# University Research Report

- Review of Carnegie R1 Metrics
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- Significant Awards

# Review of Carnegie R1 Metrics

Data for Carnegie Metrics are now available for 2016. In this section we present a review of Clemson metrics and anaylsis.
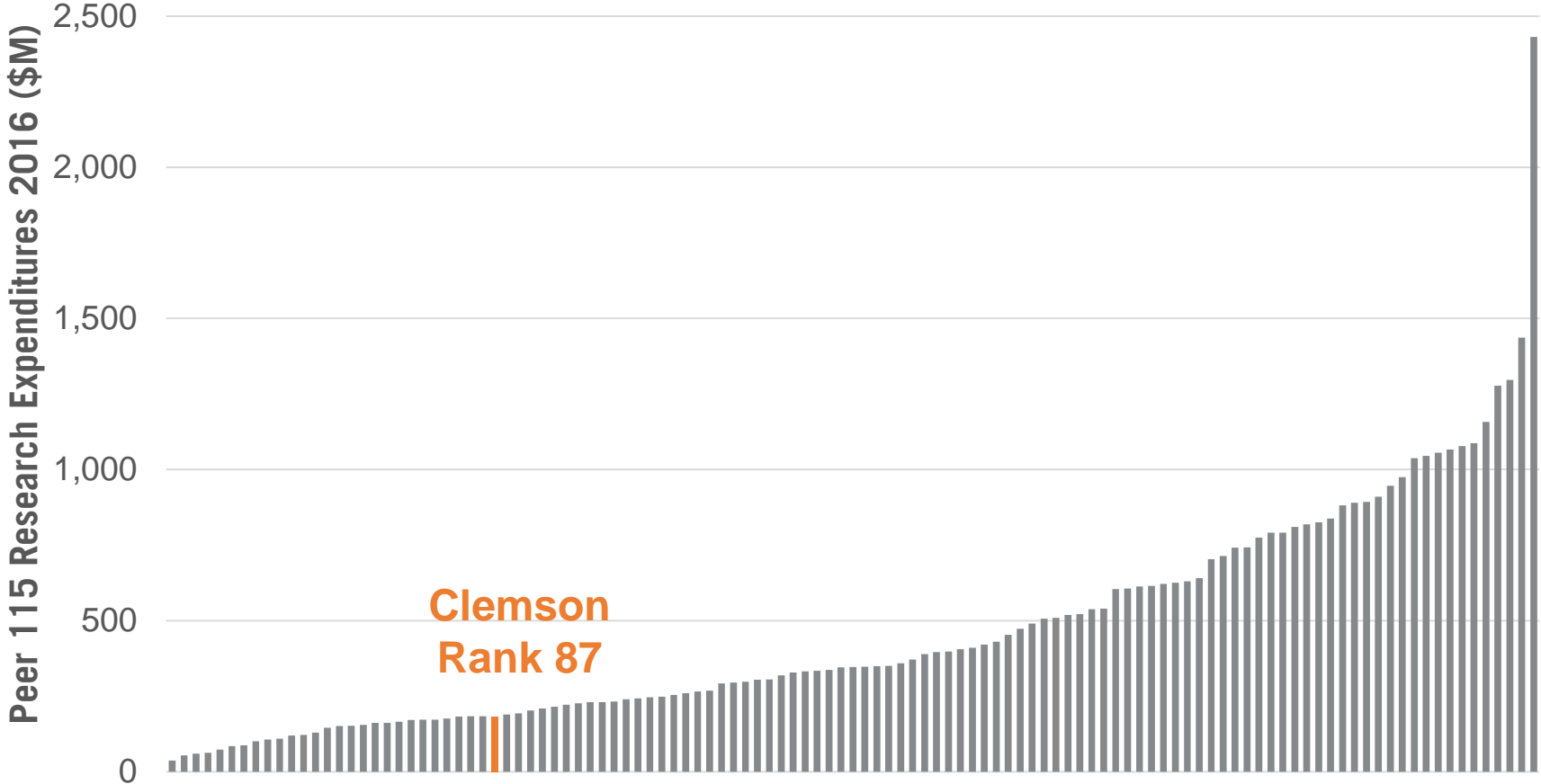
# 2018 Carnegie Review

- Clemson University continues to improve in each of the 10 Carnegie metrics (**Table, Page 2**) used to determine universities' basic category (i.e., Doctoral University, Highest Research also known as R1 status)
  - Clemson continues to move in a positive direction for each of the 10 Carnegie metrics in terms of absolute values (e.g., science and engineering expenditures in terms of dollars or STEM graduations in terms of numbers of graduates)
  - Clemson has moved up in rankings compared to its 115 R1 peers (rankings are numbered with the lowest number representing the highest rank). Clemson has moved up in seven of the ten ranking metrics. The most positive movement included the addition of postdoctoral fellows and non-faculty research staff. Clemson also gained significant ground in rankings due to increasing doctoral completions, particularly in the social sciences (psychology and economics). Despite growth in absolute values, Clemson has lost some ground in three of the rankings (i.e., non-science and engineering expenditures, doctoral STEM completions, and per-capita non-science and engineering expenditures). Clemson's rank in these metrics is very high, small losses in rank is to be expected.
  - Clemson University has continued to climb in its average ranking (i.e., average of 10 metrics) from an average rank in 2014 of 101 to an average rank in 2016 of 92.
- In terms of total research expenditures according to NSF Higher Education Research and Development (HERD) Survey, Clemson University ranks in the third quartile for 2016 total research expenditures (**Graph, Page 3**) compared to its 115 R1 peers. The outlier on the extreme upper end of this chart is Johns Hopkins with $2.4 billion in research expenditures (Research expenditures at Johns Hopkins include the Applied Physics Laboratory, with $1.4 billion in total R&D expenditures in FY 2016).
- There are many factors contributing to overall research expenditures (**Graph, Page 4**). We used the following key factors to determine research efficiency and compared Clemson to its R1 peers:
  - Count of tenure or tenure-track faculty, larger faculty size will move expenditures in a positive direction.
  - The total number of full-time graduate and undergraduate students per faculty, larger student to faculty ratio tends to decrease research expenditures.
  - The availability of research space, availability of larger and high quality research space should increase research expenditures.

We then examined which of our R1 peers are members of the American Association of Universities (AAU) (**Graph, Page 5**). There are 62 total AAU universities (60 in the United States and 2 in Canada). AAU universities are recognized as the flagship universities in North America and represent excellence across multiple dimensions, including research. When considering research efficiency, Clemson ranks 35th overall among R1 universities and 19th overall among AAU universities.
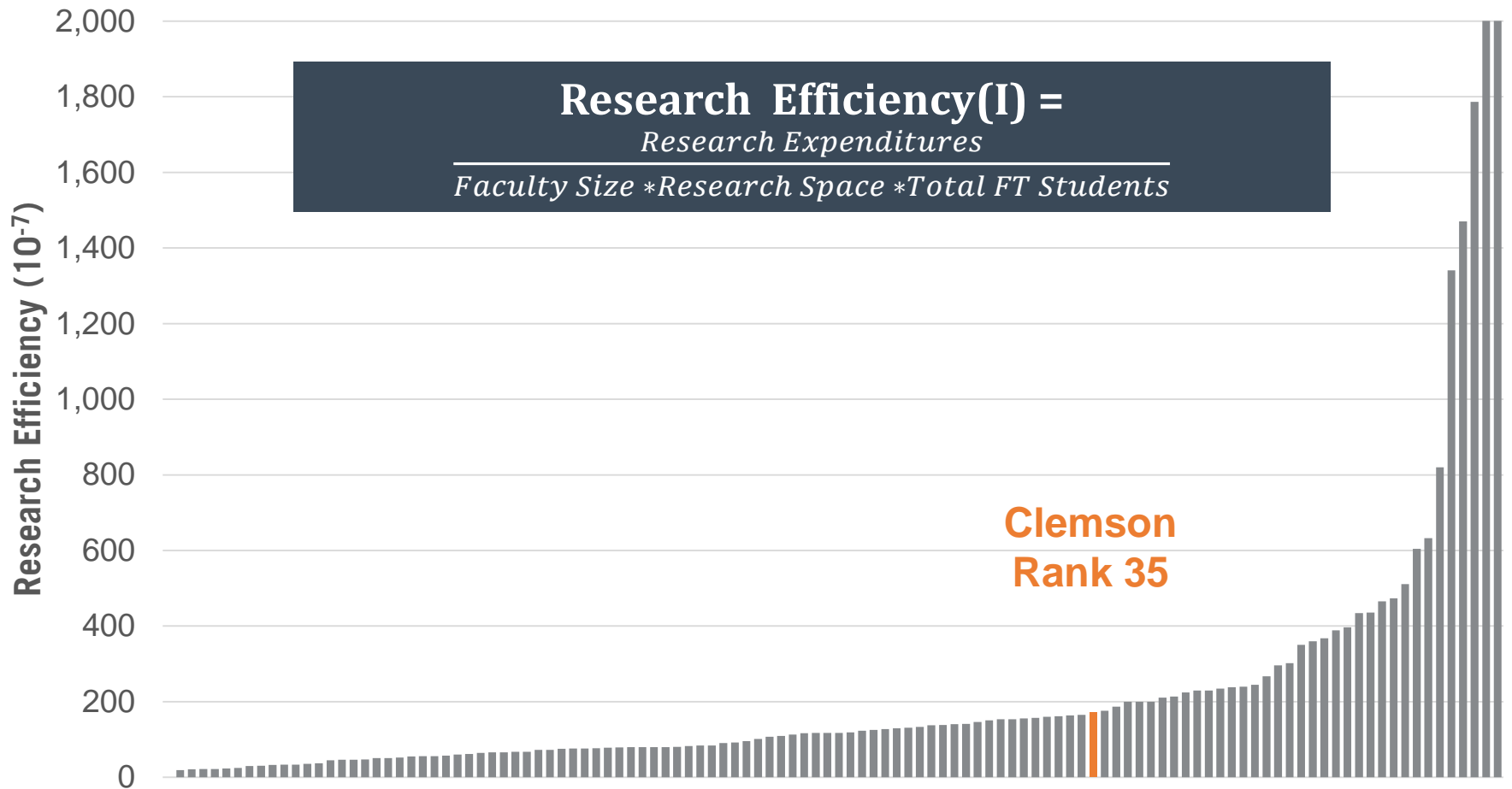
# 2018 Carnegie Review

| Metrics | Clemson 2014 | Clemson Rank R1 & R2 (n=222) | Clemson 2015 | Clemson Rank R1 & R2 (n=222) | Clemson 2016 | Clemson Rank R1 & R2 (n=222) | Δ Metric 2014 to 2016 | Δ Rank 2014 to 2016 |
|---|---|---|---|---|---|---|---|---|
| 1. S&E Exp | $116,871,000 | 114 | $120,858,000 | 114 | $133,342,000 | 110 | +$16,471,000 | + 4 |
| 2. non-S&E Exp | $44,199,000 | 16 | $50,375,000 | 16 | $50,623,000 | 18 | +$6,424,000 | - 2 |
| 3. Postdoc & Non Fac Res. | 65 | 131 | 91 | 120 | 97 | 116 | +32 | + 15 |
| 4. PhD Humanities | 2 | 160 | 3 | 161 | 5 | 145 | +3 | + 15 |
| 5. PhD Social Sciences | 9 | 151 | 16 | 136 | 19 | 119 | +10 | + 32 |
| 6. PhD STEM | 143 | 63 | 159 | 49 | 149 | 71 | +6 | - 8 |
| 7. PhD Other | 62 | 86 | 59 | 95 | 62 | 82 | +0 | + 4 |
| 8. Per Cap S&E Exp | $136,532 | 125 | $136,563 | 128 | $151,181 | 120 | +$14,649 | + 5 |
| 9. Per Cap non-S&E Exp | $51,634 | 6 | $56,901 | 8 | $57,396 | 8 | +$5,762 | - 2 |
| 10. Per Cap Postdoc & Non Fac Res. | 0.0759 | 158 | 0.1028 | 137 | 0.1100 | 132 | +0.0341 | + 26 |

**Average rank= 101**              **Average rank= 92**

Carnegie Review

# 2018 Carnegie Review



Clemson Rank 87

Peer 115 Research Expenditures 2016 ($M)

# 2018 Carnegie Review



**Research Efficiency(I) =**

$$\frac{Research\ Expenditures}{Faculty\ Size * Research\ Space * Total\ FT\ Students}$$

**Clemson**
**Rank 35**

# 2018 Carnegie Review

$$\text{Research Efficiency (I)} = \frac{\text{Research Expenditures}}{\text{Faculty Size} * \text{Research Space} * \text{Total FT Students}}$$

**Research Efficiency ($10^{-7}$)**

**Clemson Rank 35**
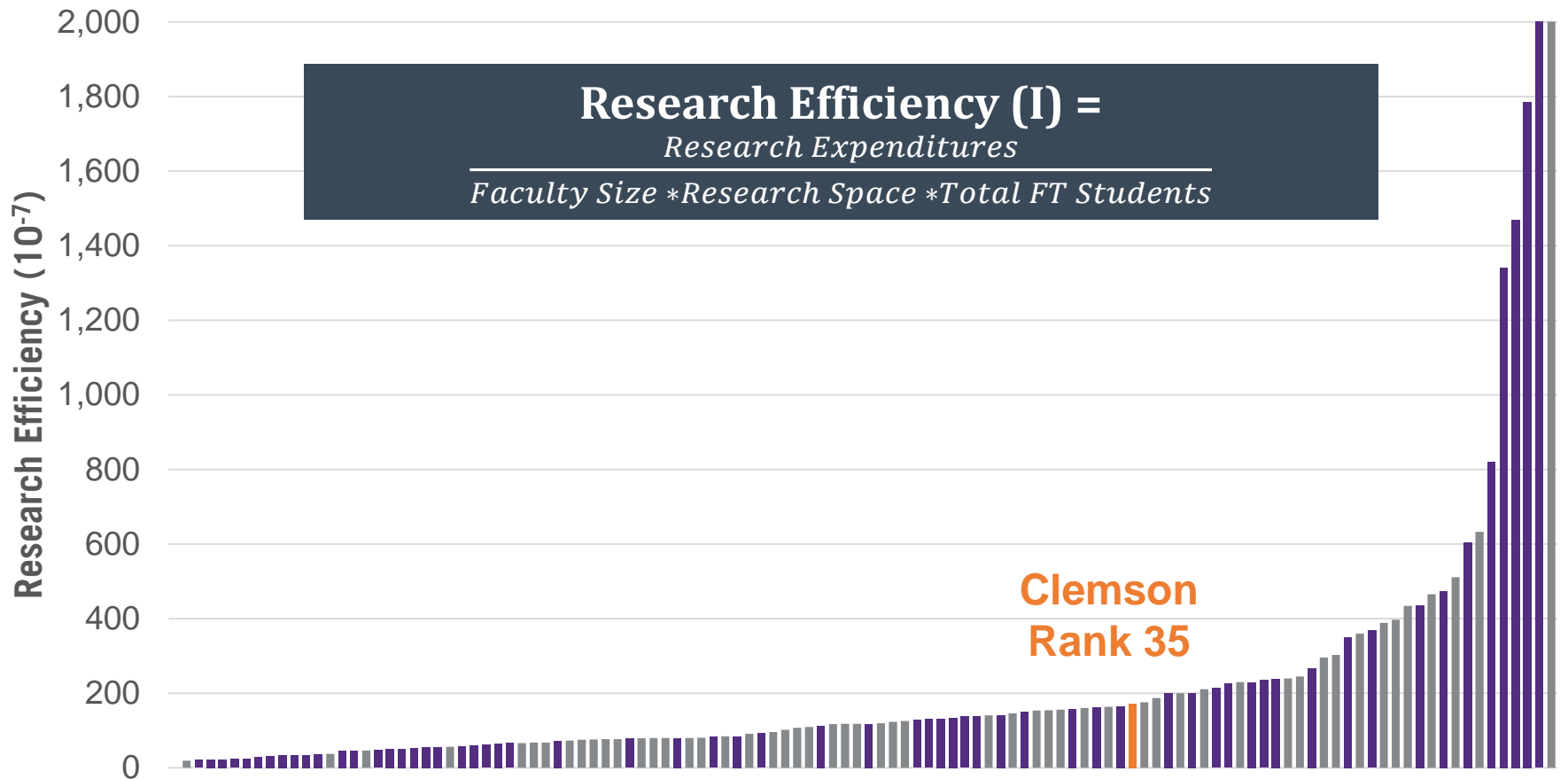
Purple indicates AAU universities (n=60). If Clemson was an AAU university, it would rank 19th by this measure of efficiency.

# Focus on Faculty

**College by College - Notable Faculty Achievements** - Dollars alone do not give a complete indication of institutional research and scholarly productivity. National awards and quality publications also contribute to faculty and institutional reputation.  Each college was requested to send a brief write-up of three top faculty with high research and scholarly productivity. This section includes the write-ups received.

# College of Agriculture, Forestry and Life Sciences

**Matias J. Aguerre, MS, PhD**
**Assistant Professor**
**Department of Animal and Veterinary Science**

Matias Aguerre is an agricultural production engineer and ruminant nutritionist. He started at Clemson in the spring of 2017. The overarching objective of his research program is to improve nutrient utilization efficiency in livestock production systems through novel, greater and more efficient use of high-quality forages in livestock diets. In addition, he is interested in determining how changes in dietary forage concentration and type (*i.e.*, grasses and legumes) affect lactation performance and nutrient utilization between different breeds of dairy cattle, in particular, Holstein vs. Jersey cattle. The outcomes of the proposed research activities will also contribute to protection of air and water quality and reduce consumer concerns about the environmental impact of animal production. He conducts most of his research at the Simpson Research Farm and the LaMaster Dairy Cattle Center. Aguerre currently teaches courses in Field Crops-Forages production and Sustainability of Livestock Systems. He serves as faculty advisor for Animal and Veterinary Sciences graduate and undergraduate students, and he is the coach of the Dairy Science Challenge team.

Bulleted List of Accomplishments:

- Awarded the ADSA Midwest Branch Young Dairy Scholar.
- Author and co-author of 7 peer-reviewed journal articles and 11 peer-reviewed proceedings and abstracts.
- Co-author of a book chapter. Title: Sustainable nutrition management of dairy cattle in intensive systems. In: Achieving sustainable production of milk. Volume 3.
- Invited speaker at the 2nd International Symposium on Greenhouse Gases in Agriculture. 2016. Topic: Carbon Balance in Temperate Systems: Efficiency of Carbon Utilization in Wisconsin Dairy Farms.

**Feng Chen, PhD**
**Professor**
**Department of Food, Nutrition and Packaging Sciences**

Feng Chen is a food chemist with research focus on nutraceuticals and food flavors. After joining Clemson University in 2001, Chen has published more than 200 peer-reviewed papers. Chen is teaching two undergraduate core courses, Food Chemistry I and Food Chemistry II, and another graduate course, "Nutraceuticals and Functional Food." Chen is also actively involved in the Creative Inquiry Program. He is serving as the chairman of the departmental Tenure and Promotion Review (TPR) committee. In addition, he was elected as the CAFLS senator leader, as well as the university senator.

Bulleted List of Accomplishments:

- Published more than 200 peer-reviewed papers in top-ranking journals with a high H-index 31; served as associate editor and the technical editor for 2 books and 9 book chapters; 7 patents (including 5 US patents) were awarded.
- Awarded for 24 CU proposals with $2,225,601, and 3 international grants as PI with $1,050,000.
- Served in the CU IP committee (2006-2010), elected as the CAFLS senator leader (2014), and university senator (2012-14); departmental safety coordinator (2001-2014); TPR chairman (2017--18), etc.
- Served as Chair or organizer of nutraceutical and food flavor sessions in national and international meetings in: IFT, 2005, 2013; ACS, 2006, 2009; Worldnutra, 2006; Congress IFT 2008; Pacifichem, 2015; ACMAP, 2017, etc.; Reviewer for USDA, IFT, Chinese NSF, NC Biotch proposals; associate editors and editorial members for international peer-reviewed journals.
- As the CI team advisor, led CI team into the final undergraduate student research competition in the 253rd American Chemical Society (ACS) National Meeting, 2017.
- Graduate student, Mr. Weizheng Wang, won 2nd Place in the CU graduate student research competition (GRADS), May, 2017. He was also awarded the Best Graduate Paper Competition of North American Jiangnan University Alumni and Friends Association (NAJUA) during the IFT annual meeting during June 28-30, 2017.
- Based on CU Tiger Prints (*http://tigerprints.clemson.edu/topdownloads.html*), Chen's former MS student, Mr. Hung Khiem Trang's thesis is listed as the most popular paper that is ranked No#1 with a total number of download by 28,270 times after its publication in August 2013.
- Chen's Former Ph.D student, Dr. Gregory Jones, was named the CAFLS Outstanding Graduate Research Assistant in Spring, 2014; Chen's former Ph.D student, Dr. Changqing Wu, who is now an associate professor in the University of Delaware, was awarded the Wade Stackhouse Graduate Fellowship, Clemson, SC, in 2004-2005.

**Young J. Han, PhD, PE**
**Professor**
**Department of Agricultural Sciences**

Young Han is a Registered Professional Engineer in the Agricultural Sciences Department who provides instrumentation and control expertise as a member of Clemson's Precision Farming Team.  Dr. Han's main research interest is to develop sensors and control technologies for site-specific application of water, pesticide and fertilizer for precision agriculture and to demonstrate the use, benefits and effectiveness of such technologies in the southeastern United States. Current research projects are supported by Cotton Incorporated, USDA, and NASA. These projects include the design and development of a controller-based variable rate hydraulic system for site-specific application of liquid fertilizers, using GPS (Global Positioning System) to determine hydrological properties of soils, site-specific nematicide placement in cotton, and improving nitrogen use efficiency in cotton through optical sensing and variable rate application technologies.  Han teaches two major courses for Agricultural Mechanization and Business majors, and advises a number of Creative Inquiry projects in Sensors and Control Applications for Precision Agriculture.

Bulleted List of Accomplishments:

- Received 2015 Carl M. Lund Professor of the Year Award.  Department of Agricultural and Environmental Sciences.
- Received 2012 Carl M. Lund Professor of the Year Award.  Department of Agricultural and Environmental Sciences.
- Led a Creative Inquiry Project, "Sensors and Controls for Precision Agriculture" in Fall 2015 and in Spring 2016.  The system developed by the CI project became a part of the system recently applied for US Patent, titled "Electro-mechanical Controller for Adjusting Pump Stroke On-the-go," by the Clemson Precision Farming Team.
- For the last five years, Han was a co/principal investigator of 12 different externally funded projects, for a total of $2,368,122.  Han was involved in another 23 research proposals for a total of $7,011,609, which are still pending or not funded.
- For the last five years, Han has authored or coauthored nine refereed journal articles and 19 other manuscripts in conference proceedings and technical papers.

# College of Architecture, Arts and Humanities



**Todd Anderson, MFA**
**Assistant Professor**
**Art, Printmaking**

Todd Anderson was born in Rochester, Minnesota, USA. Anderson received his Bachelor of Fine Arts from the University of Wisconsin-Madison in 1997 and his Master of Fine Arts (with Distinction) from the University of New Mexico in 2004. Anderson worked at various Fine Art print studios over the course of seven years, including Tandem Press (Madison, Wisconsin, USA), The Tamarind Institute of Lithography (Albuquerque, New Mexico, USA) and The Artist's Press (Mpumalanga, Republic of South Africa). His artwork is in numerous notable collections, including the New York Public Library Print Collection, the U.S. Library of Congress Print Collection and the Metropolitan Museum of Art.

Bulleted List of Accomplishments:

- In February 2017, we reported that Professor Anderson's work had been acquired by the Metropolitan Museum of Art, and others listed above. In November, 2017, he was notified that his prints would be on display at the Met, in New York, NY from November 21, 2017–February 5, 2018. This is an incredibly prestigious accomplishment. We are aware of only two other academic artists (artists with full-time academic careers) who have been acquired by the Met--faculty members from Yale and Columbia Universities; we know of no other academic artists who have had their artwork exhibited at the Met, while still alive. This is a singularly impressive achievement; the Met's collection of works on paper (prints and drawings) is approximately 2,000,000 individual objects, and only a very small subset of these works is ever displayed. As such, having Professor Anderson's artwork chosen for exhibition is extremely, *extremely* rare. Such artwork must be of the highest caliber--a visual and cultural representation of the Met's overall holdings--while additionally serving as a vehicle for helping contextualize and making sense of our contemporary moment.

- As further background, the Metropolitan Museum of Art is second only to the Louvre in Paris as most visited museum in the world, with an annual attendance of 7,000,000 visitors. Todd's artwork on display (Nov. 21 2017 – Feb. 5 2018) will have between 1.1-1.3 million visitors.

- Please see next pages to review Todd's extraordinary work.

9/13     BLACKFOOT GLACIER, THE LAST GLACIER

8/3          JACKSON GLACIER, THE LAST GLACIER

**Hala F. Nassar, PhD**
**Professor**
**School of Architecture**

Hala F. Nassar, is a Professor Landscape Architecture with a BSArch, MSArch, and PhD in History of Landscape Architecture from Ain Shams University in Cairo, Egypt, and Master of Agricultural Sciences in Landscape Design from Pennsylvania State University. She served as a faculty member at Ain Shams University while practicing at COPA and ESEI in Cairo before arriving in the United States in 1996. She previously taught at South Dakota State University and West Virginia University.

Her research interests include historical and cultural landscapes, 19th-century landscapes of Cairo, Islamic landscape tradition and international education. Her scholarly work is published in *Landscape Journal*, *Landscape Review*, *Urban Design International* and *Critiques of Built Work*. Professor Nassar teaches various courses, including the History of Landscape Architecture; and various Design Studios. Professor Nassar has taught Urban Design Studios in collaboration with Ain Shams University in Cairo that focuses on the design and development of the historic fabric of Luxor, Egypt.

Bulleted List of Accomplishments:

- Recently the National Science Foundation awarded Clemson and Duke Universities a $750,000, three-year grant to create a more economical solution for public spaces. The effectiveness of their designs will be tested at the Durham Bulls Athletic Park and Sarah P. Duke Gardens. Professor Nassar is the Principal Investigator for Clemson and will provide expertise on how to best design drone-deterring structures so there is minimal impact on the aesthetical composition of outdoor environments.

**Denise Woodward-Detrich**
**Director, Lee Gallery**
**Department of Art**

Denise Woodward-Detrich is the Director of the Lee Gallery in the Department of Art at Clemson University. Before joining Clemson University Woodward-Detrich served as a Master Instructor at the South Carolina Governor's School for the Arts and Humanities and prior to that as exhibitions coordinator at Clemson University from 1996-2000. She received her MFA in Ceramics from the New York College of Ceramics at Alfred University and has maintained an active exhibitions record having been invited to participate in seven national exhibitions in 2001. Detrich has given workshops in North Carolina, South Carolina and Tennessee and has been included in publications such as Wheel Thrown Pottery by Don Davis, Best of Pottery, published by Rockport Publishers and Studio Potter magazine.

Bulleted List of Accomplishments:

- Detrich recently received a grant from the SC Arts Commissions entitled: *Upstate 8: SC Fellowship Women Exhibit.* This exhibit; celebrating the artwork of eight award winning women was being presented at the Lee Gallery at the Clemson University Center for Visual Arts from Oct. 2 through Nov. 8. The exhibition was part of a larger endeavor to highlight artists during a yearlong 50th Anniversary celebration of the South Carolina Arts Commission. On June 7, 1967, Governor Robert E. McNair signed legislation that established the South Carolina Arts Commission. This historic moment signaled a new era of public support for the arts that has endured for 50 years. The exhibition highlighted the work of eight women artists from the Upstate who were direct beneficiaries of this historic legislation through the support they received from competitive fellowships awarded to them by the South Carolina Arts Commission. These eight women are leaders in the arts, mentors through their creative research and contributors to the thriving cultural climate that the state of South Carolina now enjoys. Students enrolled in an undergraduate Creative Inquiry Program called Clemson Curates were charged to develop an exhibit that showcased the fellowship program. These students, advised by Lee Gallery director Denise Woodward-Detrich, reviewed all of the artists and made the final selections. We are honored to be chosen to curate such an important collection of women artists from Upstate," said Woodward-Detrich.The participating artists were Alice Ballard, Patti Brady, Diane Hopkins-Hughs, Terry Jarrard-Dimond, Ellen Kochansky, Linda Williams McCune, Jane Allen Nodine, and Susan Wooten. Intersecting subject matter presented within the exhibition includes connections to nature through materiality, imagery, and the capacity for symbolic meaning. Other related content includes the exploration of feminine forms and sensibilities associated with nature as an embodiment of the female, traditional feminine materials and processes through textiles, connections to family, place, the personal, and the emotional. This innovative art collaboration is part of the commitment of the Lee Gallery at the Clemson University Center for Visual Arts to support the university's ClemsonForward strategic plan to provide educational activities that expose students to research through artistic means.
- Other exhibits include:
  10x10x10 Mighty Tieton, Tieton, WA, 2016, International Cup, The Clay Studio of Missoula, MT, 2016, Its Only Clay, Watermark Arts Center, Bemidji, MN, 2015, Department of Art Faculty Exhibit, Lee Gallery, Clemson, SC, 2015, Starbrick Clay National, Nelsonville, Ohio, 2015, Baltimore Clayworks, 35th Anniversary Exhibit, Baltimore, MD, 2015, Any Way You Want to Shake It, The Art Center of Clemson, 2014,5th Contemporary Clay, Western Colorado Center for the Arts, 2014

# College of Behavioral, Social and Health Sciences

**Heide S. Temples, PhD**
**Assistant Professor**
**School of Nursing**

Heide Temples is a Pediatric Primary Care Nurse Practitioner whose research and teaching interests focus on pediatrics and the epigenetics of childhood obesity, growth and development. Her research with the Peri/postnatal Epigenetic Twins Study (PETS) at the Murdoch Childrens Research Institute in Melbourne Australia was published in the prominent *Journal of Human Lactation.* The research demonstrated a healthier weight, body mass index (BMI) and smaller arm and abdominal circumference in children that were breastfed longer than 4 months. Her current research has identified significant differences in the bio-markers for type 2 diabetes (T2D) and cardiovascular disease associated with the infant's diet during the first year of life. She is analyzing the epigenetic mechanisms of DNA associated with changes in growth and T2D bio-markers. Temples also received the American Nurses Credentialing Center (ANCC) Certified Nurse Award in 2017 for her cutting-edge and innovative research in childhood obesity. This is the highest award given to Advanced Practice Registered Nurses by the national board certifying body for Nurse Practitioners.

Bulleted List of Accomplishments:

- Publications in the *Journal of Pediatric Health Care,* the official journal of the National Association of Pediatric Nurse Practitioners.
- Received $15,000 from the Evelyn Mundy Memorial Faculty Endowment Award from Clemson University, School of Nursing, Clemson, South Carolina.
- Invited Visiting Researcher at the Murdoch Children's Research Institute, Summer 2017 in Melbourne, Australia.
- Invited Item Writer for the Pediatric Primary Care Nurse Practitioner and Family Nurse Practitioner Board Certification Exams, American Nurse Credentialing Center, Silver Spring, Maryland.
- Appointed as a Pediatric Content Expert for the American Nurse Credentialing Center (ANCC), Silver Spring, Maryland.
- Awarded the 2017 International Nurses Association (INA) Award, featured in the Worldwide Leaders in Health Care, Islip, New York.
- Presented research at the International Society of Nurses in Genetics (ISONG) World Congress in Dublin, Ireland.
- Presented research at the National Association of Pediatric Nurse Practitioners (NAPNAP) National Conference in Denver, Colorado.
- Appointed as an Institute for Advancement of Health Care (IAHC) Scholar at Greenville Health Systems, Greenville, SC.
- Served as past president of Sigma Theta Tau International, Honor Society of Nursing, Gamma Mu Chapter, Clemson, South Carolina.

**Joel E. Williams, MPH, PhD**
**Associate Professor and Director of Graduate Studies**
**Ph.D. Program Coordinator**
**Department of Public Health Sciences**

Joel Williams is a behavioral scientist in the Department of Public Health Sciences. His academic training is in the areas of exercise science, public health and applied statistics. He has clinical work experience in sports medicine and hospital settings. Joel's area of expertise is implementation and evaluation of health promotion and disease prevention programs and interventions. Most of his research has focused on obesity prevention and control in community and clinical settings, and he is currently expanding into research involving the use of mobile technology for tracking disease symptoms, health behaviors, and promoting patient self-management. Williams is actively engaged in presenting and publishing research in these areas. Some of his percent effort is devoted to administrative duties for departmental graduate programs in clinical and translational research (Graduate Certificate) and applied health research and evaluation (M.S. & Ph.D.), and accelerated/joint programs with the Medical University of South Carolina.

Bulleted List of Accomplishments:

- Clemson University School of Health Research Scholar; Institute for Advancement of Health Care Faculty Fellow.
- Doctoral Seminar, Applied Evaluation Methods in Health, Health Research I: Design & Measurement, Epidemiological Research, Theories & Determinants of Health.
- Co-Investigator on a project using mobile technology to promote type 2 diabetes self-management in the military health system (U.S. Department of Defense)
- PI/Co-PI/Co-Investigator on three studies with pediatric eosinophilic esophagitis patients (SC Telehealth Alliance, American College of Gastroenterology, Mary Lohr Foundation)
- Co-Investigator for a school-based health center evaluation project (Riley Center)
- PI for several contracts to support a postdoctoral research associate and several doctoral students (Greenville Health System)
- Panel Reviewer for the National Institute of Mental Health Transdisciplinary Collaborative Centers for Health Disparities Research on Chronic Disease Prevention U54 grants ; Grant Reviewer for the Patient-Centered Outcomes Research Institute; American College of Sports Medicine Exercise is Medicine Community Health Committee Co-Chair; National Institute of Food and Agriculture, Nutrition and Health Committee for Planning and Guidance (Nutrition and Physical Activity Subcommittee) Member; Guest Editor and Editorial Board, *Family and Community Health*; Psychology and Behavior Section Editor and Review Board, *International Journal of Exercise Science*; Review Board, *American Journal of Health Behavior*

**Sarah Winslow, PhD**
**Associate Professor,**
**Department of Sociology, Anthropology and Criminal Justice**
**Director, National Scholars Program**

Sarah Winslow is a sociologist whose research and teaching focus on social inequality, particularly gendered dynamics and processes in institutional contexts such as families, workplaces, and sports. Her work has been published in top generalist and specialty journals such as *Gender & Society, Journal of Marriage and Family, Journal of Family Issues,* and *Social Currents*. Her current research projects focus on (1) how gender operates and is institutionalized in fantasy sports and (2) as co-PI of Clemson's National Science Foundation ADVANCE grant, gender in academic careers, including inequality in faculty time allocations; the implications of time allocation mismatches for job satisfaction, turnover, and attrition; and the impact of institutional culture and policies on the attraction, retention, and advancement of women faculty. In addition to her scholarly work, she is Director of the National Scholars Program, Clemson's premier merit scholarship program. In this role, she advises and mentors all current National Scholars, oversees the recruitment and selection process for each new cohort of National Scholars, and manages all programmatic and budgetary operations and strategic planning for the NSP, including study abroad experiences and academic enrichment opportunities, alumni and parent relations, development and stewardship, and coordination with all relevant university offices.

Bulleted List of Accomplishments:

- Co-PI on Clemson's five-year, $3.4 million National Science Foundation, ADVANCE - Institutional Transformation (IT) grant, "Clemson TIGERS ADVANCE Transforming the Institution through Gender Equity, Retention, and Support."
- Co-Editor of *Gender in the 21st Century: The Stalled Revolution and the Road to Equality*, published in 2017 by the University of California Press.
- Co-author of three academic journal articles and two book chapters published in top outlets in 2016–2017.
- Recipient of the D.W. Bradbury Award for Outstanding Service to the Honors College (2017), "Professor of the Game" recognition (September 17, 2016), and Clemson University President's Commission on the Status of Women Outstanding Faculty Award (2015).
- Editorial Board Member for the American Sociological Review, the flagship journal in sociology, and Program Chair of the 2015 Southern Sociological Society annual meeting.
- In 2 ½ years as National Scholars Program Director, National Scholars have achieved the following accomplishments and recognitions: Truman Scholarship (1), Rhodes Scholarship finalist (1), Fulbright Fellowship (1) and finalist (1), National Science Foundation Graduate Research Fellowship (2) and finalist (1), Goldwater Scholarship (2), Clemson Undergraduate Student Body President (2), and Norris Medal (2).

# College of Business

**Philip L. Roth, PhD**
**Trevillian Distinguished Professor of Management**
**Department of Management**

Phil Roth is an organizational behavior researcher who studies the "people side" of management. He is interested in employee selection/talent acquisition. Specifically, he studies how well various tests and interviews predict job performance. His interests also extend to how various tests might adversely impact various protected groups (e.g., blacks, hispanics, and females). Phil's latest projects involve examining the effects of using social media in hiring. For example, what happens when employers look at social media websites such as Facebook and Twitter? One implication is that job applicants' political party and issue affiliations can easily become known and this state of affairs can influence who is hired; there is a tendency for Democrats to prefer to hire Democrats and Republicans to hire Republicans. Other information is also available, such as clues to applicants' religion and/or disabilities. Phil is currently working with two PhD students in Information Systems to examine these issues. His recent work was highlighted in a blog by the London School of Economics.

Bulleted List of Accomplishments:

- One of the top 25 "most cited" organizational behavior researchers publishing in the *Journal of Applied Psychology* (noted in 2017).
- Top 1% of organizational behavior researchers for the period of 1988 to 2008.
- Overall 10,000 citations to his work in Google Scholar (to date).
- Noted as 12th most frequently cited author in Industrial/Organizational Psychology textbooks in 2017.
- Author on articles ranked as tied for 1st, 7th, and 21st most frequently cited articles in I/O Psychology textbooks in 2017.
- Fellow, Society for Industrial and Organizational Psychology. Fellow, American Psychological Society.
- Elected member at large to the Executive Committee of the Human Resources Division of the Academy of Management for 2012-2015 and again for 2016-2018.
- Elected chairman of the Research Methods Division of the Academy of Management (2001-2005).
- Coauthor of the Human Resources Division's best journal article award in 2007.
- Coauthor of the Human Resources Divisions best paper at the annual convention in 2005.
- Personnel Psychology reviewer of the year 2016.
- Provost's research award 2001.
- Outstanding Senior Researcher for the College of Business Award for 1995-1996, 1998-1999, 2004-2005, 2009-2010, 2013-2014.

**Scott D. Swain, PhD**
**Associate Professor**
**Department of Marketing**

Scott Swain is an Associate Professor of Marketing at Clemson University. Prior to joining Clemson, Swain served on the faculties of Boston University and Northeastern University and is a former Naval Officer (Submarines). His research focuses on technology adoption, psychological ownership, and corporate reputation.

Swain's research frequently appears in high-impact journals including: *Journal of Marketing; Journal of Marketing Research; Journal of Consumer Research*; J*ournal of the Academy of Marketing Science; Journal of Retailing Decision Support Systems; Journal of Behavioral and Experimental Economics; Journal of Business Research; Journal of Marketing Analytics Marketing Letters; Journal of Management and Engineering Integration; Journal of Marketing Theory and Practice; Journal of Personal Selling & Sales Management*

Bulleted List of Accomplishments:

- Ranked in top 7% globally for research impact among Associate Professors among top 500 research-intensive business schools (Soutar et al. 2017).
- Identified as top 20 global scholar on psychological ownership by WU Vienna University of Economics and Business (2017).
- Identified as top 40 global scholar on corporate reputation by Drexel University's Institute for Strategic Leadership (2017).
- Winner of 2016 *Bright Idea Award*, given by the NJ Policy Research Organization Foundation to the ten best research manuscripts published in business.
- Winner of 2016 *Best Paper Award*, awarded by the American Marketing Association at the annual winter gathering (premier conference in marketing).
- Elevated College of Business quality ranking by publishing four manuscripts in the highest-ranking journals in marketing (2014, 2017), information systems (2015), and economics (2015).

**Paul Wilson, PhD**
**Trevillian Distinguished Professor**
**The John E. Walker Department of Economics**

Paul Wilson is one of the college's Trevillian Distinguished Professors and a member of the John E Walker Department of Economics. He earned a Ph.D. in economics from Brown University and has taught at the University of Georgia and the University of Texas (Austin) before coming to Clemson in 2006. Professor Wilson is also a visiting scholar at the Federal Reserve Bank of St Louis and a Visiting Professor of Statistics at the Universite Catholique de Louvain, Louvain-la-Neuve in Belgium.

Paul is a highly-accomplished scholar. His work primarily focuses on employing statistical techniques to measure the productivity of firms and how efficiently firms use inputs. Paul's more recent research projects focus on designing ways to quantify productivity in sectors where outputs are less tangible. His research on banking productivity is widely cited including Ben Bernanke, the former Chairman of the Federal Reserve.

In addition to Paul's scholarly achievements, Paul is an excellent teacher, a demanding, yet compassionate, advisor and mentor for graduate students, and a conscientious colleague who is willing to assist in any way to improve the quality and reputation of the department. Paul primarily teaches in the graduate sequence and he is one of the more sought-after dissertation advisors. Several of the students have stated that these weekly meetings were instrumental in keeping them focused and prepared for the job market. His students have written on a wide range of topics and have placed well in industry and in the academy. For example, Liliana Danila's research used Paul's econometric methods to measure the productive efficiency of the U.S. bank holding companies, Richard Gearhart's dissertation studied the efficiency of delivery for the U.S. health care system, Arpita Biswas wrote on changes in tax laws, Di Wu has written on auctions, and Senad Sinanovic has written on immigration.

Bulleted List of Accomplishments:

- Paul is currently the main advisor for four PhD. students and is a dissertation committee member for two other PhD. students.
- Paul's students have placed at well-respected universities such as Wofford, the University of Houston, University of Hawaii, and University of Minnesota.
- Paul's students are also well represented in the government and industry. His students have been hired by Freddie Mac, the Institute for Defense Analysis, RAND, Capital One, and the strategic finance division at Walmart to name a few.
- Paul has published 76 articles in refereed journals.
- Since his arrival at Clemson in 2006, he has had 28 articles published.
- According to the Social Science Citation Index, Paul's citation count is well over 1,000 and he has nearly 75,000 citations reported by Google Scholar.
- The website Research Papers in Economics (RePEc.org) uses a variety of measures to compute a scalar score(s) for each author and Paul ranks in the top three percent of all economists according to their measures--there are only two other members in the Economics Department in the top five percent.
- He has served as an associate editor and editor of the Journal of Productivity Analysis and has served as a referee for many of the top journals in economics.
- He has received three National Science Foundation grants. The most recent NSF grant was in 2012.

# College of Education

**Tony W. Cawthon, PhD**
**Alumni Distinguished Professor**
**Department of Educational and Organizational**
**Leadership Development**

Tony Cawthon's research focuses on issues impacting the higher education and student affair community and the students they serve. His work has focused on career and professional development, inclusion and diversity, marginalized student populations, particular LGBT students, and student affairs partnering with academic affairs. His work offers higher education professionals knowledge for improving the experiences of college students. Cawthon's work has appeared in *The College Student Affairs Journal, The Journal of Research and Practice in Student Affairs, and The Journal of College and University Student Housing*. He has published two books with two in press, two monographs, 18 book chapters, and over 38 refereed manuscripts. He also has served as past editor of *The College Student Affairs Journal* and *The Journal of College and University Student Housing.*

Bulleted list of accomplishments:

- Selected as 2018 National Association of Student Personnel Administrators Pillar of the Profession.
- Has two books in press for publication in 2018.
- Faculty in Residence for the Southeastern Association of Housing Officers.
- Co-authored, *The Body of Knowledge for Campus Housing Professionals*, a research project for the Association of College and University Housing Officers-International.
- Invited presenter at the 4th Annual Transatlantic Dialogue on Cultural Diplomacy in Luxembourg.
- Co-authored *Foundational Student Affairs Partnering with Academic Affairs (SAPAA) Documents: A NASPA SAPAA Knowledge Community Research Project*, a research project for the National Association of Student Personnel Administrators.
- Received the Ted K. Miller Award for Excellence in Student Learning from the Southern Association of College Student Affairs and the Joseph E. Heyward Humanitarian Award from the South Carolina College Personnel Association.

**Jane Clark Lindle, PhD**
**E.T. Moore Distinguished Professor of Educational Leadership**
**Department of Educational and Organizational Leadership Development**

Lindle's research includes the micropolitical influences of educational policy on the practices of school leaders, teachers and their relationships with students, families, and communities. Her work has focused on how those relationships affect students' access to education, parent and community engagement, and school safety. Her work as a Moore Distinguished Professor has focused on relationships among P20 leadership in South Carolina, the Southern Regional Education Board (SREB), and the University Council for Educational Administration (UCEA). Lindle has served as a principal and special education teacher in Kentucky, North Carolina, South Carolina and Wisconsin and as professor in Kentucky, Pennsylvania, South Carolina, and Wisconsin. She also has served in university governance roles at three universities including Faculty Senator and Grievance Board Chair. She has generated research funding at the rate of 1.4 proposals per year, in a field that is tied to grants and contracts from public agencies rather than large competitive federal funds.

Bulleted list of accomplishments:

- Selected as 2017 Reviewer of the Year by the *Journal of Cases in Educational Leadership*
- 2015 Eugene T. Moore School of Education Award of Excellence in Graduate Student Advising/Mentoring
- 2016-2017 College of Education Dean Fellow for Regional and State Policy
- 2017-2019 term appointment as Co-Associate Director of Policy for UCEA
- Member of two Editorial Boards for peer-reviewed, research journals
- Published six research, peer-reviewed articles, five book chapters, and has three invited chapters in press for 2018, 2019, and 2020; averaging 4.7 publications per year
- Co-Editor of a UCEA book series with the third of six books in the series in press for 2018
- Recognized by the Rand Corporation, in 2016 and 2017's study, for the Wallace Foundation for designing and testing a rural university-school partnership logic model of mid-career, school leadership development involving 12 South Carolina school districts that meets federal standards for evidence-based education programs under the Every Student Succeeds Act (ESSA), the latest version of the Elementary and Secondary Education Act (ESEA).

**Meihua Qian, PhD**
**Assistant Professor**
**Department of Education & Human Development**

Qian's primary research interests are in the areas of creativity, gifted education, and measurement. Her research agenda is aligned with the current sophisticated approaches to assessment, which reflect the interactions among substantive research and all kinds of methodological aspects. Specifically, Qian's research focuses on how to measure and promote creativity in different educational settings (e.g., game-based learning environment, and making contexts) using different methods (e.g., classical test theory, and item response theory). She has published her work in several top tier journals including *Creativity Research Journal, Psychology of Aesthetics, Creativity and the Arts, Journal of Creative Behavior, Journal of Psychoeducational Assessment, Psychology and Marketing, Computers in Human Behavior, Elementary School Journal, Action in Teacher Education, and Journal of Digital Learning in Teacher Education.*

Bulleted list of accomplishments:

- PI ($20,000 in 2016-2018), A Deeper Look at Deeper Learning: Evidence from Descriptive and Explanatory Multilevel Item Response Theory Models and the American Educational Research Association (AERA) Study of Deeper Learning Fellowship
- Consultant ($100,000 in 2017-2018), MAKEval--Developing tools to measure key outcomes of making, Funded by Google
- PI ($10,000 in 2017-2018), Authentic Learning for the 21st Century: An Engaging Quest to Explore the Creativity of Genetics, Clemson R Initiative Seed Grant
- PI ($7000 in 2017-2018), Exploring the Creativity of Genetics, College of Education (CoE) ADR Research Award, Clemson University
- PI ($6000 in 2016-2017), Skyrim Mod: Exploring the creativity of Genetics, CoE ADR Research Award
- PI ($5000 in 2015-2017), increasing the gifted and talented identification of underrepresented populations, CoE ADR Research Award
- Published two book chapters and five blinded, peer reviewed journal articles: one appeared in *Computers in Human Behavior* (Impact factor 3.435, 5-year Impact Factor 4.252) in 2016 and has been cited 49 times, and one was published in *Elementary School Journal* (acceptance rate < 5%) in 2017.
- Editor (2017-present), *Cogent Psychology*, a peer-reviewed, multidisciplinary research journal published by Cogent OA, part of Taylor & Francis group and Routledge

# College of Engineering, Computing and Applied Sciences

**Timothy A. DeVol, PhD, CHP**
**Toshiba Professor of Nuclear Engineering**
**Department of Environmental Engineering and**
**Earth Sciences**

Timothy DeVol's research interests are in the areas of radiological environmental measurements, environmental health physics, statistical methods, homeland security, radioactive material process monitoring and in-situ and field portable analytical instrumentation for radioactive environmental contaminant quantification.

Current research projects include environmental monitoring of alpha- and beta-emitting radionuclides in water; statistical analysis of monitoring data; environmental monitoring of gamma-ray emitters; digital signal processing of radiation signals; numerical modeling of detectors; and nuclear forensics. DeVol teaches undergraduate an introductory course in nuclear engineering and radiological sciences. He teaches graduate courses in environmental risk assessment, ionizing radiation detection and measurement laboratory and advanced topics in health physics. DeVol manages the MS program in Environmental Health Physics, which is the only program at Clemson that is ABET accredited at the graduate level. His research group typically includes approximately eight graduate students and several research assistant professors.

Bulleted List of Accomplishments:

- College of Engineering, Computing and Applied Sciences Collaboration Award for 2016 with Dr. Scott Husson (Professor, Chemical and Biomolecular Engineering)
- Assisted in establishing a minor in Nuclear Engineering and Radiological Sciences at Clemson University
- Chair of the University Radiation Safety Committee
- Member of the CECAS Dean's Advisory Council
- Director of the CHE approved Nuclear Environmental Engineering Sciences and Radioactive Waste Management center
- Appointed to the National Academy of Sciences, Engineering, and Medicine, Hanford Low-Activity Waste Review Committee
- Serves on the Health Physics Society's Academic Education Committee
- Research expenditures of ~$500K per year, near the top for EEES
- Approximately five publications per year

**Sophie Joerg, PhD**
**Assistant Professor**
**Visual Computing,   School of Computing**

Sophie Joerg is a computer scientist who studies the synthesis and perception of human motion for a variety of applications.  She is a widely recognized leader in the area of character animation, human motion capture, and perception of motion with specific research foci in hand and finger animation and perception, related virtual reality (VR) applications, as well as eye motion synthesis and perception.

This year, Joerg received the prestigious NSF CAREER Grant on perceptually driven hand motion synthesis as well as sizable financial industry support to work on the perception of hands in virtual reality.  In total, she was awarded over $900,000 in funding in 2017 as a principal investigator. She is an active researcher with a vibrant publication record but is also a popular teacher and maintains strong service roles.  Namely, Sophie is an outreach leader teaching middle school students how to code and a leader in her research community as the Program Chair for the ACM Symposium on Applied Perception (SAP) in 2017 and Conference Chair for SAP 2016.

<u>Bulleted List of Accomplishments:</u>

- Awarded NSF CAREER: Perceptually Guided Hand Motion Synthesis; $497,158
- Awarded Industry funds: The Effect of Virtual Hands and Their Motions in Virtual Reality; $357,709  (Company Name withheld due to NDA)
- Awarded NSF Small: Looking Across the Uncanny Valley: Procedural and Data-Driven Methods for Gaze Modeling; $494,347 (50% award credit). The project is active starting its fourth year
- Co-PI on awarded NSF INSPIRE: Virtual Environment Interactions: Exploring Embodied Learning in Support of Computational Thinking; $579,673 (25% award credit)
- Awarded supplemental funds and gifts from NSF REU and NVidia; over $50,000
- Best Paper Award at ACM SAP 2016 for co-authored paper on Visuo-haptic Feedback published in ACM Transactions on Applied Perception (TAP)
- PhD student Lorraine Lin won Best Presentation Award for her talk at ACM SAP 2016
- From AYs 2015-7, published (peer-reviewed) 5 journal papers, 6 conference papers*, 2 book chapters, and several posters as well as gave several invited presentations     *Note, in Computer Science, and especially Computer Graphics, conferences are both highly competitive and highly cited venues
- Serving as Program Chair for ACM SAP 2017, served as program chair for ACM SAP 2016
- Teaching evaluations for 2015-6 was 4.95/5 average, and 2016-7 was 4.79/5 average
- Oversees the Visual Computing division seminar and research discussions, supports the Digital Production Arts Program especially the shared motion capture laboratory.

**Naren Vyavahare, PhD**
**Hunter Endowed Chair and Professor of Bioengineering**
**Department of Bioengineering**

As a researcher, Naren Vyavahare is a recognized leader in cardiovascular research in the United States and in the world. For the past 24 years, his research has been focused on cardiovascular pathology and implant development. His pioneering work addressing the prevention of the degradation of bioprosthetic pig valves used to replace diseased heart valves in more than 350,000 patients yearly in the United States alone is clinically used on St. Jude Medical Epic bioprostheses. Additionally, his work on elastin stabilization for abdominal aortic aneurysm (US Patent 7,252,834) is now licensed to Vatrix Medical Inc. for clinical use. Since the beginning of his career at Clemson University, his total funding exceeded $25M as a PI alone and published 116 manuscripts.

Bulleted List of Accomplishments:

- Serves as the Director of the NIH Center of Biomedical Research Excellence (COBRE) "SC BioCRAFT", a $11M NIH funded program

- Received $1.47 million from the National Institutes of Health (RO1) to advance research into abdominal aortic aneurysms

- Recipient of the 2016 Faculty Mentoring Award by the College of Engineering

- Served as a study section member for the NIH Bioengineering Study section for a three year term

- Received the McQueen Quattlebaum Faculty Achievement award for Exemplary Leadership in the engineering profession from College of Engineering and Science at Clemson University

- Inducted Fellow of the American Institute for Medical and Biological Engineering, "For his outstanding contributions for the treatment of abdominal aortic aneurysms and leadership in biomaterials education and training."

# College of Science

**Marco Ajello, PhD**
**Assistant Professor**
**Department of Physics and Astronomy**

The goal of Marco Ajello's work is to understand the evolution of the extragalactic background light: the Universe's homogeneous glow at ultraviolet, optical and infrared wavelengths. Understanding stellar formation, evolution, and death remains a fundamental and exciting task at the core of astrophysics and cosmology. In particular, shortly after the Big Bang, large gas clouds of almost pristine gas (made mostly of Hydrogen and Helium) started collapsing to form the first galaxies. At the same time, gas within these proto-galaxies collapsed to form the first generation of stars. This is the moment when light (as we know it, i.e. mostly at optical wavelengths) generated by the first stars started pervading the Universe. However, the Universe was not yet transparent to light. The ultraviolet light from these first starts had to first ionize most of the Hydrogen to allow light to freely propagate throughout our Universe. This epoch, named `re-ionization', has not yet been observed (because happened very early on and thus also very far from us) and there are active debates about modes, times and sources of the re-ionization. The study of the re-ionization figures prominently in the recommendation of NASA and NSF for the activities to be executed in the next decade as nearly any large upcoming telescope, including the famous NASA James Webb telescope, will peer into this exciting epoch. The light of all stars, including the very first ones, is encoded in the extragalactic background light that Ajello studies by means of the absorption imprint that this light produces in the spectra of sources of high-energy gamma rays. By measuring this absorption signature, Ajello is able to reconstruct the entire history of stellar formation in the Universe, including the rate of formation of the first starts. Ajello's research has the capabilities to anticipate some the results that will be tackled by the largest facilities available in the next decade and provide direct tests of theories of stellar and galactic evolution. Ajello's work has been generously funded by NASA and NSF.

Bulleted List of Accomplishments:

- Published 43 peer-reviewed articles (266 total, h-index 92, 26000 citations)
- Presented invited talks at Yale University, University of Wisconsin Madison, NASA GSFC and Perimeter Institute (Waterloo, Canada)
- Presented the Highlight talk of the ICRC meeting in The Hague, Netherlands, (largest conference in the field with ~1200 attendees)
- Presented 8 contributed talks at conferences
- Serving on the NuSTAR (NASA mission) users' committee to advise the mission on how to best reach its goals and serve the community
- Managing $700,000 in active grants (PI on 22 proposals since at Clemson, awarded more than $1,500,000)
- Awarded 22 nights of telescope observations from Kitt Peak and Cierro Tololo
- Awarded time on all high-energy NASA Satellites (Fermi, NuSTAR, Chandra, XMM-Newton, and Swift)

**Cheryl Ingram-Smith, PhD**
**Associate Professor**
**Department of Genetics and Biochemistry**

The focus of Cheryl Ingram-Smith's research is *Entamoeba histolytica*, an intestinal parasite that causes approximately 90 million cases of diarrheal disease each year and approximately 100,000 deaths. *E. histolytica* is water- and food-borne, and is prevalent worldwide in developing countries lacking sufficient sanitation.

The long-term goal of her research is to gain a better understanding of *E. histolytica* metabolism as it traverses the different environments encountered during various stages of infection in the human host. In particular, she is interested in how the parasite grows and thrives as it passes from the nutrient-rich environment of the small intestine to the nutrient-limited environment of the large intestine, which is the site of colonization and primary infection. *E. histolytica* appears to initiate a number of different metabolic programs that allow it to survive and thrive in the large intestine. The results of this research will fill a key gap in our knowledge of *Entamoeba* metabolism during infection.

Bulleted List of Accomplishments:

- Leads a team of five graduate student and three undergraduate student researchers
- Principal Investigator of a $424K National Institutes of Health grant
- Target Investigator on a $10.5M National Institutes of Health COBRE grant (L. Temesvari, Principal Investigator, and K. Smith, Co-Investigator)
- Editorial Board member of Scientific Reports (a Nature Research Journal)
- Lead organizer for the 2017 Cell Biology of Eukaryotic Pathogens Meeting
- Two publications in 2017 (of 32 total peer-reviewed papers)
- Co-investigator on previous grant awards totaling $1.4M
- Reviewer for the National Science Foundation Graduate Fellowship program (2015)
- Clemson University National Scholars Program Award of Distinction (2015)

**Margaret M. Wiecek, PhD**
**Professor**
**Department of Mathematical Sciences**

Margaret Wiecek's research is concerned with decision-making for engineered or man-made complex systems. For example, in a complex system such as a large international corporation decisions are made to satisfy multiple objectives locally in each country so that the entire corporation performs globally at its best. In engineering design, complex problems involve a system-level design problem and component-level design subproblems that correspond to different design-team organizational structures and require disparate solution methodologies and software interfaces. Complex systems work in an environment filled with underlying challenges including (i) modeling in multiple engineering or science disciplines (e.g., statics, dynamics, controls in automotive design; financial engineering, human factors, marketing in management); (ii) multiple system levels (system, subsystem, component); (iii) conflicting and incommensurate criteria, requirements, and interactions (e.g., cost, quality, reliability, safety, productivity, affordability); (iv) uncertainty that arises from inaccurate or unknown data, use of imperfect models and measurements, lack of knowledge, and volatility of the global environment; (v) multiple decision makers who have various preferences and assess the system differently.

Wiecek advances mathematical optimization and scientific computing to develop decision-making models, methods, and algorithms for finding optimal decisions for complex systems. The models address different decision-making environments such as automotive and structural design in engineering, affordability analysis in management, or portfolio optimization in financial management. The methods harmonize local disciplinary requirements and reconcile the goals to attain the objectives required of the entire system whose performance depends on the interactions and synergy of all its parts. The algorithms need to be fast and efficient to effectively assess many decision alternatives and reveal tradeoffs among them, but also to account for human preferences that are not always captured in the mathematical model.

Bulled List of Accomplishments:

- PI on the grant "Optimization under Uncertainty and Conflict: Algorithms for Heterogeneous Quadratic Programs" funded by Office of Naval Research
- Investigator on the grant "Materials Assembly and Design Excellence in South Carolina (MADE in SC)" funded by NSF EPSCoR
- Co-edited 1 book, published 10 peer-reviewed journal articles and 2 book chapters (143 publications total, h-index = 25, Google Scholar citations = 2,547)
- Graduated one Ph.D. and two M.S. students (11 Ph.D. and 42 M.S. students total)
- Served as the President of the INFORMS Section on Multiple Criteria Decision Making
- Presented invited tutorial at INFORMS (Nashville, 2016), and invited talks in the UK (Lancaster University, University of Manchester) and Germany (Kaiserslautern University, University of Göttingen, University of Wuppertal)

# Research Metrics

# CLEMSON CUMULATIVE SUBMISSIONS: PROPOSAL COUNTS (2013-2018)
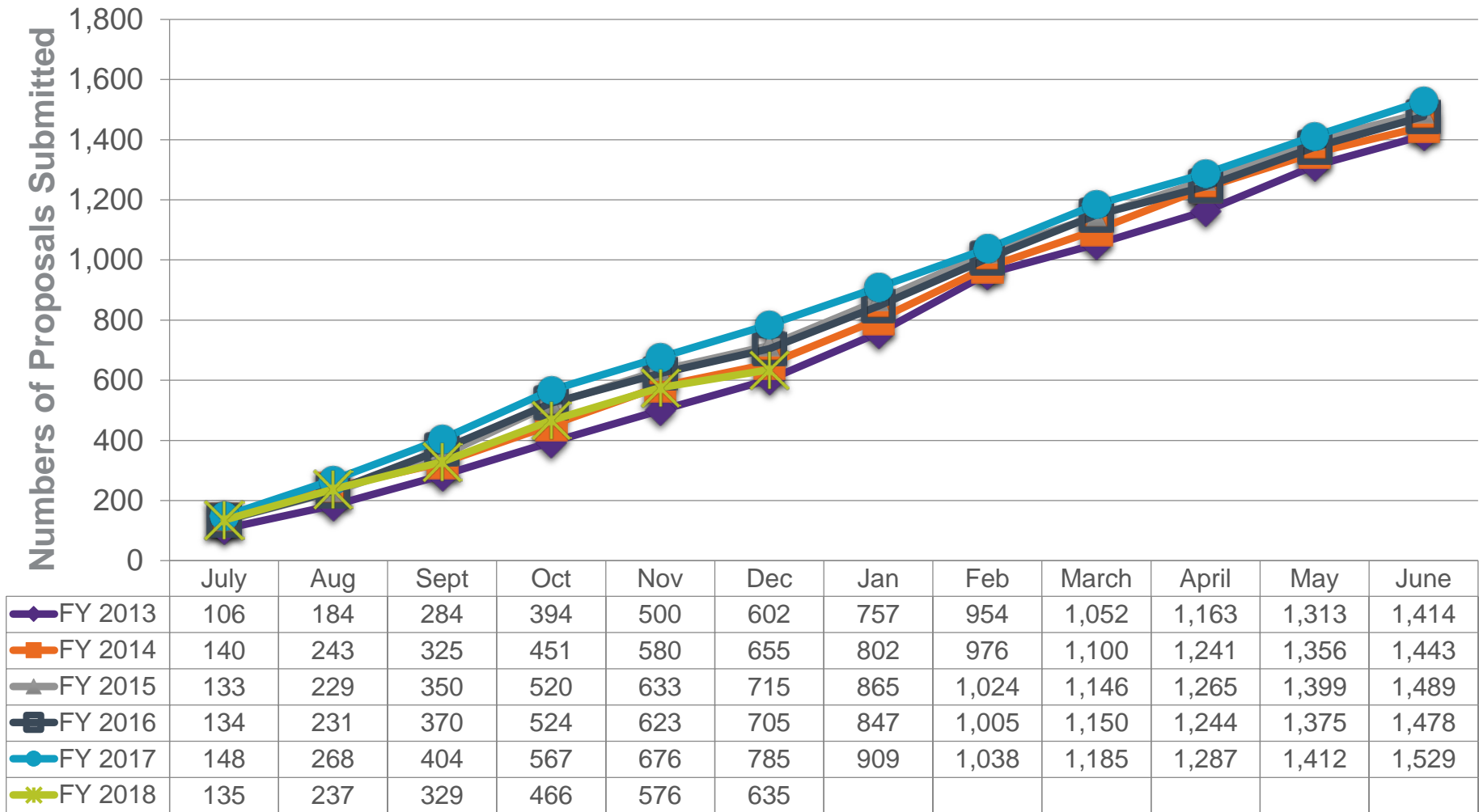


| | July | Aug | Sept | Oct | Nov | Dec | Jan | Feb | March | April | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FY 2013 | 106 | 184 | 284 | 394 | 500 | 602 | 757 | 954 | 1,052 | 1,163 | 1,313 | 1,414 |
| FY 2014 | 140 | 243 | 325 | 451 | 580 | 655 | 802 | 976 | 1,100 | 1,241 | 1,356 | 1,443 |
| FY 2015 | 133 | 229 | 350 | 520 | 633 | 715 | 865 | 1,024 | 1,146 | 1,265 | 1,399 | 1,489 |
| FY 2016 | 134 | 231 | 370 | 524 | 623 | 705 | 847 | 1,005 | 1,150 | 1,244 | 1,375 | 1,478 |
| FY 2017 | 148 | 268 | 404 | 567 | 676 | 785 | 909 | 1,038 | 1,185 | 1,287 | 1,412 | 1,529 |
| FY 2018 | 135 | 237 | 329 | 466 | 576 | 635 | | | | | | |

# CLEMSON CUMULATIVE SUBMISSIONS: $ REQUESTED (2013-2018)



**$561M**
**$547M**
**$513M**
**$510M**
**$386M**
**$189M**
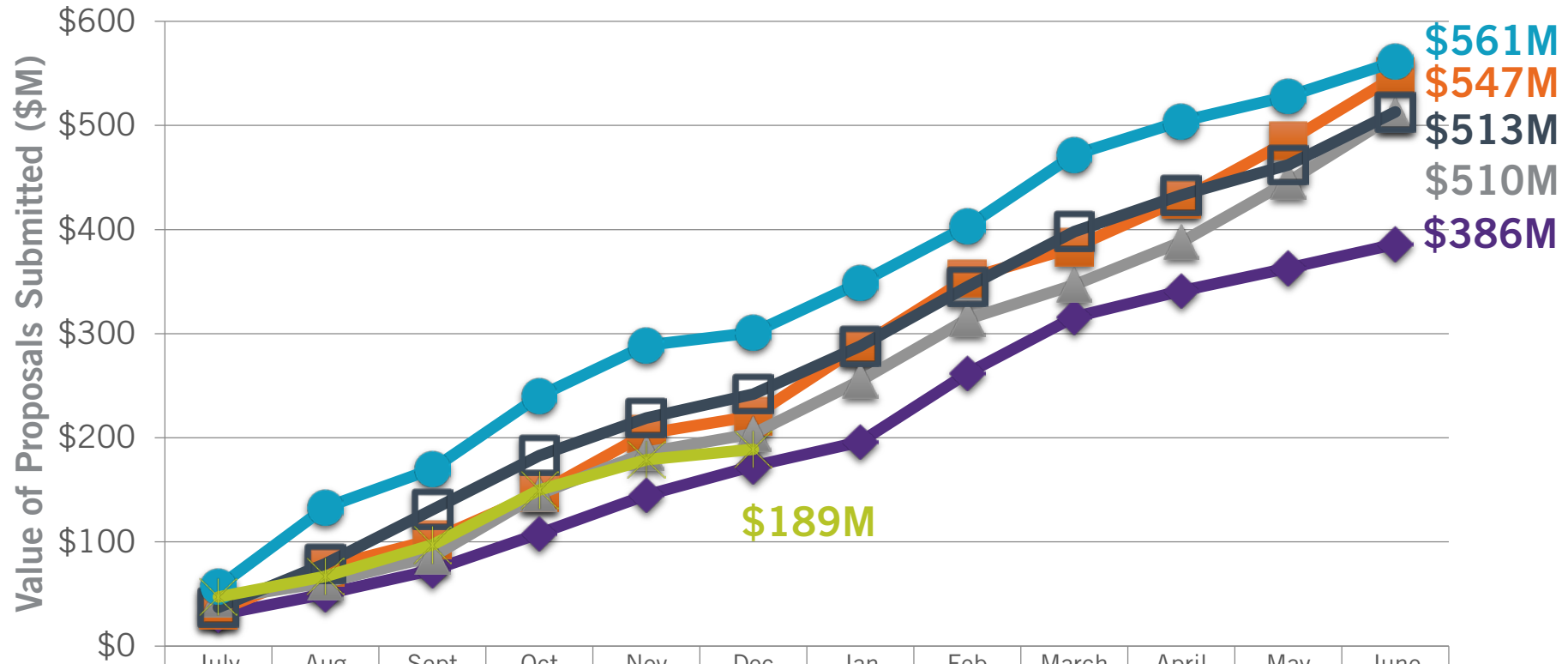
| | July | Aug | Sept | Oct | Nov | Dec | Jan | Feb | March | April | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FY 2013 | $30 | $50 | $73 | $108 | $145 | $173 | $196 | $262 | $316 | $341 | $363 | $386 |
| FY 2014 | $34 | $76 | $102 | $147 | $204 | $221 | $288 | $353 | $383 | $429 | $485 | $547 |
| FY 2015 | $45 | $61 | $86 | $146 | $186 | $204 | $255 | $314 | $347 | $388 | $446 | $510 |
| FY 2016 | $37 | $79 | $131 | $183 | $219 | $242 | $288 | $345 | $398 | $433 | $462 | $513 |
| FY 2017 | $57 | $133 | $170 | $240 | $289 | $301 | $349 | $403 | $472 | $504 | $528 | $561 |
| FY 2018 | $47 | $67 | $97 | $150 | $179 | $189 | | | | | | |

Research Metrics

2

# CLEMSON CUMULATIVE SUBMISSIONS: $ REQUESTED (2013-2018)



| | < $100K | $100K-$200K | $200K-$500K | $500K-$1M | $1M-$2M | $2M-$5M | > $5M |
|---|---|---|---|---|---|---|---|
| FY2013 | 769 | 184 | 289 | 107 | 45 | 18 | 3 |
| FY2014 | 769 | 147 | 317 | 112 | 63 | 20 | 15 |
| FY2015 | 741 | 184 | 342 | 122 | 64 | 28 | 8 |
| FY2016 | 762 | 169 | 313 | 131 | 73 | 23 | 7 |
| FY2017 | 744 | 188 | 335 | 146 | 76 | 32 | 8 |
| FY2018 | 309 | 77 | 172 | 67 | 18 | 8 | 2 |

Research Metrics

3
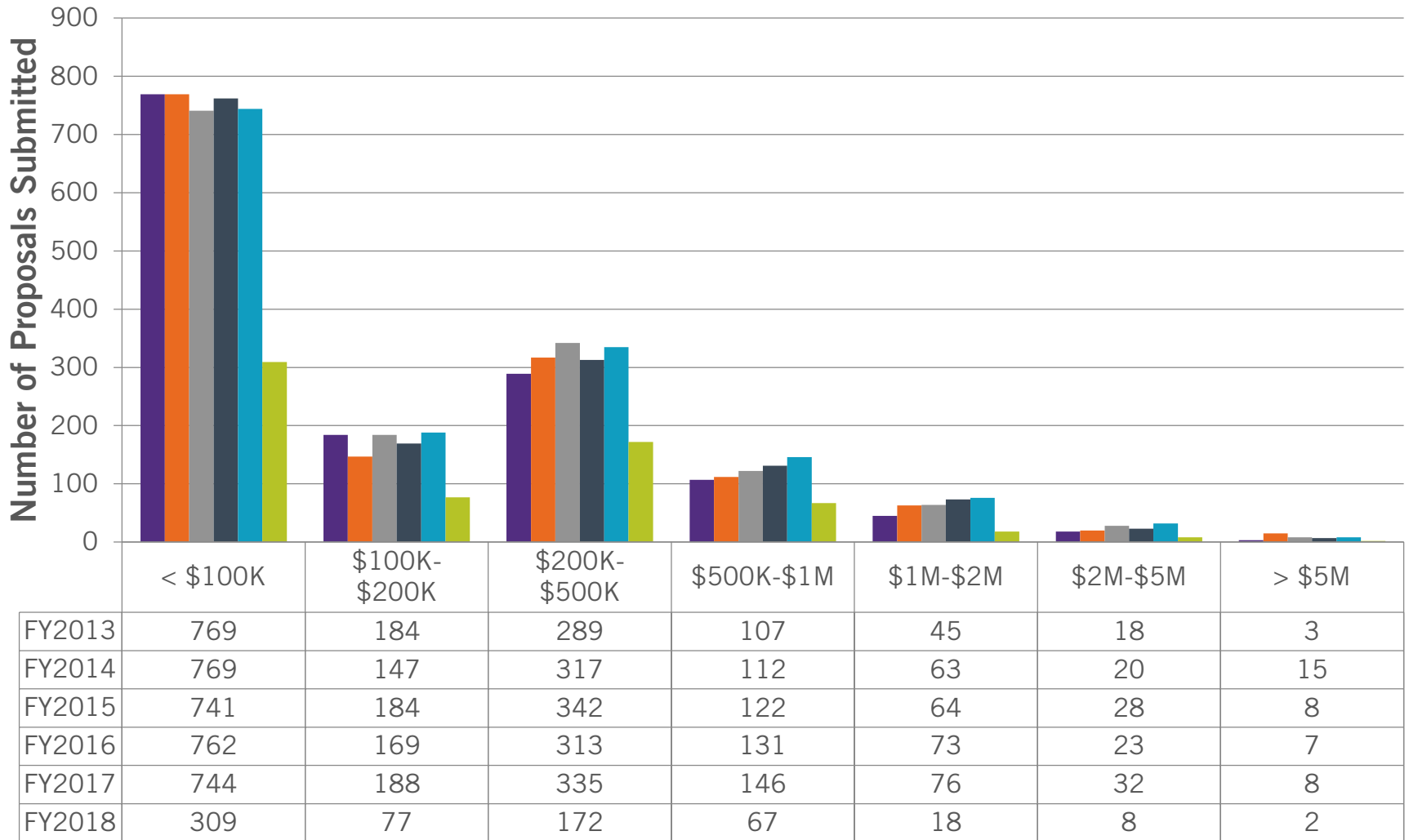
# CLEMSON CUMULATIVE SUBMISSIONS: RECENT TRENDS

- We are closely tracking proposal submissions. We have noticed that the value of submissions for 2018 has not kept pace with prior years (**Graph, page 2**). We examined the reasons for this change.
- The value of proposal submission totals have dropped in the period between July and December 2018 compared to 2016 and compared to 2017. In months with a larger than $10M difference in value of proposals submitted, we examined these months more closely.
- The largest discrepancies between the examined years are in the category of large proposals (>$500K). This is true for both 2016 vs 2018 and 2017 vs 2018.
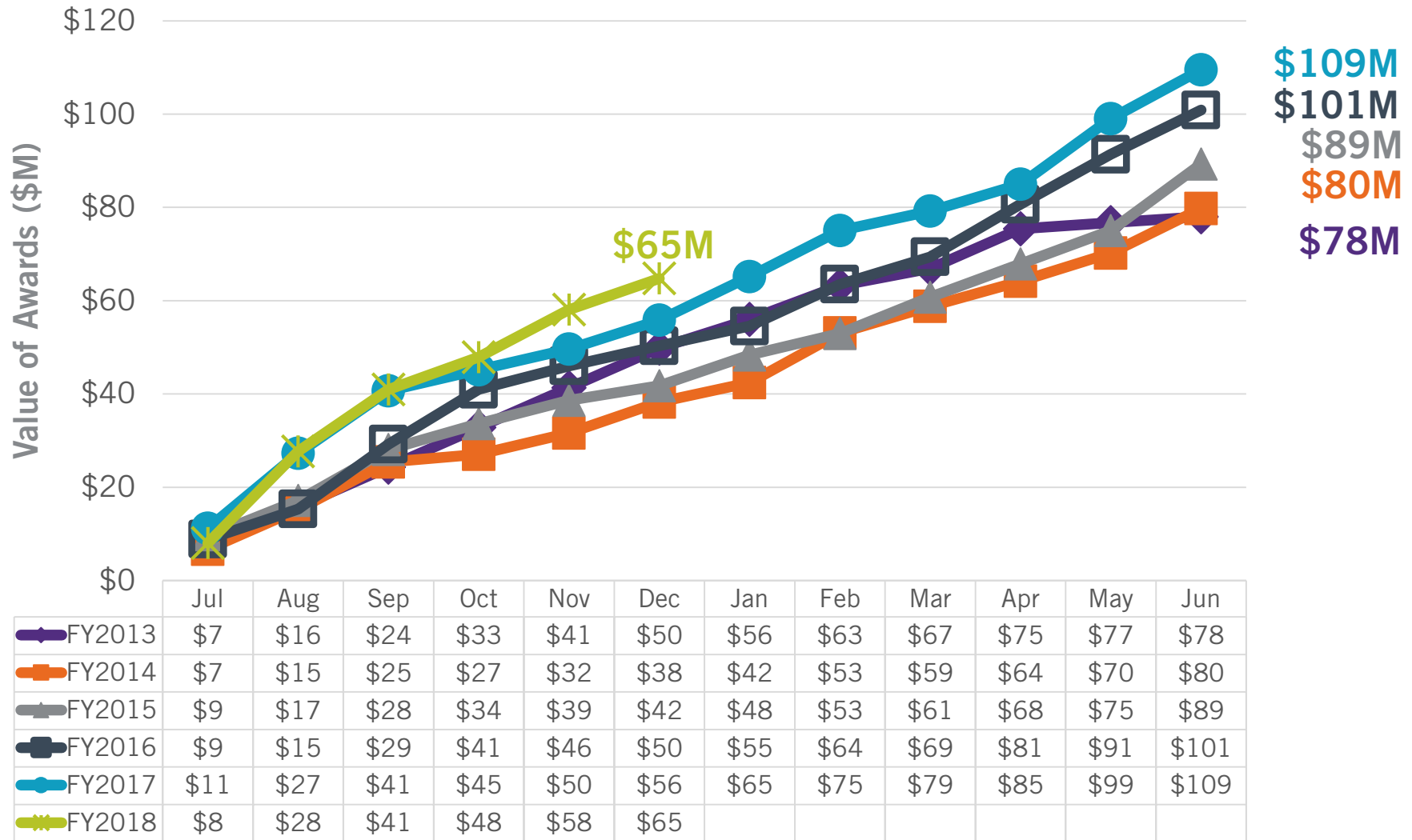    - In 2018, we observed the numbers of proposals with a value of >$500 decreased by 50% in November and by 40% in December compared to November and December 2016.
    - In 2018, we observed the numbers of proposals with a value of >$500K decreased by 23% for each month with a >$10M discrepancy (August, October and November) compared to 2017.
- Some of the discrepancy in the value of proposals submitted can be explained by submissions for very large awards in 2016 (e.g., a $25M proposal) and in 2017 (e.g., a $14M proposal submitted). In these cases, these programs at DOE ($25M) and NSF ($14M), the programs do not issue annual awards or, in the case of DOE will fund only one or two centers.
- November 2017 compared to November 2018 yielded a >$10M discrepancy in value of proposals submitted. In November 2017, many of the larger proposals (>$1M) were submitted (7 total, 1 funded) to highly competitive programs like NIH R01 and R35. In November 2018, only one R01 proposal was submitted to the NIH.

Summary: As reported in the Carnegie Review Section (**Carnegie Review Section**, **Page 5**), with the increase in research expenditures, Clemson has high research efficiency as compared to R1 institutions, when productivity factors, faculty size, research space and total full-time student enrollment, are accounted for. In addition, there have been multiple large awards received since 2015. Many of Clemson's most active research faculty have been the recipients of these awards and are now managing them. The combination of these factors is the likely cause of the slower pace of large proposal submission in 2018 and is an indication of Clemson approaching the limits of its research productivity with the available human and space resources.

# CLEMSON CUMULATIVE AWARDS (2013-2018)



| | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FY2013 | $7 | $16 | $24 | $33 | $41 | $50 | $56 | $63 | $67 | $75 | $77 | $78 |
| FY2014 | $7 | $15 | $25 | $27 | $32 | $38 | $42 | $53 | $59 | $64 | $70 | $80 |
| FY2015 | $9 | $17 | $28 | $34 | $39 | $42 | $48 | $53 | $61 | $68 | $75 | $89 |
| FY2016 | $9 | $15 | $29 | $41 | $46 | $50 | $55 | $64 | $69 | $81 | $91 | $101 |
| FY2017 | $11 | $27 | $41 | $45 | $50 | $56 | $65 | $75 | $79 | $85 | $99 | $109 |
| FY2018 | $8 | $28 | $41 | $48 | $58 | $65 | | | | | | |

Research Metrics

Clemson University
Research Report Card
Fiscal Year 2018

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 Q2 | Data Trends 2013-2017 |
|---|---|---|---|---|---|---|---|
| **RESEARCH INPUTS** | | | | | | | |
| **a. Proposal Submissions (Count)** | **1,414** | **1,443** | **1,489** | **1,478** | **1,529** | **653** | |
| 1 AAH | 38 | 51 | 65 | 62 | 69 | 43 | |
| 2 CAFLS | 235 | 230 | 224 | 222 | 241 | 91 | |
| 3 CBSHS | 81 | 93 | 102 | 104 | 112 | 57 | |
| 4 CECAS | 549 | 555 | 582 | 617 | 618 | 268 | |
| 5 COE | 51 | 54 | 39 | 45 | 46 | 10 | |
| 6 COB | 7 | 15 | 13 | 15 | 7 | 6 | |
| 7 COS | 242 | 247 | 263 | 239 | 230 | 105 | |
| 8 CCIT | 12 | 12 | 6 | 3 | 5 | - | |
| 9 PSA | 88 | 90 | 118 | 97 | 170 | 61 | |
| 10 VP for Res & Interdisc Inst | 31 | 17 | 7 | 17 | 14 | 5 | |
| 11 All Other | 80 | 79 | 70 | 57 | 17 | 7 | |
| **b. Proposal Submissions (Value)** | **$ 386,106,648** | **$ 547,095,092** | **$ 510,484,443** | **$ 513,180,239** | **$ 561,148,836** | **$ 188,864,166** | |
| 12 AAH | $ 3,580,723 | $ 14,849,844 | $ 12,839,717 | $ 10,263,562 | $ 1,732,701 | $ 2,066,092 | |
| 13 CAFLS | $ 34,372,635 | $ 43,999,698 | $ 36,519,514 | $ 23,617,486 | $ 35,593,389 | $ 16,271,408 | |
| 14 CBSHS | $ 13,290,053 | $ 21,511,560 | $ 26,844,900 | $ 33,953,358 | $ 42,973,134 | $ 13,638,229 | |
| 15 CECAS | $ 188,119,992 | $ 283,220,894 | $ 278,574,540 | $ 298,715,448 | $ 332,003,069 | $ 100,742,738 | |
| 16 COE | $ 13,990,537 | $ 14,850,254 | $ 11,982,507 | $ 15,246,312 | $ 19,874,910 | $ 2,968,842 | |
| 17 COB | $ 975,025 | $ 2,209,136 | $ 4,025,430 | $ 2,035,401 | $ 921,817 | $ 202,105 | |
| 18 COS | $ 75,761,887 | $ 118,510,356 | $ 100,001,493 | $ 106,950,376 | $ 88,889,567 | $ 40,671,595 | |
| 19 CCIT | $ 37,911,464 | $ 12,473,160 | $ 2,116,258 | $ 2,219,976 | $ 1,285,424 | $ - | |
| 20 PSA | $ 8,554,512 | $ 16,989,642 | $ 26,480,496 | $ 5,530,132 | $ 27,052,907 | $ 8,383,959 | |
| 21 VP for Res & Interdisc Inst | $ 4,191,314 | $ 5,660,278 | $ 5,861,000 | $ 6,131,772 | $ 6,079,004 | $ 1,085,436 | |
| 22 All Other | $ 5,358,506 | $ 12,820,270 | $ 5,238,588 | $ 8,516,416 | $ 4,742,914 | $ 2,833,762 | |
| **c. Research Awards** | **$ 78,013,996** | **$ 79,728,290** | **$ 89,313,594** | **$ 100,861,140** | **$ 109,488,152** | **$ 64,769,502** | |
| 23 AAH | $ 224,473 | $ 590,154 | $ 656,030 | $ 1,400,972 | $ 1,519,688 | $ 1,689,623 | |
| 24 CAFLS | $ 7,284,564 | $ 6,659,619 | $ 14,149,829 | $ 8,619,438 | $ 10,898,288 | $ 8,305,167 | |
| 25 CBSHS | $ 2,737,876 | $ 3,385,989 | $ 4,776,199 | $ 5,065,880 | $ 4,564,531 | $ 5,477,311 | |
| 26 CECAS | $ 34,201,429 | $ 37,723,081 | $ 43,231,494 | $ 45,535,064 | $ 54,000,082 | $ 31,970,981 | |
| 27 COE | $ 2,629,505 | $ 4,089,157 | $ 3,203,419 | $ 2,945,717 | $ 2,774,422 | $ 3,468,480 | |
| 28 COB | $ 2,023,722 | $ 1,114,979 | $ 1,312,998 | $ 783,916 | $ 1,179,733 | $ 430,043 | |
| 29 COS | $ 10,344,423 | $ 7,780,394 | $ 9,938,990 | $ 15,605,625 | $ 19,899,415 | $ 3,917,592 | |
| 30 CCIT | $ 1,617,466 | $ 5,675,854 | $ 668,873 | $ 819,396 | $ 477,594 | $ 1,356,010 | |
| 31 PSA | $ 14,827,292 | $ 12,284,142 | $ 9,588,294 | $ 12,965,629 | $ 7,908,591 | $ 3,285,531 | |
| 32 VP for Res & Interdisc Inst | $ 1,790,060 | $ 268,882 | $ 573,565 | $ 5,139,315 | $ 5,030,743 | $ 3,316,759 | |
| 33 All Other | $ 333,188 | $ 156,039 | $ 1,213,903 | $ 1,980,188 | $ 1,235,065 | $ 1,552,005 | |
| **d. Notable Awards** | | | | | | | |
| 34 NSF CAREER Awards (by start date) | 4 | 1 | 3 | 5 | 7 | - | |
| 35 NIH R01-Equivalent Awards (by start date) | - | - | 2 | 2 | 2 | 2 | |
| 36 NIH Career Awards (by start date) | 1 | - | - | - | - | - | |
| 37 Air Force Young Investigator Awards | - | - | 1 | 2 | - | - | |
| 38 DOE Early Career Awards | 1 | - | - | - | - | - | |
| **e. Supporting Workforce** | | | | | | | |
| 39 Graduate Student Enrollment | 4,206 | 4,372 | 4,670 | 4,664 | 4,425 | 4,985 | |
| 40 Sponsored Graduate Research Assistants | 822 | 745 | 707 | 693 | 696 | 761 | |
| 41 Postdoctoral Fellows | 48 | 64 | 83 | 85 | 90 | 97 | |
| 42 Research Faculty: Permanent 100% Non-E&G Funded | 6 | 6 | 6 | 11 | 17 | 14 | |
| 43 Research Faculty: Temporary 100% Non-E&G Funded | 18 | 18 | 15 | 14 | 24 | 27 | |
| **RESEARCH PROCESS** | | | | | | | |
| **f. Sponsored Research Expenditures by Business Unit \*\*** | **$ 75,388,679** | **$ 69,907,663** | **$ 73,307,908** | **79,493,329** | **89,547,288** | **39,708,860** | |
| 44 AAH | $ 504,683 | $ 378,112 | $ 419,440 | $ 1,104,015 | $ 1,324,634 | $ 600,953 | |
| 45 CAFLS | $ 8,768,472 | $ 7,706,442 | $ 6,752,344 | $ 8,631,050 | $ 11,066,587 | $ 4,671,425 | |
| 46 COB | $ 1,239,726 | $ 1,200,289 | $ 1,081,898 | $ 958,613 | $ 867,778 | $ 336,902 | |
| 47 CECAS | $ 34,969,267 | $ 34,550,052 | $ 34,968,963 | $ 37,483,798 | $ 42,945,440 | $ 18,284,442 | |
| 48 CBSHS | $ 3,050,080 | $ 2,817,714 | $ 3,680,307 | $ 4,068,139 | $ 4,413,360 | $ 2,179,484 | |
| 49 COE | $ 3,286,747 | $ 3,256,328 | $ 3,793,915 | $ 2,510,444 | $ 2,580,041 | $ 1,091,874 | |
| 50 COS | $ 13,209,952 | $ 10,501,024 | $ 9,286,770 | $ 11,327,997 | $ 14,777,229 | $ 7,205,681 | |
| 51 CCIT | $ 1,996,620 | $ 1,631,190 | $ 3,400,258 | $ 2,775,609 | $ 426,836 | $ 112,985 | |
| 52 PSA | $ 4,746,123 | $ 4,858,414 | $ 5,847,737 | $ 5,588,699 | $ 5,749,370 | $ 2,860,271 | |
| 53 VP for Res & Interdisc Inst | $ 1,878,676 | $ 1,302,734 | $ 1,892,429 | $ 3,531,216 | $ 3,930,146 | $ 1,742,745 | |
| 54 All Other | $ 1,738,332 | $ 1,705,355 | $ 2,183,847 | $ 1,513,750 | $ 1,465,867 | $ 622,098 | |

| | | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 Q2 | Data Trends 2013-2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g. Sponsored Research Expenditures by Innovation Cluster | | $ | 75,388,679 | $ | 69,907,663 | $ | 73,307,908 | | 79,493,329 | | 89,547,288 | 39,708,860 | |
| 55 | Advanced Materials | $ | 14,258,840 | $ | 11,288,090 | $ | 10,713,746 | $ | 10,385,364 | $ | 10,704,113 | $ 4,838,858 | |
| 56 | Cyberinfrastructure and Big Data Science | $ | 10,277,111 | $ | 10,513,388 | $ | 10,137,409 | $ | 8,874,268 | $ | 8,125,965 | $ 3,748,722 | |
| 57 | Energy, Transportation and Advanced Manufacturing | $ | 4,687,300 | $ | 5,680,684 | $ | 7,236,983 | $ | 7,645,169 | $ | 17,772,810 | $ 6,861,591 | |
| 58 | Health Innovation | $ | 13,115,231 | $ | 10,248,431 | $ | 10,188,088 | $ | 12,470,389 | $ | 16,316,309 | $ 7,413,489 | |
| 59 | Human Resilience | $ | 8,200,415 | $ | 7,708,375 | $ | 9,700,880 | $ | 9,762,842 | $ | 7,780,667 | $ 3,966,822 | |
| 60 | Sustainable Environments | $ | 18,331,776 | $ | 16,877,332 | $ | 17,926,296 | $ | 21,723,962 | $ | 18,924,983 | $ 8,639,680 | |
| 61 | Other | $ | 6,518,006 | $ | 7,591,364 | $ | 7,404,505 | $ | 8,631,335 | $ | 9,922,442 | $ 4,239,698 | |
| h. Sponsored Research Expenditures by Funding Source | | $ | 75,388,679 | $ | 69,907,663 | $ | 73,307,908 | $ | 79,493,329 | $ | 89,547,288 | $ 39,708,860 | |
| 62 | Federal Gov | $ | 62,890,679 | $ | 56,872,229 | $ | 58,457,288 | $ | 65,135,890 | $ | 74,571,410 | $ 33,108,778 | |
| 63 | Foundations, Societies, and Associations | $ | 4,221,409 | $ | 4,294,121 | $ | 4,741,795 | $ | 4,137,246 | $ | 4,696,551 | $ 2,152,613 | |
| 64 | Industry/Other | $ | 4,930,465 | $ | 5,641,543 | $ | 6,071,417 | $ | 6,870,782 | $ | 6,793,645 | $ 2,718,138 | |
| 65 | International | $ | 813,542 | $ | 577,879 | $ | 765,179 | $ | 778,835 | $ | 517,558 | $ 165,698 | |
| 66 | Local Gov | $ | 597,732 | $ | 614,527 | $ | 578,235 | $ | 530,909 | $ | 523,786 | $ 241,442 | |
| 67 | State Gov | $ | 1,934,852 | $ | 1,907,364 | $ | 2,693,993 | $ | 2,039,667 | $ | 2,444,338 | $ 1,322,191 | |
| i. Sponsored Research Expenditures per T/TT | | | | | | | | | | | | | |
| 68 | AAH | $ | 3,299 | $ | 2,264 | $ | 2,343 | $ | 5,841 | $ | 8,177 | $ 3,642 | |
| 69 | CAFLS | $ | 88,570 | $ | 81,120 | $ | 69,612 | $ | 84,618 | $ | 105,396 | $ 43,254 | |
| 70 | COB | $ | 14,415 | $ | 13,047 | $ | 11,510 | $ | 9,683 | $ | 8,855 | $ 3,336 | |
| 71 | CECAS | $ | 169,754 | $ | 160,698 | $ | 163,406 | $ | 163,685 | $ | 194,323 | $ 81,264 | |
| 72 | CBSHS | $ | 27,982 | $ | 26,853 | $ | 33,764 | $ | 42,376 | $ | 34,751 | $ 17,027 | |
| 73 | COE | $ | 54,779 | $ | 51,688 | $ | 62,195 | $ | 38,037 | $ | 44,483 | $ 18,825 | |
| 74 | COS | $ | 95,724 | $ | 72,421 | $ | 61,912 | $ | 77,589 | $ | 95,956 | $ 45,896 | |
| 75 | CU average (Total exp/Total T/TT faculty) | $ | 83,858 | $ | 75,089 | $ | 78,826 | $ | 85,753 | $ | 84,297 | $ 36,487 | |
| | | | | | | | | | | | | | |
| RESEARCH OUTPUTS/OUTCOMES | | | | | | | | | | | | | |
| 76 | Doctorates Awarded (Aug, Dec, May) | | 187 | | 217 | | 237 | | 233 | | 231 | 142 | |
| 77 | STEM Doctorates Awarded (Aug, Dec, May) | | 118 | | 153 | | 165 | | 138 | | 156 | 107 | |
| 78 | Disclosures | | 102 | | 129 | | 70 | | 60 | | 65 | 13 | |
| 79 | Patents | | 16 | | 15 | | 15 | | 14 | | 18 | 6 | |
| 80 | Licenses/Options | | 9 | | 7 | | 7 | | 5 | | 10 | 5 | |
| 81 | Licensing Revenue | $ | 1,134,289 | $ | 762,811 | $ | 360,131 | $ | 354,827 | $ | 539,490 | $ 90,553 | |
| 82 | Start-up Companies (based on licenses/options above) | | 1 | | 4 | | 4 | | 2 | | 3 | 1 | |
| | | | | | | | | | | | | | |
| THE BOTTOM LINE | | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
| | Research Awards | $ | 78,013,996 | $ | 79,728,290 | $ | 89,313,594 | $ | 100,861,140 | $ | 109,488,152 | $ 64,769,502 | |
| | Other Sponsored Program Awards (CCIT Medicaid) | $ | 24,009,167 | $ | 28,567,490 | $ | 32,532,784 | $ | 58,187,130 | $ | - | | |
| * Awards Total | | $ | 102,023,163 | $ | 108,295,780 | $ | 121,846,378 | $ | 159,048,270 | $ | 109,488,152 | $ 64,769,502 | |
| ** Research Expenditures | | $ | 75,388,679 | $ | 69,907,663 | $ | 73,307,908 | $ | 79,493,329 | $ | 89,547,288 | $ 39,708,860 | |
| | Other Sponsored Programs Expenditures | $ | 24,009,167 | $ | 28,567,490 | $ | 32,532,784 | $ | 58,187,130 | $ | - | | |
| | Less CURF Indirect Expenditures | $ | 1,303,354 | $ | 743,951 | $ | 684,695 | $ | 574,081 | $ | 255,982 | $ 64,322 | |
| Sponsored Research and Programs Expenditures | | $ | 98,094,492 | $ | 97,731,202 | $ | 105,155,997 | $ | 137,106,378 | $ | 89,291,306 | $ 39,644,538 | |
| | | | | | | | | | | | | | |
| * See section c. above | | | | | | | | | | | | | |
| ** See section f. above | | | | | | | | | | | | | |

# Research Report Card Trends

This brief report addresses areas of decline outlined in the Research Report Card for years 2013 through 2017 for units demonstrating a persistent decline.

| College | Observations | Action |
|---|---|---|
| **CAFLS** | • **Line 2 – Submission Counts**: The difference in submissions is approximately 6% over four years or a difference of 13 proposals. From 2016 to 2017, CAFLS has regained strength in this area with 241 submissions – 9% growth.<br>• **Line 13 – Submission Value:** CAFLS has been trying to increase submissions of large multi-disciplinary and multi institutional proposals. Announced RFPs applicable to CAFLS vary from year to year. With the goal of submitting larger proposals, CAFLS's submissions total has improved by 51% in 2017 compared to 2016.<br>• **Line 24 – Awards:** There was a $4M award (2010682) to CAFLS in 2015 to James Frederick came as a single lump, which made increased the 2015 value relative to other years. CAFLS awards are usually in the range of $7-9M. CAFLS has completed FY2017 with awards totaling $11M representing 26% growth over 2016. | Currently, the university is planning to add faculty members in CAFLS to address teaching demand, which will allow more time for research by faculty.<br><br>Further, CAFLS is completing its strategic planning and will identify specific areas of strategic importance for each department. These actions will help to reverse the pattern in the positive direction. |
| **CAAH** | • **Line 12 – Submission Value:** There is a downward trend in proposal submission values beginning in 2014 and continuing through 2017. In 2015, there were several large submissions including a $4M proposal and three proposals greater than $1M. In 2016, there were four proposals with values between $1M and $2M. There were no large proposals (>$1M) submitted by CAAH in 2017. | Action will be taken if sign of weakness is detected. |
| **CCIT** | • **Line 8 – Submission Counts:** Research has not been the primary mission of CCIT. However, a small number of research proposals, in the range of 10-15 proposals/year, are submitted annually by CCIT due to the research interests of previous CIO, Jim Bottum. With his retirement as well as the recent emphasis on the cybersecurity challenges in the University, the attention on the research proposal submission has become less critical. This trend has remained unchanged in *2017.*<br>• **Line 19 – Submission Value**: In 2013, CCIT submitted a proposal worth $36M (2013001037) to the NSF. In 2014, CCIT submitted a proposal worth $10M (2014001325) to the NSF. These large proposals caused the submission totals for 2013 and 2014 to be significantly higher than average. As indicated above, CCIT annual research proposal submission has been historically a small number. This trend has remained unchanged in 2017.<br>• **Line 30 – Awards:** In 2014, CCIT was awarded $5M (2009949) for James Bottum's NSF project. This award is significant enough to disrupt the funding trends for CCIT. This trend has remained unchanged in 2017. | The new CIO will begin in July 2017. After his arrival, the focus of CCIT on research proposal submissions will be evaluated and re-assessed. |

| | | |
|---|---|---|
| **All Other** | • **Line 11 and Line 22 – Submission counts & values:** All other category consists of Economic Development, Libraries, Facilities, Student Affairs, and Cooperative Extension, where research grants are not first priority. As a result, a high degree of variability occurs in this category. The trends observed in 2016 remained largely unchanged in 2017. | No action is needed |
| **COB** | • **Line 17 - Submission values:** The peak submissions occurred in 2015 was a result of several large proposal submissions in the same year. Otherwise, College of Business maintains an average of $1M - $2M/year proposal submission. Colleges of Business nationwide have low rates of extramural funding; these trends are not unique to Clemson. There has been little change in submission values for 2017; the trend remains largely unchanged.<br>• **Line 28 – Awards:** The research program for COB is comparatively small ($1-2M range) while this College serves a very large student population. Although there has been a decrease during 2013-2016 period, there has been recovery of awards in 2017 with awards totals for the COB rebounding by 51% to $1.2M. | Action will be taken if sign of weakness is detected. |
| **Advanced Materials** | • **Line 55 – Expenditures:** Annual expenditures of this cluster was $14M in 2013 and since then has averaged about $10-11 M. Thus, there seemed to be a slowing of expenditures for projects in this Innovation Cluster. However, with the significant recent awards (e.g., $6M EPSCoR Track-1, $6M EPSCoR Track-2, and $3.2M DARPA), this trend reversed in 2017 with 3% growth over 2016 totals. | Action will be taken if sign of weakness is detected. |
| **Local Govt.** | • **Line 66 – Expenditures:** Totals for local government have been historically low (~$500K/year) but appear exaggerated in the sparklines. There has been a slight decline in local government expenditures since 2014. These awards are small and tend to be annual -- so small shifts in awards will be apparent in expenditures. For example, the difference between 2016 and 2017 expenditures from local government sources is 2%. | Action will be taken if sign of weakness is detected. |
| **CURF** | • **Line 78 – Disclosures:** The numbers of disclosures per year is highly variable. In 2013 and 2014, CURF was processing all the BIOE senior design disclosures; after 2014, CURF no longer supported this process. In addition, Johnell Brooks with AuE submitted a significant number (between 10-15) of disclosures in 2014 for driving scenarios. Launch of the technology maturation fund in 2014 was accompanied by a caveat that applicants demonstrate at least one disclosure. There has been an increase in disclosures of 8% from 2016 to 2017.<br>• **Line 81 – Licensing revenue:** An overpayment by a software company in 2013 led to an artificial inflation of licensing revenue. Repayment of that sum took place over 2014-2016. In 2014, royalty downturn was mitigated by a one-time $300K payout on a biomedical device license by a company beginning the IPO process. Following the conclusion of the repayment, there has been a 52% increase in licensing revenue from FY 2016 to FY 2017. | We are currently working on a new plan for CURF. |

# Significant Awards

# Clemson University's Top Ten Awards
Received Between September 9, 2017 and December 20, 2017

| PI | Award | (Sponsor)Project Title | Abstract |
|---|---|---|---|
| **Robert Frager** | $2.6M | (SC DSS and SC DHHS) ICSS Employment and Training | This project supports the work of specialists in Clemson University's Youth Learning Institute (YLI) as they develop employee training and evaluation protocols for employees of SC CSS (Child Support Services) in case management. |
| **Kuang-Ching Wang** | $2.5M | (NSF) CISE: CloudLab Phase II: Community Infrastructure To Expand the Frontiers of Cloud Computing Research | University of Utah has collaborated with Clemson University to develop a multi-university testbed for advanced cloud computing architecture research. This award represents the second phase of the project begun in 2014. |
| **Windsor Sherrill** | $2.3M | (Greenville Health Authority) HEALTHY GREENVILLE 2036: CU Healthy Communities: Integrated Services for Diabetes Prevention and Management in Greenville County | In South Carolina, total hospital charges related to a diabetes diagnosis was $404 million in 2014. Clemson University will partner with the Greenville Hospital System (GHS) to recruit, educate and deploy a new population health workforce to manage/prevent diabetes by offering community-based client support services. |
| **Kuang-Ching Wang** | $1.6M | (DOD) HEALTH INFORMATION TECHNOLOGIES AND INFORMATICS: Complete And Resilient Documentation (CARD) for Operational Medical Environments | Clemson will collaborate with Palmetto Health to demonstrate and validate hands-free electronic health record data entry solutions. The challenges addressed include collection of health data in noisy environments. The research team will develop the CARD platform for use by the US military for deployment in battlefield medical operations. |
| **Vahidi Ardalan** | $1.0M | (DOE) AOI 4: ENERGY EFFICIENT MOBILITY SYSTEMS RESEARCH: Boosting Energy Efficiency of Heterogeneous Connected Automated Vehicle (CAV) Fleets via Anticipative and Cooperative Vehicle Guidance | Clemson leads a team including researchers at Argonne National Laboratory and the International Transportation Innovation Center. The team will demonstrate that mixed traffic streams, utilizing both conventional human-driven vehicles and connected and automated vehicles (CAVs), results in more than 10% reduction in energy consumption. This project will include testing on the novel vehicle-in-the-loop experimental platform at CU I-CAR. |

| | | | |
|---|---|---|---|
| **Oliver Meyers** | $1.0M | (US ARMY) NDE Precursor Mechanics of Embedded Magnetostrictive Composite Sensors | Composite materials are widely used throughout the aerospace, automotive and machine tool industries. These materials are prone to failure if defects are detected. Many of the defect-detecting techniques, particularly those termed non-destructive evaluation (NDE), can detect flaws when a structure is under load. The project will examine if embedded magnetostrictive particles (MSP) offers a potential evaluation technique to locate and quantify damage in composites caused by the fabrication process. |
| **Rajendra Bordia** | $600K | (DOE) Integrated TBC/EBC for SiC Fiber Reinforced SiC matrix Composites for Next Generation Gas Turbines | Gas turbines generate electrical power efficiently but the mechanical parts are subjected to extremely high temperatures (up to ~1,700° C). In order to improve efficiency and to protect mechanical parts from extreme heat, this project develops novel polymer derived ceramic coating materials with a novel coating protocol to prevent turbine thermal damage. |
| **Julia Frugoli** | $600K | (NSF) Research-PGR: Functional Genomics of Beneficial Legume-Microbe Interactions | This project pairs Clemson University with the Nobel Samuel Roberts Foundation. Researchers are seeking a better understanding of the interactions between the roots of legumes, more particularly barrelclover, and beneficial microbes. |
| **Michael Marshall** | $500K | (USDA) NRCS: NHQ: CIG: Utilizing Deep-rooted Cover Crops to Enhance Water Quality, Soil Health, and Farm Profits While Reducing Soil Compaction in Coastal Plain Region | Clemson partners with the University of Georgia to support farmers in the Southeastern Coastal Plain adopt innovative and proven conservation technologies and approaches for crop production that enhance water quality, soil health, environmental quality and farm profit and reduce soil compaction and fuel consumption. |
| **Leah Casabianca** | $500K | (NSF) MRI: Acquisition of a 500 MHz NMR Spectrometer with Cryoprobe | This award supports Clemson's purchase of equipment. The Department of Chemistry will purchase NMR (nuclear magnetic resonance) equipment that provides a non-destructive method for examining organic and inorganic chemical mechanisms. This equipment will replace an 18-year-old NMR spectrometer, essential equipment in both physical and life sciences. |