Quarterly Research Reports

clemson.edu/research/division-of-research/leadership
R1 Status Confirms Clemson’s National Reputation

Carnegie R1 Confirmed January 2022

• Boosts National Reputation
• Opens Door for Collaboration/Funding
• Helps Recruit Faculty, Students, Industry
### R1 Designation Reflects Performance Across Disciplines

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Clemson 2015</th>
<th>Clemson 2018</th>
<th>Clemson 2021</th>
<th>Δ Metric 2015-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science &amp; Engineering Expenditures</td>
<td>$117M</td>
<td>$145M</td>
<td>$165M</td>
<td>$48M</td>
</tr>
<tr>
<td>Non-Science &amp; Engineering Expenditures</td>
<td>$44M</td>
<td>$49M</td>
<td>$54M</td>
<td>$10M</td>
</tr>
<tr>
<td>Postdoc &amp; Non-Faculty Researchers</td>
<td>65</td>
<td>111</td>
<td>162</td>
<td>97</td>
</tr>
<tr>
<td>PhD Humanities</td>
<td>2</td>
<td>8</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>PhD Social Sciences</td>
<td>9</td>
<td>20</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>PhD STEM</td>
<td>143</td>
<td>170</td>
<td>156</td>
<td>13</td>
</tr>
<tr>
<td>PhD Other</td>
<td>62</td>
<td>33</td>
<td>55</td>
<td>-7</td>
</tr>
<tr>
<td>Per Capita Science &amp; Engineering Expenditures</td>
<td>$180K</td>
<td>$159K</td>
<td>$174K</td>
<td>-$6K</td>
</tr>
<tr>
<td>Per Capita Non-Science &amp; Engineering Expenditures</td>
<td>$52K</td>
<td>$53K</td>
<td>$56K</td>
<td>$4K</td>
</tr>
<tr>
<td>Per Capita Postdoc &amp; Non-Faculty Researchers</td>
<td>0.08</td>
<td>0.122</td>
<td>0.170</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### EXECUTIVE SUMMARY

- Carnegie tracks 10 metrics
- Captures performance in STEM, Social Sciences and Humanities
- Clemson metrics improving in nearly all categories
Clemson Faculty Authoring More Peer-reviewed Articles

Journal Articles Authored

- 2010-2014: 5,910
- 2011-2015: 5,800
- 2012-2016: 6,000
- 2013-2017: 6,500
- 2014-2018: 6,800
- 2015-2019: 7,100
- 2016-2020: 7,400
- 2017-2021: 7,710

Per capita: 5.91 to 7.71

42% increase over past decade

SOURCE: Web of Science
Citations of Clemson Research Are Increasing

- Per capita citations increased from 36.55 to 61.02, reflecting an 82% increase over the past decade.

**Graph:**
- Y-axis: Citations of Research
- X-axis: Years (2010-2014, 2011-2015, etc., up to 2017-2021)
- Data shows a gradual increase with a significant spike in 2017-2021.

**Source:** Web of Science
Clemson Faculty Author Some of Most Prominent Papers in Their Fields

8 Hot Papers in 2021:

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

SOURCE: Web of Science

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

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

Ali Shirzadibabakan, PhD student
College of Business

*Urban expansion modeling using an enhanced decision tree algorithm*
Clemson Faculty Author Some of Most Prominent Papers in Their Fields

8 Hot Papers in 2021:

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

SOURCE: Web of Science

Apparao Rao, endowed professor
College of Science
Cell-like-carbon-micro-spheres for robust potassium anode
Large-scale low-cost synthesis methods for potassium ion battery (PIB) anodes with long cycle life and high capacity

Ting Zheng, postdoctoral fellow
College of Engineering, Computing & Applied Sciences
Recent advances in cellulose and its derivatives for oilfield applications

Sneh Punia Bangar, graduate research assistant
College of Agriculture, Forestry & Life Sciences
Delineating the inherent functional descriptors and biofunctionalities of pectic polysaccharides
Strategies for Research Growth

**IMPROVE THE CULTURE**
- Incentivize and incubate collaboration with R-Initiative funds and Research Symposium
- Support faculty development with CAREER Academy
- Celebrate success with faculty awards programs
- Increase faculty representation with Research Advisory Board
- Nurture the pursuit of high-value projects

**BE STRATEGIC**
- Aggressively pursue large projects: Centers for Biomedical Research Excellence
- Capitalize on legacy investments: International Center for Automotive Research; Dominion Energy Innovation Center; Center for Human Genetics
- Target federal priorities
- Pursue and enhance strategic partnerships: Savannah River National Lab; Prisma; Medical University of South Carolina; Industry Partnerships

**HIRE GREAT TALENT**
- Recruit top junior and senior faculty: Endowed chairs and professorships; Early career recipients
- Bring new leadership to the colleges: Deans and Associate Deans for Research
- Build a strong Research Division focused on customer service

**INVEST IN SERVICE, EFFICIENCY, FACILITIES**
- Invest in core facilities with top-notch equipment
- Improve operational efficiency: BioRAFT online lab management; Core facility management software
- Build a strong Research Division focused on customer service; operate with balanced budgets despite challenges
- Refocus Research Foundation to enhance service and create opportunity
Improve Research Efficiency

New BioRaft lab safety management software
• 60% reduction in time completing safety tasks
• 1,288 hours saved on inspections.

New iLab Core Facility Management System
• Easier, online facility scheduling and billing.

New Web-based Compliance Management
• Integrated into InfoEd for ease of use
• Institutional Review Board, Institutional Animal Care and Use Committee, and the Institutional Biosafety Committee

Searchable Research Equipment Database
• Facilitates asset sharing to maximize utilization
Investment in World-Class Facilities

Electron Microscopy Facility
- World’s most advanced Scanning Electron Microscope
- Photoelectron and Auger Electron Spectroscopy

Clemson Light Imaging Facility
- New widefield imaging system

Godley-Snell Research Center
- New CT and MRI for large animals

Aquatics Animal Research Facility
- 4,000-square-foot facility with 12 individual rooms
# Investing in People with the R-Initiative Funding Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CU SUCCCEEDS</strong></td>
<td>4 award programs to support project initiation or completion, interdisciplinary teams, and short-notice external funding opportunities.</td>
</tr>
<tr>
<td><strong>CU RESEARCH FELLOWS</strong></td>
<td>Funds to hire and train qualified new research faculty, research associates and postdoctoral researchers.</td>
</tr>
<tr>
<td><strong>EXTERNAL REVIEW</strong></td>
<td>External reviews to strengthen proposals before submission to funding agencies</td>
</tr>
<tr>
<td><strong>CU CORE INCENTIVIZED ACCESS</strong></td>
<td>Grants access to Clemson’s core research facilities and equipment at no cost.</td>
</tr>
<tr>
<td><strong>CU MAJOR RESEARCH INSTRUMENTATION</strong></td>
<td>Funds to purchase, replace or upgrade major research equipment.</td>
</tr>
<tr>
<td><strong>DOCTORAL DISSERTATION COMPLETION GRANTS</strong></td>
<td>Funds to help students successfully earn their PhDs on time.</td>
</tr>
<tr>
<td><strong>SPONSOR TRAVEL GRANTS</strong></td>
<td>Visit agency and foundation program directors to build relationships</td>
</tr>
<tr>
<td><strong>CURF-PRISMA MATURATION FUND</strong></td>
<td>Collaborate with Prisma Health clinicians to develop and commercialize health care innovations</td>
</tr>
<tr>
<td><strong>CURF-PRISMA MATURATION FUND</strong></td>
<td></td>
</tr>
</tbody>
</table>
R-Initiative Participation by College

Participation Rate = % of T/TT Faculty to be PI or Co-PI on R-Initiative Proposal

- **CAAH**: 28% (44/157)
- **CAFLS**: 40% (49/124)
- **CBSHS**: 38% (51/135)
- **Business**: 9% (10/109)
- **Education**: 26% (12/46)
- **CECAS**: 55% (136/247)
- **Science**: 62% (97/156)
R-Initiative Award Rate

<table>
<thead>
<tr>
<th>Division</th>
<th>Funded Proposals</th>
<th>Unfunded Proposals</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAH</td>
<td>72%</td>
<td></td>
</tr>
<tr>
<td>CAFLS</td>
<td>76%</td>
<td></td>
</tr>
<tr>
<td>CBSHS</td>
<td>84%</td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>82%</td>
<td></td>
</tr>
<tr>
<td>CECAS</td>
<td>82%</td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td>78%</td>
<td></td>
</tr>
</tbody>
</table>
R-Initiative Award Breakdown per College

- CAAH
- CAFLS
- CBSHS
- Business
- Education
- CECAS
- Science

Categories:
- SUCCEEDS
- Fellows
- Doctoral Dissertation
- MRI
- CU-CIA
With the R-Initiatives, Clemson has invested more than $9 million in research involving 594 faculty.

**R-Initiative Deliverables**

- **8 Books Authored**
- **83 Articles and Presentations**
- **$14 Million in Additional External Funding Secured**
- **97 Students Have Earned PhDs**
- **20 New Pieces of Equipment Acquired**
- **23 Postdocs and Research Associates Hired**
- **11 Art Exhibitions and Residencies**

The first grants were awarded in 2017. Here are the deliverables so far:
Examples of Work Supported by R-Initiatives

Todd McDonald, associate professor of art, presented at the Waterloo Arts Juried Exhibition.

Carolina Dunn, associate professor of history, published a book.

Valerie Zimany, chair of the Department of Art, had work on display at the New Taipei Yingge Ceramic Museum, Taiwan.

Examples of Work Supported by R-Initiatives

Travers Scott, associate professor of communication, published a book

Oriana Aragon, assistant professor of marketing, presented at the International Convention of Psychological Science

Roxanne Calabria, professor in the School of Nursing, published an article in Nursing Education Perspectives

Sandra Linder, professor of teaching and learning, presented at the annual conference of the National Association for the Education of Young Children.
Office of Research Development

**Faculty Support**
- CAREER Academy
- Proposal Development Support/Training
- Nominations for Prestigious Honors/Awards
- Workshops/Informational Sessions

**Team Building**
- Building interdisciplinary teams for large grant proposals
- TigerSphere – a program to build interdisciplinary teams around a central theme chosen by faculty
  - Environmental Justice
  - Linking Clemson’s Interdisciplinary Resilience Researchers

**Explore New Opportunities**
- Monitor agency programs
- Private Foundations
- Limited Submissions
- Young Investigator Awards
CAREER Academy

 ✓ Extensive, 6-month CAREER Academy presented by the Office of Research Development

 ✓ Workshops and peer group meetings

 ✓ Grant-editing support to help faculty compete for NSF CAREER Awards.

 ✓ Valuable insights from CAREER awardees, former NSF program officers, and external consultants.

clemson.edu/research/development
<table>
<thead>
<tr>
<th>Name</th>
<th>Position/Department</th>
<th>Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valerie Zimany</td>
<td>CAAH</td>
<td>One of 10 U.S. artists named to the International Academy of Ceramics</td>
</tr>
<tr>
<td>Sruthi Narayanan</td>
<td>CAFLS</td>
<td>Received Early Career Award from Crop Science Society of America in recognition of research</td>
</tr>
<tr>
<td>Chikezie Isiguzo</td>
<td>CBSHS</td>
<td>Earned global fellowship from Association of Certified Anti-Money Laundering Specialists</td>
</tr>
<tr>
<td>Lauren Davis</td>
<td>Science</td>
<td>Named Beckman Scholar and Goldwater Scholar and received Astronaut Scholarship</td>
</tr>
<tr>
<td>Aleda Roth</td>
<td>Business</td>
<td>Research award created in her name by Production &amp; Operations Mgt. journal</td>
</tr>
<tr>
<td>Richard Brooks</td>
<td>CECAS</td>
<td>Selected as a Distinguished Member of the Association for Computing Machinery</td>
</tr>
<tr>
<td>Abby Allen</td>
<td>Education</td>
<td>Received early career award from the Institute of Education Sciences</td>
</tr>
<tr>
<td>Hala Nassar</td>
<td>CAAH</td>
<td>One of four named 2020 Fellow by the Council of Educators in Landscape Architecture</td>
</tr>
<tr>
<td>William Haller</td>
<td>CBSHS</td>
<td>Received prestigious Fulbright Scholar Award</td>
</tr>
<tr>
<td>Abby Allen</td>
<td>Education</td>
<td>Received early career award from the Institute of Education Sciences</td>
</tr>
<tr>
<td>Sruthi Narayanan</td>
<td>CAFLS</td>
<td>Received Early Career Award from Crop Science Society of America in recognition of research</td>
</tr>
<tr>
<td>Chikezie Isiguzo</td>
<td>CBSHS</td>
<td>Earned global fellowship from Association of Certified Anti-Money Laundering Specialists</td>
</tr>
<tr>
<td>Lauren Davis</td>
<td>Science</td>
<td>Named Beckman Scholar and Goldwater Scholar and received Astronaut Scholarship</td>
</tr>
<tr>
<td>Aleda Roth</td>
<td>Business</td>
<td>Research award created in her name by Production &amp; Operations Mgt. journal</td>
</tr>
<tr>
<td>Richard Brooks</td>
<td>CECAS</td>
<td>Selected as a Distinguished Member of the Association for Computing Machinery</td>
</tr>
<tr>
<td>Abby Allen</td>
<td>Education</td>
<td>Received early career award from the Institute of Education Sciences</td>
</tr>
<tr>
<td>Sruthi Narayanan</td>
<td>CAFLS</td>
<td>Received Early Career Award from Crop Science Society of America in recognition of research</td>
</tr>
<tr>
<td>Chikezie Isiguzo</td>
<td>CBSHS</td>
<td>Earned global fellowship from Association of Certified Anti-Money Laundering Specialists</td>
</tr>
<tr>
<td>Lauren Davis</td>
<td>Science</td>
<td>Named Beckman Scholar and Goldwater Scholar and received Astronaut Scholarship</td>
</tr>
<tr>
<td>Aleda Roth</td>
<td>Business</td>
<td>Research award created in her name by Production &amp; Operations Mgt. journal</td>
</tr>
<tr>
<td>Richard Brooks</td>
<td>CECAS</td>
<td>Selected as a Distinguished Member of the Association for Computing Machinery</td>
</tr>
<tr>
<td>Abby Allen</td>
<td>Education</td>
<td>Received early career award from the Institute of Education Sciences</td>
</tr>
<tr>
<td>Sruthi Narayanan</td>
<td>CAFLS</td>
<td>Received Early Career Award from Crop Science Society of America in recognition of research</td>
</tr>
<tr>
<td>Chikezie Isiguzo</td>
<td>CBSHS</td>
<td>Earned global fellowship from Association of Certified Anti-Money Laundering Specialists</td>
</tr>
<tr>
<td>Lauren Davis</td>
<td>Science</td>
<td>Named Beckman Scholar and Goldwater Scholar and received Astronaut Scholarship</td>
</tr>
<tr>
<td>Aleda Roth</td>
<td>Business</td>
<td>Research award created in her name by Production &amp; Operations Mgt. journal</td>
</tr>
<tr>
<td>Richard Brooks</td>
<td>CECAS</td>
<td>Selected as a Distinguished Member of the Association for Computing Machinery</td>
</tr>
<tr>
<td>Abby Allen</td>
<td>Education</td>
<td>Received early career award from the Institute of Education Sciences</td>
</tr>
<tr>
<td>Sruthi Narayanan</td>
<td>CAFLS</td>
<td>Received Early Career Award from Crop Science Society of America in recognition of research</td>
</tr>
<tr>
<td>Chikezie Isiguzo</td>
<td>CBSHS</td>
<td>Earned global fellowship from Association of Certified Anti-Money Laundering Specialists</td>
</tr>
<tr>
<td>Lauren Davis</td>
<td>Science</td>
<td>Named Beckman Scholar and Goldwater Scholar and received Astronaut Scholarship</td>
</tr>
<tr>
<td>Aleda Roth</td>
<td>Business</td>
<td>Research award created in her name by Production &amp; Operations Mgt. journal</td>
</tr>
<tr>
<td>Richard Brooks</td>
<td>CECAS</td>
<td>Selected as a Distinguished Member of the Association for Computing Machinery</td>
</tr>
<tr>
<td>Abby Allen</td>
<td>Education</td>
<td>Received early career award from the Institute of Education Sciences</td>
</tr>
<tr>
<td>Sruthi Narayanan</td>
<td>CAFLS</td>
<td>Received Early Career Award from Crop Science Society of America in recognition of research</td>
</tr>
<tr>
<td>Chikezie Isiguzo</td>
<td>CBSHS</td>
<td>Earned global fellowship from Association of Certified Anti-Money Laundering Specialists</td>
</tr>
<tr>
<td>Lauren Davis</td>
<td>Science</td>
<td>Named Beckman Scholar and Goldwater Scholar and received Astronaut Scholarship</td>
</tr>
<tr>
<td>Aleda Roth</td>
<td>Business</td>
<td>Research award created in her name by Production &amp; Operations Mgt. journal</td>
</tr>
<tr>
<td>Richard Brooksp</td>
<td>CECAS</td>
<td>Selected as a Distinguished Member of the Association for Computing Machinery</td>
</tr>
</tbody>
</table>

**Behind the Numbers: Faculty & Student Achievement**
Researchers of the Year

Lior Rennert
Assistant Professor
Public Health Sciences
College of Behavioral, Social and Health Sciences

Rhondda Thomas
Calhoun Lemon Professor
Literature
College of Architecture, Arts and Humanities

2022 Researchers of the Year to be announced at 12:45 in the Auditorium
University Research, Scholarship & Artistic Achievement Awards

Amy Apon
Professor, C. Tycho Howle Director
School of Computing

Julia Brumaghim
Professor
Chemistry

Kai He
Assistant Professor
Materials Science & Engineering

Anjali Joseph
Spartanburg Regional Health System Endowed Chair
Architecture + Health Design

Linda Li-Bleuel
Professor
Performing Arts

Jacob Sorber
Associate Professor
School of Computing

Hai Xiao
Samuel Lewis Bell Distinguished Professor
Electrical & Computer Engineering

2022 URSAAA winners to be announced at 12:45 in the auditorium
2022 Clemson University
RESEARCH symposium
May 10, 2022