricultural research.

Representatives of the organization visited Clemson facilities and research farms across the state in March as part of its reaccreditation process, which examines policies, animal housing and management, veterinary care, facilities, and all other aspects of an institution's animal care and use program. Following the visit, the group recognized recent investments in facilities and equipment that solidify Clemson's topnotch animal science program and noted strong collaboration among departments and colleges, as well as participation from Clemson leaders, including President Jim Clements and other members of the executive leadership team. Collaboration and participation from leadership creates a winning culture, the group commented.

AAALAC International is a private, nonprofit organization that promotes the humane treatment of animals in science through voluntary accreditation and assessment programs, according to its website. Accredited institutions must be re-evaluated every three years.

More than 1,000 companies, universities, hospitals, government agencies and other research institutions in 49 countries have earned AAALAC accreditation, demonstrating their commitment to responsible animal care and use. These institutions volunteer to participate in AAALAC's program, in addition to complying with the local, state and federal laws that regulate animal research. Some of the institutions that have earned AAALAC accreditation include the Sloan-Kettering Cancer Center, St. Jude Children's Research Hospital, The American Red Cross, and the National Institutes of Health.

Clemson first received AAALAC accreditation in 1994.



Clemson's LeMaster Dairy Center

“ The AAALAC site visit was highly successful. I think they witnessed firsthand Clemson's commitment to excellence and our collaborative spirit.

- **Robin Tyndall,**

director of research compliance
Division of Research



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President Clements, center, poses for a group photo with Researcher of the Year nominees and recipients of the University Research, Scholarship and Artistic Achievement Awards.

An infectious disease expert instrumental to COVID-19 mitigation and a scholar who has helped tell the story of African Americans in America were named Researchers of the Year at Clemson University.

Rhondda Thomas, Calhoun Lemon Professor of Literature, was named senior Researcher of the Year, and Lior Rennert, assistant professor of public health sciences, was named junior Researcher of the Year.

“University research is about generating and disseminating new knowledge to help improve society and the world. Dr. Rennert and Dr. Thomas are having profound impact through research,” said Tanju Karanfil, Clemson vice president for research.

The awards were presented at the annual Clemson University Research Symposium in May. The Symposium brings together faculty from all colleges and disciplines to share ideas and form research collaborations, as well as to celebrate successes. More than 200 people attended the event either in person or online.



Rhondda Thomas

A recipient of the prestigious Whiting Foundation fellowship, Thomas has garnered national and international recognition for her interdisciplinary, multifaceted Call My Name Project. The project documents and shares the stories of African Americans in the history of Clemson University and local communities from freedom in Africa through desegregation in South Carolina.

Her book published in November was recognized in the 2021 book award competition by the National Council on Public History. She is editing a collection of 10 essays on The Rhetorics of Campus History and is completing two projects with Cambridge University Press. Additionally, with funding from the National Endowment for the Humanities, she is working to complete the Call My Name traveling museum exhibit, scheduled to begin touring in early 2022. Thomas is a faculty member in the College of Architecture, Arts and

Humanities.

“I’m so honored to receive this recognition of my research as a humanities professor,” Thomas said. “Thank you to the committee for selecting me from such an accomplished group of nominees. And I’m grateful to work at Clemson where I can pursue my research interests with support from my

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department, college, and the administration.”

Said Nicholas Vazsonyi, dean of the College of Architecture, Arts and Humanities: “The College of Architecture, Arts and Humanities is so proud of the work Dr. Thomas has been doing, and delighted that she is being recognized for it. Dr. Thomas’s “Call My Name” initiative and the projects surrounding it embody the concept of public facing humanities. They demonstrate palpably how the humanities can be transformative for both individuals and institutions.”

For Researcher of the Year, each college nominated 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.



Lior Rennert

Rennert – a faculty member in the College of Behavioral, Social and Health Sciences – is an internationally recognized infectious disease scholar.

His primary research activities include the modeling, evaluation, and implementation of effective COVID-19 testing strategies and public health interventions. He has published his work in prestigious international journals and earned five 1st author manuscripts in high impact journals in the past year, including *The Lancet Child & Adolescent Health* and *BMC Medical Research Methodology*. Rennert is principal investigator on multiple externally funded grants, and his work has been covered by several media outlets. He also serves as a reviewer for six journals, including the *British Medical Journal* and *Clinical Infectious Diseases*.

“I am honored to receive this prestigious award, and am extremely grateful to my department, college, and the university for their consistent support that put me in position to succeed here at Clemson,” Rennert said.

Said Leslie Hossfeld, dean of the College of Behavioral, Social and Health Sciences: “Dr. Rennert is an extraordinary scholar, and this recognition is well deserved. As an infectious disease epidemiologist and biostatistician, he has been instrumental in pandemic planning for the University. His research has been recognized in premier journals in his field, and he continues to produce outstanding scholarship. He is such a remarkable researcher and colleague. What an incredible talent. I am so delighted for him, and for our college.”

Nominees from each college are listed on the next two pages.

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Junior faculty nominees in addition to Rennert:



Garcia

Jorge Luis Garcia, assistant professor of economics in the College of Business, is a labor and development economist who studies fertility, human capital, and female labor force participation choices, exploring the economic fundamentals that cause policies to perpetuate female disadvantage in developing countries.



Madathil

Kapil Madathil, assistant professor of civil and industrial engineering in the College of Engineering, Computing and Applied Sciences, has expertise in applying

the knowledge base of human factors engineering to the design and operation of sustainable human-computer systems that involve rich interactions among people and technology. His research covers the entire spectrum of system design: from identifying the user needs to designing and developing computing systems.



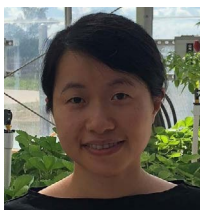
Mousavi

Ehsan Mousavi, assistant professor of construction science and management in the College of Architecture, Arts and Humanities, is collaborating on projects funded by the National Science Foundation, U.S. Department of Energy, and the American Society of Heating, Refrigerating, and Air Conditioning Engineers. Mousavi has developed an extensive research background in the indoor air quality of hospitals. Specifically, he has studied the effect of environmental parameters on the transmission and spread of pathogenic agents.



Podilla

Ramakrishna Podila, assistant professor of physics and astronomy in the College of Science, works at the interface of physics, biology, and nanoscience to integrate the principles of condensed matter physics, optical spectroscopy, and physiological chemistry to uncover novel phenomena at the nanoscale and to understand nano-bio interfaces. Current research themes cover energy conversion and storage, nanotoxicity for the development of therapeutics, and biosensing and imaging.



Wang

Hehe Wang, assistant professor of plant and environmental sciences in the College of Agriculture, Forestry and Life Sciences, conducts basic and applied research to study the epidemiology, ecology, and genetics of bacterial pathogens in different crop production systems. She works to develop novel, sustainable, and information-driven management strategies to prevent and minimize disease development.



Whitworth

Brooke Whitworth, associate professor of teaching and learning in the College of Education, investigates the role of district science coordinators and the scaling of professional development models. Few studies have examined the role of district science coordinators in supporting change and student achievement over the last 30 years. Her work has begun to build this area of research, inform where district science coordinators need support, and identify policy implications surrounding this position.



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Senior faculty nominees in addition to Thomas:



Bates

C.C. Bates, associate professor of education and human development in the College of Education, works to create technological innovations to support professional development of educators, curriculum to address reading and writing difficulties, and differentiated reading instruction in the primary grades.



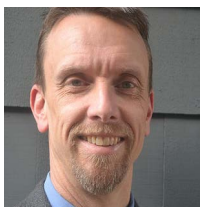
Ding

Feng Ding, associate professor of physics and astronomy in the College of Science, is leading a computational biophysics lab at Clemson, which focuses on uncovering the structure, dynamics, and function interrelationship of biomolecules and molecular complexes. The main goal is to develop state-of-the-art molecular modeling methodologies and apply these approaches to uncover disease mechanisms and help design novel diagnostic and therapeutic solutions.



Powell

Brian Powell, professor of environmental engineering and earth sciences in the College of Engineering, Computing and Applied Sciences, focuses on the understanding and prediction of the physical, chemical, and biological processes which govern the mobility of radionuclides in natural and engineered systems. The knowledge gained from his work can be used to evaluate risk posed by subsurface contamination, to design remediation strategies for contaminated sites, and to facilitate the use of safe disposal practices.



Sinclair

Robert Sinclair, professor of psychology in the College of Behavioral, Social and Health Sciences, focuses on occupational health psychology, the application of theories and methods of psychology to the study of worker safety, health, and well-being. Recent research covers economic stressors, such as job insecurity and perceived income inadequacy, and health. He also studies organizational climates that enhance worker safety, health, and well-being, as well as occupational health risks in special populations such as healthcare and military personnel.



White

Sarah White, professor of plant and environmental sciences in the College of Agriculture, Forestry and Life Sciences, works to evaluate the use of plant and bio-based treatment technologies to manage nutrient pesticide, and plant pests carried in irrigation water. She is particularly interested in helping growers clean water so that it can be reused on-farm. She recently led a national team of researchers from 10 universities that received \$8.2 million in funding from USDA-Specialty Crops Research Initiative.



Zagenczyk

Tom Zagenczyk, professor of management in the College of Business, conducts research that integrates psychological and social network methods to better understand the role that both individual differences and social-contextual factors play in shaping employee-organization relationships and outcomes, including employee-supervisor relationships and relationships between coworkers.



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At the Research Symposium, Clemson also awarded its newest recipients of University Research, Scholarship and Artistic Achievement Awards (URSAAA). URSAAA was created in 2018 to recognize Clemson University faculty who have achieved rare career milestones, such as:

- Receiving the highest level of national or international recognition in their field;
- Authoring a paper that has received more than 1,000 citations;
- Expending more than \$1 million on research in a fiscal year.

Only about 10 percent of Clemson's faculty body has earned the URSAAA distinction. Those earning the URSAAA designation are lifetime members who will be invited to an annual gathering to celebrate scholarship and discovery at Clemson University. URSAAA recipients are listed below, along with their URSAAA achievement.



AMY APÓN

*Professor and C. Tycho Howle
Director, School of Computing*
Expenditures exceeding \$1 million



JULIA BRUMAGHIM

Professor of Chemistry
Publication exceeding 1,000
citations



KAI HE

*Assistant Professor of Materials
Science and Engineering*
Publication exceeding 1,000
citations



ANJALI JOSEPH

*Spartanburg Regional Health
System Endowed Chair,
Architecture and Health Design*
Publication exceeding 1,000
citations



LINDA LI-BLEUEL

Professor of Performing Arts
Fulbright Award Recipient



JACOB SORBER

*Associate Professor in the
School of Computing*
Fulbright Award Recipient



HAI XIAO

*Samuel Lewis Bell
Distinguished Professor and
Chair, Electrical and Computer
Engineering*
Annual expenditures exceeding
\$1 million



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