Clemson University
Clemson, South Carolina

Reports Required by *Government Auditing Standards*
and the *Uniform Guidance*

For the year ended June 30, 2021

Clemson University
Clemson, South Carolina
Contents

Clemson University, Clemson, South Carolina
Schedule of Expenditures of Federal Awards
For the year ended June 30, 2021

Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
RESEARCH AND DEVELOPMENT CLUSTER				
Department of Agriculture				
Acquisition of Goods and Services	10.RD	58-6080-0-018	$ -	$ 30,498
Acquisition of Goods and Services	10.RD	58-6080-8-008	-	2,638
Acquisition of Goods and Services	10.RD	58-6082-0-008	-	76,641
Acquisition of Goods and Services	10.RD	58-6082-0-009	-	35,241
Acquisition of Goods and Services	10.RD	58-6082-1-008	-	2,800
Acquisition of Goods and Services	10.RD	58-6082-9-008	-	3,419
A Multi-state Effort to Contain and Manage the Invasive Guava Root Knot Nematode (GRKN) in Vegetable Crops	10.RD	2019-51181-30018	509,131	667,847
Adaptation of Intelligent Spray Application Technologies in Peach Orchards	10.RD	59-5082-6-002	-	8,666
Advancing Virus - Treehopper - Host Interactions to Devise and Disseminate Disease Management Recommendations	10.RD	2018-67011-31696	-	39,729
Animal Health	10.RD	NI19AHDRXXXXG003	-	2,315
Animal Health	10.RD	NI20AHDRXXXXG052	-	25,488
Animal Health	10.RD	NI21AHDRXXXXG056	-	3,560
Areawide Pest Management of the Invasive Sugarcane Aphid in Grain Sorghum- Clemson University, South Carolina	10.RD	58-6048-6-015	-	8,895
Asian Longhorned Beetle Research Support	10.RD	AP21PPQS&T00C002	-	40,313
Biology of the Redbay Ambrosia Beetle in Sassafras at the Leading Edge of Laurel Wilt	10.RD	19-CS-11330129-030	-	33,153
Biosensor-Based Assay for the Detection and Quantification of Quorum Sensing Autoinducers (Acyl Homoserine Lactones and Autoinducer-2) Produced in Package Foods	10.RD	2018-67031-27359	-	13,058
Breeding Biofortified Pulse and Cereal Crops for US Organic Cropping Systems	10.RD	2018-51300-28431	-	217,889
Carolina Cotton can Conserve Soil with Cover Crops	10.RD	NR213A750013G007	-	10,205
Characterization of Water Quality and Quantity in Greenhouse and Nursery Waters in the Piedmont Ecoregion of the USA	10.RD	58-5082-0-012	-	1,959
Characterize Seasonal Light Response Curves of Ligustrum Sinense (Chinese Privet) in the Understory of Hardwood Forests	10.RD	19-JV-11242311-051	-	4,501
Clemson Fire Tigers	10.RD	20-PA-11081200-276	-	2,495
Clemson-South Carolina State CYFAR	10.RD	2018-41520-28750	147,518	262,195
Collaborative Research to Improve Evaluation of Advanced and Diverse Wheat Germplasm for FHB Resistance in the Atlantic Coastal Plain	10.RD	58-6070-8-014	-	15,381
Collaborative Research to Improve Evaluation of Advanced Wheat Germplasm for FHB Resistance in the Atlantic Coastal	10.RD	59-0206-0-150	-	84,476
Crop Protection and Pest Management Extension Implementation Program for South Carolina	10.RD	2017-70006-27156	-	237,671
CULTIVAR DEVELOPMENT: Combining genomics-enabled breeding with coordinated regional testing to accelerate wheat genotype to market	10.RD	2021-67014-33941	-	6,100
Demonstrating the Influence of Cover Crop Termination Time on Nutrient Provision to Yield of Cash Crop	10.RD	NR184639XXXXG006	-	23,881
Design a Framework for Payments for Ecosystem Service and Analysis of Adoption Behavior in the Santee Basin	10.RD	NR184639XXXXG002	-	21,953
Detection and Management of Phytophthora species in Nurseries and Greenhouses.	10.RD	58-2072-0-058	-	35,540
Developing Host Plant Resistance for Thrips in Cotton to Address Emerging Insecticide Resistance	10.RD	2017-70006-27264	19,316	71,395
Developing Resources to Manage the Exotic Root-Knot Nematode Meloidogyne Enterolobii	10.RD	58-6080-8-010	-	18,206
Development and Comparison of Pathogen Viability Tests for Seed Certification and Improved Management of Bacterial Spot of Tomato	10.RD	2017-70006-27206	2,447	13,441
Development and Implementation of Biological Control Tactics for Key Vegetable Insect Pests in the Southeastern US	10.RD	2018-51300-28425	170,075	295,664
Development of a Field Detection Tool for Old World Bollworm, Helicoverpa Armigera	10.RD	AP19PPQS&T00C039	-	27,784
Development of a Regional Southern Pine Beetle Website	10.RD	19-DG11083150-038	-	21,125
Development of Genetic Resources for Host-Plant Resistance to Leaf Blight Pseudonomads in Turnip Greens and Spinach	10.RD	2020-67014-30868	-	97,416
Development of Genomic and Molecular Tools to Accelerate the Identification and Delivery of Durable Genetic Resistance to Fov4 in Upland Cotton	10.RD	2019-67029-29915	66,030	61,987
Discover Sources, Genes, and Develop New Varieties and Germplasm with Improved Meal Protein Utilizing Diversity in Cultivated and Wild Soybeans	10.RD	59-6070-0-019	-	(1,377)
Distribution and Spread of the Invasive Callery Pear	10.RD	20-DG-11083150-008	-	4,059
Diversifying organic inputs to improve soils supporting organic vegetable in southeastern USA	10.RD	2020-51106-32363	9,650	85,980
Effects of Prescribed Fire Intensity and Frequency on Bat Foraging Habitat Use and Roosting Habitat	10.RD	17-JV-11330134-108	-	545
Effects of Prescribed Fire on Ips Bark Beetles	10.RD	19-DG11083150-039	-	23,181
Enable the Use of Mass Timber Products for Non-Residential Buildings in High Velocity Hurricane Zone	10.RD	19-DG11083150-015	-	43,945
Enhancing Communication Skills of Next Generation Scientists and Educators Using Art and Technology	10.RD	2020-67034-31765	-	69,191
Enhancing the Nutrient Use Efficiency in Crop Plants by Tailoring the Nitrogen and Phosphorous Release Rates from Rendered Animal Materials	10.RD	2016-67020-25264	-	98,498
Enriching the Professional Preparation of Food Science Students	10.RD	2020-67038-30654	-	48,000
Establishing the Infrastructure to Develop Prediction Tools for Diseases & Affecting Cotton to Better Inform Mgmt. Decisions (Clemson)	10.RD	58-0206-0-195	-	11,781
Evaluating the Net Climate Benefits of Switchgrass Versus Pine Plantations in the Southeast: A Seed Grant to Support Data Collection and Model Development	10.RD	2017-68002-26612	-	3,623
Evaluation of Paper Bags for Pest and Disease Management in Organic Peach Production	10.RD	2016-51300-25726	86,326	127,355
Expanding the Use of Wood Building Products in SC	10.RD	15-CA-11083150-053	-	13,169
Exploring mechanisms of chemical resistance in Xanthomonas arboricola pv. pruni and strategies to mitigate resistance and improve disease control	10.RD	2021-67013-33574	-	42,472
FACT-CIN: Expanded Food and Nutrition Education Program - Web Based Nutrition Education and Evaluation Reporting System (WebNEERS)	10.RD	2020-67017-32395	7,630	225,892
Forest Road Soil Stabilization Demonstration Utilizing Native and Non-Native Cover Crops	10.RD	NR184639XXXXG004	-	7,884
FY19BFP Turkey(Uslu) Triple mloGene@Clmsn	10.RD	FX19BF-10777R010	-	17,398
FY2018 NCPN- Clemson University- Southeast	10.RD	AP18PPQS&T00C046	-	23,316
FY2019 NCPN Clemson University Southeast	10.RD	AP19PPQS&T00C105	-	67,838
FY2020 NCPN Clemson Univ./Cieniewicz- So	10.RD	AP20PPQS&T00C042	-	168,785
Genetic basis for acetaminophen toxicity	10.RD	AP21WSNWRC00C001	-	23,386
Genomics, Transcriptomics and Microbiome Analysis of Dipteran Pests Affecting Livestock and Humans	10.RD	58-3020-6-015	-	72,173
Green Salamander Habitat	10.RD	19-PA-11081200-115	-	3,172
Harvesting Options for Restoration Treatments	10.RD	19-JV-11330132-087	-	21,313
Hatch & Hatch Multistate	10.RD	NI19HFPXXXXG025	-	595,510
Hatch & Hatch Multistate	10.RD	NI20HFPXXXXG028	-	2,286,514
Hatch & Hatch Multistate	10.RD	NI19HMFPXXXXG045	-	214,850
Hatch & Hatch Multistate	10.RD	NI20HMFPXXXXG029	-	1,127,065
Hatch & Hatch Multistate	10.RD	NI21HMFPXXXXG011	-	275,231
Herbicide efficacy for management of invasive Callery pear	10.RD	20-CS-11330160-086	-	9,147
Improving the Nutritional Value of Chickpeas	10.RD	58-2090-8-084	-	35,746
Increasing Mass Timber and Wood Markets in the Southeast	10.RD	20-DG-11083150-250	-	22,151
Integrated Housing Design and Logistics for Disaster Relief	10.RD	19-JV-11111133-037	-	24,567
Interactive Effects of Temperature and Photoperiod on Flower Initiation and Development	10.RD	58-5082-8-013	-	44,922
Investigating the Plant-Soil Feedback That Maintains the Legacy Effect in Invaded Ecosystems to Formulate Knowledge-Based Restoration Practices	10.RD	2017-67014-26698	-	78,978
Isolation, Identification, and Management of Phytophthora Species in Nurseries and Greenhouses	10.RD	58-8062-8-015	-	10,644

The accompanying notes are an integral part of this schedule

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RESEARCH AND DEVELOPMENT CLUSTER, continued				
Department of Agriculture, continued				
Keeping the Green Heart Healthy: An Ecologically Sound and Economically Viable Conservation Plan for the Cowasee Basin	10.RD	2018-67020-27854	-	31,776
Linking Dynamic Soil Erodibility to Soil Loss in the Agricultural Landscape	10.RD	58-6060-0-008	-	13,207
McIntire Stennis	10.RD	NI19MSCFRXXXG071	-	98,212
McIntire Stennis	10.RD	NI20MSCFRXXXG072	-	744,629
Mitigation Strategies for Ergot Alkaloid-Induced Vasoconstriction and Intrauterine Growth Restricted Muscle Development	10.RD	2020-67016-30816	-	74,910
Modeling Fire-Induced Tree Mortality for Eastern Hardwood Forests	10.RD	16-JV-11242311-079	-	40,228
Monitoring Pasture Quality and Quantity Using Field Robotics	10.RD	2020-67021-31960	-	91,321
National Needs Training in Computationally Intensive Genomic Analysis and Application	10.RD	2016-38420-25299	-	2,065
On-Farm Demonstration and Evaluation of Cloud-Based Soil Moisture Monitoring Technologies for Irrigation Scheduling to Enhance Farm Profitability and Environmental Quality	10.RD	NR203A750013G010	-	76,824
Outreach Activities for the Consortium of Appalachian Fire Managers and Scientists	10.RD	19-JV-11330136-078	-	29,354
Outreach Activities for the Consortium of Appalachian Fire Managers and Scientists	10.RD	18-JV-11330136-079	-	1,684
Outreach Activities for the Consortium of Appalachian Fire Managers and Scientists	10.RD	20-JV-11330160-095	-	43,143
Phytochemical-Mediated Stress Hormesis And Priming As A Mechanism Of Resilience In Weeds And Negating These Stress Adaptations	10.RD	2021-67014-33636	-	14,041
Population Analysis Of Pseudoperonospora Cubensis And Identification Of Downy Mildew Resistance In Cucumis Mel	10.RD	2020-67034-31741	-	47,041
Promote the Sustainable Carbon Market to South Carolina Forest Landowners	10.RD	69-4639-17-147	-	13,528
Promoting cyber-learning through technology-enabled modules within FANH education	10.RD	2020-70003-32310	-	21,393
Promoting Water, Soil and Nutrient Conservation in Peach Orchards with Trees Planted in Raised Beds	10.RD	NR184639XXXXG005	-	1,147
Purchase of a Shared-Use Conviron BDW160 Plant Growth Chamber for Plant Science Research across Multiple Disciplines and Institutions	10.RD	2020-70410-32898	-	82,641
Quantifying the Cover Crops Nitrogen and Potassium Credit to 3-yr Cotton-Peanut Rotation	10.RD	NR184639XXXXG009	-	45,681
Quantifying the Spatial and Temporal Patterns of Population Establishment & Growth of the Asian Longhorned Beetle in South Carolina	10.RD	20-JV-11242303-095	-	27,916
Roles of Microplastics in Reclaimed Water - Altering Persistence and Bioavailability of Antimicrobials in Agricultural Soils	10.RD	2020-67019-31022	17,272	66,155
SC FY19 Forest Pest Outreach - Underserved Landowners	10.RD	AP19PPQFO000C259	-	9,487
SC FY20 Invasive Species Education Prog.	10.RD	AP20PPQFO000C165	-	55,379
Selection, Molecular and Genetic Analysis of HLB Tolerant/Resistant Variant Citrus Plants	10.RD	2017-70016-26051	518,591	687,456
Soil Health Demonstration at Pee Dee REC	10.RD	NR184639XXXXG012	-	(5,101)
Solutions to the Armillaria Root Rot Threat Affecting the U.S. Stone Fruit Industry	10.RD	2020-51181-32142	69,621	460,231
South Carolina Aquaculture Futures -Evaluating Socioeconomic Potentials for Rural Communities and Limitations for Entrepreneurs	10.RD	2019-67024-29671	-	42,184
Southern Heritage Crops: Developing Economic Potential in a Geographically and Culturally Unique Market Niche for Small and Medium Sized Farms.	10.RD	2020-68006-31266	-	12,239
Storage, Reactivity, and Bioavailability of Mercury in Manage Forests - Balancing Mercury Toxicity and Wildfire Risks Through Effective Fuel Reduction	10.RD	2018-67019-27795	48,791	85,245
Studies of Occupations, Culture, and Innovations toward Agricultural Literacy (SOCIAL): Professional Development for Integrating Agriculture and History Curricula	10.RD	2021-67037-34301	-	2,616
Sustainable, high-quality organic pulse proteins: organic breeding pipeline for alternative pulse-based proteins	10.RD	2021-51300-34895	-	1,989
The Impact of Leptin Concentrations on the Development of Appetite Regulation in Beef Calves	10.RD	2018-67016-27472	-	74,126
To Evaluate the Potential of Organic Farming Practices in South Carolina	10.RD	69-4639-17-142	-	9,649
Transforming Nanocellulose Into an Advanced Biorenewable Reinforcement With Hyperbranched Polymers	10.RD	2016-67021-25016	10,467	47,704
Transgene Containment and Removal in Important Perennial Grasses	10.RD	2019-33522-30102	-	132,720
Urban Forestry's Return on Investment: Accelerating our Understanding of the Nature-Health Care Cost Relationship	10.RD	20-DG-11132544-057	-	18,756
Utilization of Cross Laminated Timber	10.RD	16-DG-11083150-054	-	21,923
Utilizing Deep-Rooted Cover Crops to Enhance Water Quality, Soil Health, and Farm Profits While Reducing Soil Compaction in Coastal Plain Region	10.RD	69-3A75-17-274	7,077	50,791
White-Nose Syndrome Survival Strategies of Tricolored Bats (Perimyotis subflavus) during Fall, Winter, and Spring	10.RD	20-JV-11330170-109	-	28,922
Whole Genome Sequencing of the Face Fly, Musca Autumnalis	10.RD	58-3094-7-018	-	2,646
Yield Potential of Commercial Varieties under Drought-Identifying and Overcoming Weaknesses via the Public Breeding Pipeline (South Carolina)	10.RD	59-6070-0-006	-	2,439
Pass-through programs from:				
Colorado State University				
Sustaining Agriculture through Adaptive Management to Preserve the Ogallala Aquifer Under a Changing Climate	10.RD	G-06263-11	-	38,088
Cornell University				
Developing an Eastern Broccoli Industry Through Cultivar Development, Economically and Environmentally Sustainable Production and Delivery	10.RD	79598-10781	-	54,240
Michigan State University				
CucCAP 2: Harnessing Genomic Resources For Disease Resistance And Management In Cucurbit Crops - Bringing The Tools To The Field	10.RD	RC111377B	-	14,709
North Carolina Central University				
Control of Persistent Foodborne Pathogens Using Visible Light-Activated Antimicrobial Carbon Nanomaterials	10.RD	A19-0041-S002 / P0108382	-	1,036
North Carolina State University				
Cross-Commodity Bt Resistance in Dynamic Row Crop Agroecosystems: Linking the Development of GE Technology at the Landscape-Scale to Resistance in Cotton Bollworm	10.RD	2017-2861-01	-	1,256
Economic Impact of the Foliar Disease Downy Mildew and Fungicide Resistance on Cucumbers in the Southeastern US	10.RD	2018-3200-21	-	9,855
Enhancing the Sustainability of United States Cropping Systems through Cover Crops and an Innovative Information and Technology Network	10.RD	2019-1507-10	-	26,294
Growing New Roots: Grafting to Enhance Resiliency in U.S. Vegetable Industries	10.RD	2016-1498-01	-	64,449
Identifying Overwintering and Landscape Features Associated with Stink Bug Risk and Yield Loss in Corn	10.RD	2020-2993-01	-	540
Impact of Refuge Management Tactics On Helicoverpa Zea Population Dynamics And Resistance Risk Implications For Bt Crops	10.RD	2019-0194-02	-	59,990
NCSU, Clemson, & NC A&T CYFAR SCP 4-H STEM Education & Science Literacy: Developing The Next Generation Of Scientists	10.RD	2016-2288-02	-	29,863
Pennsylvania Department of Agriculture				
Short and long-term solution for Armillaria Root Rot in Prunus; Specialty Crop Block Grant Program - Farm Bill	10.RD	ME#44165761 // 16SCCMPA004	-	1,112
Pennsylvania State University				
Regional Approach to Cucurbit Downy Mildew Prevention, Monitoring and Management	10.RD	6061-CU-PDA-7029	-	5,356
Rutgers, The State University of New Jersey				
Protecting Pollinators with Economically Feasible and Environmentally Sound Ornamental Horticulture	10.RD	0876-PP2018-Tharayil / PO# 1046399	-	181,016
Protecting Pollinators with Economically Feasible and Environmentally Sound Ornamental Horticulture	10.RD	1609-PP2020-Chong / PO 1380272	-	125,664
Protecting Pollinators with Economically Feasible and Environmentally Sound Ornamental Horticulture	10.RD	6065-PP2016-Chong / PO#479850	-	47,219

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RESEARCH AND DEVELOPMENT CLUSTER, continued				
Department of Agriculture, continued				
Pass-through programs from, continued:				
South Carolina Department of Agriculture				
		19-G013		
Are the Gummy Blight Fungi in South Carolina Becoming Resistant to Tebuconazole?	10.RD	AM190100XXXXG013	-	18,924
Assessing Nematode Populations Damaging Bermudagrass Across South Carolina	10.RD	AM200100XXXXG073	-	11,353
Capture and Reuse of Phosphorus in Specialty Crop Production	10.RD	AM180100XXXXG026	-	21,963
		19-G013		
Detecting and Managing the hypervirulent nematode Meloidogyne enterolobii on Sweet Potato and Pepper in South Carolina	10.RD	AM190100XXXXG013	5,124	18,759
Developing First Strategies to Manage Bronzing, A Major Factor Impairing the Quality of SC Peaches	10.RD	AM200100XXXXG073	-	6,386
		19-G013		
Developing Strategies to Improve Management of Bacterial Diseases in South Carolina Peach Orchards	10.RD	AM190100XXXXG013	-	25,319
Developing Strategies to Manage Premature Peach Tree Decline from Cytospora Canker in Peach Orchards	10.RD	AM180100XXXXG026	-	10,535
Development of a New Diagnostic Tool to Identify the Bacterial Disease Complex on Leafy Brassica Greens	10.RD	AM200100XXXXG073	-	12,777
Development of a Website for Weed Control Recommendations in Specialty Crops in South Carolina	10.RD	AM180100XXXXG026	-	1,097
Enabling Breeding of Peach Cultivars for Spring Climate Resilience Traits	10.RD	AM200100XXXXG073	-	17,956
Enabling Breeding of Peach Cultivars for Spring Climate Resilience Traits	10.RD	D039/AM170100XXXXG034	-	6,990
Evaluating and Promoting Cold-Hardy Citrus Species for South Carolina	10.RD	AM200100XXXXG073	-	1,606
Evaluation of Novel POST-Emergent Herbicide Concepts in Sweet Potato	10.RD	D040/AM170100XXXXG034	-	3,119
Good Agricultural Practices for Field Pea and Kale Nutritional Breeding in South Carolina	10.RD	AM180100XXXXG026	-	25,269
Improving Irrigation Scheduling for Maximum Fruit Size in Peach Orchards in South Carolina	10.RD	AM180100XXXXG026	-	2,820
Improving Propagation Efficiency of Golden Camellia, a Valuable Yellow-flowering Selection, with High Market Demand	10.RD	AM200100XXXXG073	-	35,482
Integrated Management of Peach Associated Nematodes Endemic in South Carolina	10.RD	AM200100XXXXG073	-	18,400
		19-G013		
Managing Cercospora Leaf Spot on Beet Greens with Tolerant Cultivators and Conventional and Organic Fungicides	10.RD	AM190100XXXXG013	-	9,930
Reducing the Impacts of Chemical Insect Pest Management in Cucurbit Crops	10.RD	AM180100XXXXG026	-	14,546
Research Projects, Educational Events, Demonstrations and Field Days to Educate Growers and Improve Grower Production Management Skills	10.RD	AM200100XXXXG073	-	12,439
South Carolina Cantaloupe Disease Survey	10.RD	AM180100XXXXG026	-	425
South Carolina Forestry Commission				
Ice Storm Impact on Forest Health: Monitoring & Predicting the Growth & Mortality of Ice-damaged Trees in Southern Forests	10.RD	NONE	-	8,088
Tennessee Department of Agric-Forestry Division				
		32510-06619/ 61709 (Edison		
Developing a Regional Forest Health and Invasive Species Outreach Program	10.RD	Vendor ID: 57646)	-	67,106
Tennessee State University				
Flatheaded Borer Management in Specialty Tree Crops	10.RD	332.77-21.2177 / PO142885	-	6,866
Texas A&M University				
Investigating Action Thresholds and Alternative Approaches for Managing Helicoverpa Zea in Cotton	10.RD	M2001832	-	17,924
Research and Extension to Address Herbicide Resistance Epidemic in Annual Bluegrass in Managed Turf Systems	10.RD	06-505773-01005-M1900021	-	69,300
The Center for Produce Safety				
Identifying Competitive Exclusion Microorganisms against Listeria monocytogenes from Biological Soil Amendments by Metagenomic, Metatranscriptomic, and Culturing Approaches	10.RD	2019CPS07	-	(110)
Verification and Validation of Environmental Monitoring Programs for Biofilm Control in the Packing House	10.RD	2020CPS02	-	49,788
The Nature Conservancy				
Inspiration and Empowerment: Developing Effective Win-Win Solutions for Aquatic Life and Agriculture	10.RD	Clemson_04_2020_A106203	-	19,271
University of Arkansas				
Development and Implementation of Innovative Food Safety Training Tools for the Production and Distribution of Microgreens	10.RD	91172-01	-	38,348
Environmental Assessments to Customize Food Safety Training for Very Small to Small Berry Producers in the Southeastern United States	10.RD	91163-01	-	12,322
Environmental Control of SARS-CoV-2 within Food Service Establishments	10.RD	AWD-000210-02	-	70,817
University of Florida				
Plant Safety, Horticultural Benefits, and Disease Efficacy of Essential Oils for Use in Organically Grown Fruit Crops: From the Farm to the Consumer	10.RD	SUB00002400	-	3,494
University of Georgia				
Cover Cropping to Improve Soil Moisture Content for the Following Cash Crop	10.RD	SUB00001798	-	6,364
Cover Cropping to Increase the Sustainability of Cropping Systems by Developing Soil Organic Matter, Improving Soil Health, and Suppressing Weed Growth.	10.RD	SUB00001662	-	7,100
Developing Sustainable and Profitable Tools for Producing Tomato in Fields Infested with Soilborne Pathogens, Nematodes, and Weeds	10.RD	SUB00002138	-	48,249
Incorporating Natural, Non-toxic Arthropod Resistant Tomato Varieties Into Southern Production Systems	10.RD	SUB00002042	42,736	76,680
The Potential of Inter-Seeded Cover Crops for Enhancing Soil Health and Soil Moisture Content in a Row Crop Production System	10.RD	SUB00002279	-	15,343
Utility of Anaerobic Soil Disinfestation and Organic Herbicides for Weed and Disease Management in Organic Solanaceous Vegetable Systems	10.RD	SUB00001973	11,709	107,200
University of Kentucky				
		3200001832-18-311 / PO#		
Measuring And Building On Local Food System Vitality For Communities In The South	10.RD	7800004462	-	35,315
University of Nebraska - Lincoln				
Characterizing the Interplay Between Sorghum and Fall Armyworm	10.RD	25-6228-0342-002	-	11,518
US Endowment for Forestry & Communities				
A Systems Approach to Design and Manufacture CNC-Enabled Lightweight Automotive Components	10.RD	E17-18	-	58,614
		20-00096/ 16-DG11132544-		
Advancing Mass Timber Design and Education for Buildings on Military Installations	10.RD	050	-	44,026
Full-Scale Testing of Cross-Laminated Timber Diaphragm In-Plane Shear and Development of a Design Guide for Practitioners	10.RD	E17-96/E17-96.1	7,995	32,346
Transforming Cellulose Nanocrystals into High-Performance Silicon-Based Products	10.RD	20-00082	-	42,491
Virginia Polytechnic Institute				
Managing Risk Associated With the Use of Automatic Milking and Feeding Systems (robots) in Dairy Farms of the Southern Region	10.RD	549590-19244	-	5,931
Total Department of Agriculture			1,757,506	13,551,899

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RESEARCH AND DEVELOPMENT CLUSTER, continued				
Department of Commerce				
Developing and Implementing a Biological Condition Gradient for Nearshore Habitats of Puerto Rico	11.RD	NA20NOS4200124	-	36,233
Understanding Visitor Use and its Impacts on Key Resources at the ACE Basin National Estuarine Research Reserve	11.RD	NA20NOS4200125	-	35,287
Epidemiology and Reproductive Impacts of the Newly Discovered Egg Parasite Carcinonemertes Obrieni on the Caribbean Spiny Lobster Fishery in Florida and the Caribbean	11.RD	NA20NMF4270197	3,380	4,259
Continuation Development of a Mini-Ebit for TES (Transition Edge Sensor) X-ray Detector	11.RD	70NANB21H048	-	38,609
Improving Disaster Resilience by Quantifying WUI community ember exposure	11.RD	70NANB17H213	-	79,530
Novel Time-Dependent Metrology for Precision Spectroscopy of Highly Charged Ions	11.RD	70NANB20H087	-	163,496
Development of a Mini-Ebit for TES X-ray Detector Development	11.RD	70NANB19H162	-	59,022
Pass-through programs from:				
South Carolina Research Authority				
South Carolina Medical Device Alliance	11.RD	CU-2019	-	169,276
South Carolina Sea Grant Consortium				
A Socioeconomic Evaluation of Stormwater Control Measures to Guide Decision-Making in Coastal South Carolina - Year 1	11.RD	R/CG-2 Year 1	-	746
Effects of Coastal Flooding on Access to Infrastructure and the Resulting Economic Effects in Coastal Communities: Hydrological and Economic Impacts to Coastal Community Access During Nuisance Flood Events	11.RD	R/SE-2 Year 1	-	13,791
Enabling Terrestrial Omega-3 Production for Aquaculture from Local Natural Resources	11.RD	R/AQUA19-1	-	18,971
Enabling Terrestrial Omega-3 Production for Aquaculture from Local Natural Resources	11.RD	R/AQUA19-1 Year 2	-	30,154
Examining the Social Carrying Capacity for Mariculture Development on the South Carolina Coast	11.RD	R/A-36 Year 2	-	6,713
Kathryn D. Sullivan Earth & Marine Science Fellowship: The Influence of Butterflyfish and Coral Genome on the Progression and Transmission Success of Coral Disease	11.RD	M/PM-2B Year 3	-	971
Quantifying Responses of Salt Marsh Productivity to Environmental Variability over Multiple Time Scales using Novel Field Management - Year 1	11.RD	R/ER-50 Year 1	5,223	5,223
Quantifying Responses of Salt Marsh Productivity to Environmental Variability over Multiple Time Scales using Novel Field Management - Year 2	11.RD	R/ER-50 Year 2	-	16,800
Rapid Response to Seafood Supply Chain Vulnerabilities by Assessing Direct Marketing Options in South Carolina	11.RD	A/RR-1a	-	10,791
Something Very Fishy: A Marine Science STEAM Program for Elementary Schools	11.RD	R/ED-1	9,163	37,795
Something Very Fishy: A Marine Science STEAM Program for Elementary Schools - Year 2	11.RD	R/ED-1 Year 2	-	11,006
Urban Stormwater Runoff as a Source of Microplastic and Tire Wear Particles in Coastal Waterways: Transport, Cumulative Impacts to Biota, and Mitigation	11.RD	R/ER-52	9,875	31,660
National Estuarine Research Reserve Association			-	-
Coastal Zone Management Administration Awards	11.RD	NMS-002	-	8,382
South Carolina Department of Natural Resources				
Estimation of Abundance for Age 1 and Adult Atlantic Sturgeon in Two Rivers in the Carolina and Chesapeake Distinct Population Segments (DPSs)	11.RD	SCDNR FY2020-022 P24019487319	-	107,432
University of South Carolina				
The North Inlet-Winyah Bay National Estuarine Research Reserve	11.RD	21-4333 PO#2000056626	-	9,646
Total Department of Commerce			27,641	895,793
Department of Defense				
A DIGITAL PLATFORM FOR STUDIES IN LEARNING AND OPTIMZATION OF LEARNING SYSTEMS	12.RD	N00014-19-1-2610	-	108,042
A Subependymal Giant Cell Astrocytoma (SEGA) Mouse Model	12.RD	W81XWH-20-1-0447/Log # TS190006	-	153,953
A Unified Materials Approach to Mitigating Nonlinearities in HEL Optical Fibers	12.RD	N00014-17-1-2546	111,119	298,638
Abiotic Transformation of Chloroethenes in Low-Permeability Formations	12.RD	W912HQ-16-C-0022	241	386
Algorithm Design for Optimization in Communication and Navigation	12.RD	FA9453-19-1-0078	-	19,476
An Integrated Multi-Material Digital Life Cycle Approach for Additive Manufacturing of Ground Vehicle Structures and Components	12.RD	W911NF-20-2-0237	1,052,212	2,120,482
Assessing the Impact of Asymmetric Information in Interdiction and Bilevel Games	12.RD	N00014-17-1-2421	-	48,696
Autonomous Agents that Make Contextual-Based Decisions through Associative Learning	12.RD	N00174-19-1-0026	-	36,910
Complete and Resilient Documentation (CARD) for Operational Medical Environments	12.RD	W81XWH-17-C-0238	-	141,012
Complex Models on Graph Based Topological Spaces	12.RD	W911NF-17-1-0455	-	21,991
Conic Programming Reformulations and Relaxations for Quadratically Constrained and Quadratic Programs	12.RD	N00014-20-1-2154	33,407	82,149
Considerations of Ethical and Unethical Behavior on Trust in Human-Autonomy Teaming	12.RD	FA9550-20-1-0342 2	-	131,186
COVIA: Computer Vision based Intelligent Assistant for Mistake Proofing of Complex Maintenance Tasks on Navy Ships	12.RD	N00174-21-1-0010	-	12,033
Deeply Subwavelength All-Dielectric Nanophotonics in Silicon	12.RD	FA9550-19-1-0057	-	117,824
Development and Validation of New Technologies for TrueView	12.RD	N00014-20-1-2585	-	60,587
Development of Protocols to Quantify Abiotic Transformation Rates and Mechanisms for Chlorinated Ethenes in Water Supply Aquifers	12.RD	W912HQ-20-C-0038;CLIN 0001 PO# W74RDV00781560	-	181,291
Discriminatory Transcriptional Response of Environmental Microorganisms and Microbial Communities to Low-Dose Ionizing Radiation	12.RD	HDTRA1-17-1-0002	-	37,034
Embedding Bio-Sentinels in the Indoor Microbiome to Remediate Airborne Threats	12.RD	N66001-20-1-4047	-	73,774
Exploration of Carbon-Based Hybrid Nanoarchitectures as a Unique Platform for Managing Excited State Energies and Processes	12.RD	FA9550-16-1-0166	-	(2)
Extending the Reformulation-Linearization Technique to Continuous, Nonconvex Problem	12.RD	FA9550-19-1-0339	-	76,032
High Photon Density Spatiotemporal (OAM+SAM) Vector Beams for Maritime Environment	12.RD	N00014-20-1-2558	434,818	1,289,490
HOBBIT Control System Development for Higher Order Bessel Beams Integrated in Time (HOBBIT)	12.RD	N00014-17-1-2779	-	88,353
Hollow-core MWIR Optical Fibers	12.RD	W911NF-19-1-0409	-	49,569
Hybrid Integration for Beam Combining on Silicon Photonics Platform-Optoelectronics Program	12.RD	W911NF-18-1-0176	-	141,889
Identifying and Evaluating Impacts to Wetlands from the Savannah River Estuary	12.RD	W912HZ-19-2-0007	-	292,235
Incorporating Matrix Diffusion in the New Modflow Flow and Transport Model for Unstructured Grids	12.RD	W912HQ19C0018	199,411	376,349
Integrated Modal Control and Beam Combining of High Power Diode Arrays for the Next Generation HEL System	12.RD	N00014-17-1-2556	70,864	288,138
Investigating the Range of Response of Auroral Electron Precipitation in High Latitude Electrodynamics	12.RD	FA9550-19-1-0130	-	17,499
Learning agility for single and multiple swimming robots via bioinspired proprioception	12.RD	N00014-21-1-2367	-	12,401
Multilevel Hybrid Quantum-classical Algorithms for Combinatorial Optimization	12.RD	W911NF2020075	-	6,634
New Techniques for Network-Coded Multicast Distribution in Wireless Communications Networks	12.RD	N00014-17-1-2418	-	18,214
Non-Destructive Evaluation Precursor Mechanics of Embedded Magnetostrictive Composite Sensor	12.RD	W911NF-17-2-0184	-	54,103
PHOTOACOUSTIC INTERACTIONS USING HIGHER ORDER BESSEL BEAMS INTEGRATED IN TIME AND SPACE (HOBBITS)	12.RD	N00014-20-1-2037	-	104,257
Point-of-injury application of hydrogel embedded dexamethasone for severe traumatic brain injury	12.RD	W81XWH-20-C-0114	-	114,225
Power Scaling of Combinable Fiber Lasers to Beyond 5kW	12.RD	W911NF-17-1-0454	-	226,660
Predictive Structure-Function Relationships for Enzymes Immobilized on Complex Surfaces	12.RD	HDTRA1-16-1-0023	-	23,457

The accompanying notes are an integral part of this schedule

(continued)

Clemson University, Clemson, South Carolina
Schedule of Expenditures of Federal Awards
For the year ended June 30, 2021

Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
RESEARCH AND DEVELOPMENT CLUSTER, continued				
Department of Defense, continued				
Preventing Infection by Surface Modification of Orthopaedic Fracture Fixation Implants for Improved Limb Salvage Outcomes	12.RD	W81XWH-14-1-0438	-	1
Privacy Support for TLA	12.RD	W911QY-16-C-0105	-	15,803
Promoting Human Interpretation and Interaction to Mitigate Bias in Artificial Intelligence Assisted Decision Aids	12.RD	N00014-21-1-2336	-	5,318
Pulse-Based Clock Synchronization for Embedded AI	12.RD	W911NF-20-2-0054	-	46,229
Radiofrequency detection and control of cellular physiological process	12.RD	W911NF-21-1-0145	-	627
Reactive Membranes for Rapid Isotopic Analyses of Waterborne Special Nuclear Material	12.RD	HDTRA1-16-1-0016	-	179,727
Segregation Induced Grain Growth Anomalies in Nanocrystalline Alloys	12.RD	W911NF-20-2-0122	-	94,173
Spatiotemporal Testbed for High Photon Density Beams	12.RD	N00014-21-1-2257	-	7,259
Time for Robotics - Technology in Manufacturing Education for Robotics	12.RD	N00014-18-1-2882	12,163	667,443
TrueView Enhancements	12.RD	N6600118P0319	-	116
Pass-through programs from:				
Applied Research Associates, Inc.				
Military Working Dog Protective Suit	12.RD	D00122.010.0002	-	3,235
Arcadis, Inc.				
Thermal In-Situ Sustainable Remediation (TISRSM) To Enhance Biotic and Abiotic Reactions and Accelerate Remediation Timeframes	12.RD	D20-222/ 30027243.00001	-	57,824
Auburn University				
Migratory Behavior of Diadromous and Potamodromous Fish at a Rock Arch Rapids Structure in the Cape Fear River, North Carolina	12.RD	20-FAA-360863-Clemson	-	134,061
Brown University				
Fractional PDEs for Conservation Laws and Beyond: Theory, Numerics and Applications	12.RD	00001605	-	65,473
CFD Research Corporation				
Point of Care Blood Coagulopathy Monitor	12.RD	201905294	-	2,105
Cornerstone Research Group, Inc.				
Phase II SBIR, DHA17-005: Compression Garment with Embedded Electronics for Ambulatory Health and Performance Monitoring	12.RD	2018-1051	-	6,749
Signature Management Textiles	12.RD	PO # 2021-0525 / W911QY-21-C-0046	-	23,340
Georgia Institute of Technology				
Individual Differences in Executive Attention and its Value in Selection for Military Jobs	12.RD	AWD-000996-G1 / PO-5139885	-	28,048
GSI Environmental, Inc.				
Development of a Quantitative Framework for Evaluating Natural Attenuation of 1,1,1-TCA,1,1-DCA,1,1-DCE, and 1,4-Dioxane in Groundwater	12.RD	2017-111-CLEMS-01	-	17,931
Leidos, Inc.				
Personalized Protective Biosystem	12.RD	P010250791	-	50,668
Lynntech, Inc.				
Machine Learning for Simulation Environments	12.RD	NAV-818	-	41,865
Maher & Associates LLC				
THERMOFORMING OF COMPOSITES FOR ALUMINUM REPLACEMENT	12.RD	18-0130-0002	-	11,100
Massachusetts Institute of Technology				
Virtual Manufacturing Lab (VM-Lab): A Multimedia Design House for Digital Learning in Manufacturing-USA Workforce Education	12.RD	S4916 / PO# 388434	-	303,771
Medical University of South Carolina				
Connectome Biomarkers for Predicting Alzheimer's Risk in Traumatic Brain Injury	12.RD	A00-3895-S001/MUSC18-141-8D682	-	7,999
Naval Postgraduate School				
Gate Drive and Smart Control for Fast Light-Weight DC Solidstate Circuit Breaker	12.RD	N00244-21-2-0001	-	7,097
Palo Alto Research Center, Inc.				
Smart Configuration Optimizer Through Transformative Analytics (SCOTTY)	12.RD	P315899	-	211,927
Rhodium Scientific, LLC				
Establishing Protective Biomanufacturing Processes for Human Systems in Remote Environmentsium	12.RD	RHM-BLE1-0818	-	7,234
Rowan University				
Advancing Structural Materials for Army Modernization Priorities via Direct Write Approaches	12.RD	51291-4	-	145,392
Snake Creek Laser, LLC				
One Micrometer Integrated Transmitter for Balanced Radio-Frequency-Over- Fiber Photonic Links	12.RD	N6833520C0973B	-	23,783
Soar Technology, Inc.				
Mishap Awareness Scenarios and Training for Operational Readiness Responses	12.RD	SC-19-007	-	76,026
The Johns Hopkins University				
Understanding the Skin Microbiome through the Integration of Metagenomics, Bioinformatics, Spatial Ecology, and Synthetic Biology	12.RD	152174	-	184,761
University at Buffalo				
Computer Vision Based Intelligent Assistant for Mistake Proofing of Complex Maintenance Tasks on Navy Ships	12.RD	N001741910025 / PO# R1239105	-	96,625
University of California - Santa Barbara				
Highly-Perfect BaSnO3 Thin Films for Electronic Devices	12.RD	KK1905 / N00014-18-1-2704	-	5,495
University of Delaware				
Tailored University Feedstock for Forming (TuFF)	12.RD	42525	-	4,332
University of Illinois				
Internal Cooling of Fiber and Disc Lasers by Radiation Balancing and Other Optical or Phonon Processes	12.RD	084272-16069	-	127,565
University of Michigan				
ARC Phase V - An Architectural Framework for Virtual Prototyping of Next Generation Combat Vehicles	12.RD	SUBK00011909 / PO 3005719475	-	34,431
ARC Phase V- Boosting Military Vehicle Hybridization - Developing Modeling, Simulation and Control Tools for Optimal Energy Storage Devices Selection	12.RD	SUBK00011890 / PO 3005661363	121	3,117
Automotive Research Center Phase V - Cooperative Agreement: Trust-based Symbolic Motion and Task Planning for Multi-robot Bounding Overwatch	12.RD	SUBK00013068 / PO 3006000781	-	69,169
Improving Energy Efficiency and Mobility of Connected Fleets via Route Preview and Cooperative Control	12.RD	3003058759	-	(2,082)
VIPR-GS 1.1- Deep Reinforcement Learning Approach to CPS Vehicle Re-envisioning- ARC Phase V Cooperative Agreement	12.RD	SUBK00013773 / PO 3006125452	-	486,247
VIPR-GS 2.4- Integrated Transient Control and Thermal Management of Autonomous Off-Road Vehicle Propulsion Systems- ARC Phase V Cooperative Agreement	12.RD	SUBK00013774 / PO 3006125310	-	367,988

The accompanying notes are an integral part of this schedule

Clemson University, Clemson, South Carolina
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Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
RESEARCH AND DEVELOPMENT CLUSTER, continued				
Department of Defense, continued				
Pass-through programs from, continued:				
University of Michigan, continued				
VIPR-GS 2.5- Energy Management of Multi-Scale Vehicle Fleets- ARC Phase V Cooperative Agreement	12.RD	SUBK00013775 / PO 3006125656	-	366,085
VIPR-GS 3.1- Computational Representation and Analysis of Mission and System Requirements- ARC Phase V Cooperative Agreement	12.RD	SUBK00013776 / PO 3006125692	-	334,028
VIPR-GS 3.2- Model Interface Specification and Environment to Support Model Integration- ARC Phase V Cooperative Agreement	12.RD	SUBK00013777 / PO 3006125693	-	340,503
VIPR-GS 3.3- Best Practices for Computational Tradespace Exploration, Analysis and Decision-Making- ARC Phase V Cooperative Agreement	12.RD	SUBK00013778 / PO 3006126223	-	315,207
University of Texas at Arlington				
Distributed Autonomy, Resiliency, and Optimality in Naval Microgrids	12.RD	2017GC1264	-	10,945
Virginia Polytechnic Institute				
Chiral Spin Liquids and Other Topological Phases of Cold Atoms and Molecules in Optical Lattices	12.RD	450408-19244	-	37
William Marsh Rice University				
Next Generation Teams and Organizational Subsystems Research	12.RD	R1A604	-	107,966
Total Department of Defense			1,914,356	11,919,710
Department of Interior				
Community and Ecosystem-Level Effects of Growing v. Dormant Season Burning in the Southern Appalachians	15.RD	L16AC00192	-	24,338
Functional Morphology and Physiology of Shortleaf Pine Fire-Adapted Traits JFSP 19-1-01-42	15.RD	L20AC00013	-	7,253
Monitoring of Non Breeding Sea Ducks on the Great Lakes	15.RD	F21AC00222-00	7,718	9,068
Development of Long-Term Monitoring Plan for the Spruce-Fir Moss Spiders	15.RD	F21AC00349	-	4,999
Investigating Impediments to Recruitment of the Carolina Heelsplitter (Lasmingona decorata)	15.RD	F20AC11776	-	18,168
State Water Resources Research Institute Program	15.RD	G16AP00082	20,095	73,581
Natural and Anthropogenic Influences on Tidally Influenced Forested Wetlands of the Southeast U.S.	15.RD	G19AC00208	-	65,248
Growing Visitation and Enhancing Visitor Experiences at National Wildlife Refuges (NWRs) Through Better Estimation Techniques	15.RD	G19AC00438 (RWO #104)	363	39,414
Vessel-based Surveys for Pelagic Seabirds in the Gulf of Mexico	15.RD	G17AC00371 (RWO #102)	7,700	145,340
Spatial Ecology, Movement Patterns, and At-Sea Habitat use of Brown Pelicans in the South Atlantic Bight	15.RD	G16AC00395 (RWO #100)	-	162,239
Keeping History Above Water Charleston - A Workshop for Communities in Action	15.RD	P20AP00386	-	6,578
A study on Tree Health and Survival to Determine How Patterns of Tree Decline and Mortality Impact Accumulation of Forest Fuels.	15.RD	P19AC01063	-	6,173
CESU - A Study of Visitors Using the Trails and Rivers at Mammoth Cave National Park to Improve Visitor Access and Protect the Park's Resources	15.RD	P19AC01168	27,660	66,632
CESU - Collect Oral Histories Related to Establishment of Freedom Riders National Monument, Birmingham Civil Rights National Monument, Reconstruction Era National Historic Park	15.RD	P20AC01015	-	22,982
NPS Southeast Region Marine Science Support Center	15.RD	P15AC01833	-	3,084
Research to Evaluate Visitor Use Distributions, Impacts, Crowding, and Conflicting Use at Multi-Use Sites in Katmai National Park and Preserve	15.RD	P17AC01038	-	3,713
Pass-through programs from:				
Georgia Department of Natural Resources				
Conservation and Life History of the Northern Pine Snake Across North Georgia	15.RD	46200-605-200126 / PO # 152919	-	36,017
Gulf States Marine Fisheries Commission				
Identifying Drivers of Hybridization Between Endemic and Invasive Black Basses in Georgia	15.RD	FWS-800-037-2018-CU	-	5,088
Kansas State University				
Research to Evaluate Visitor Characteristics Across and Within Seasons at Joshua Tree National Park	15.RD	A00-0751-S001-A02 / S19037	-	25,295
National Fish & Wildlife Foundation				
Identifying Habitat Requirement of the Carolina Heelsplitter in Order to Inform Habitat Restoration and Species Recovery (NC,SC)	15.RD	1906.17.058597	10,115	13,465
North Carolina Wildlife Resources Commission				
Eastern Hellbender Reproductive and Larval Ecology				
Ecological Studies and Monitoring Strategies for Eastern Spotted Skunks in North Carolina	15.RD	WM-0326	-	411
South Carolina Department of Natural Resources	15.RD	WM-0322	-	49,120
Basin-wide Planning for Bartram's Redeye Bass in the Savannah River	15.RD	SCDNR FY2021-029 P24019497620	-	71,467
Effect of Forest Management on Early-Successional Avian Species in South Carolina	15.RD	SCDNR FY 2020-018 P24019486020	-	50,356
Environmental DNR Determination of the Distribution of the Patch-Nosed Salamander (Urspelerpes brucei) in South Carolina	15.RD	SCDNR FY 2020-019 P24019497520	-	23,480
Green Salamander Population Assessment and Connectivity Across a Gradient of Forest Disturbance	15.RD	SC-T-F18AF00973/SCDNR#P24044 06119	-	13,874
NABat Acoustic Monitoring in South Carolina	15.RD	P24014404619	-	23,715
Response of Bachman's Sparrow to Habitat Management in a Wiregrass-tree Ecosystem	15.RD	SCDNR FY 2020-017 P24019087119	-	23,242
Roosting and Foraging Ecology of Rare and Sensitive Coastal Bats	15.RD	SCDNR FY2017-019/P24014304618	-	1,252
Southeast Aquatic Resources Partnership				
Incorporating Fish Species Swimming Speed into Barrier Removal Prioritization - Swim	15.RD	none	-	36,010
The Nature Conservancy				
Reptile Surveys of The Talladega-Mountain Longleaf Pine Conservation Local Implementation Team (LIT) Boundary, Northwest Georgia	15.RD	GABU 02182020	-	9,937
Total Department of Interior			73,651	1,041,539

(continued)

Clemson University, Clemson, South Carolina
Schedule of Expenditures of Federal Awards
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Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
RESEARCH AND DEVELOPMENT CLUSTER, continued				
Department of Justice				
Effects of Campus Sexual Assault Prevention Programs on Attitudes and Behavior Among College Students: A Systematic				
Review and Meta-analysis	16.RD	2019-SI-AX-0004	-	129,551
GIS Application for Building a Nationally Representative Forensic Taphonomy Database	16.RD	2020-DQ-BX-0025	-	10,331
Pass-through programs from:				
Oconee County				
Oconee County (SC) Justice and Mental Health Planning & Implementation Initiative	16.RD	001/ 2020-MO-BX-0045	-	16,431
Wichita State University				
Assessment of Cognitive Performance-Based Training to Improve Police Decision-Making	16.RD	WSU# 21-00192	-	24,023
Total Department of Justice			-	180,336
Department of State				
Pass-through programs from:				
Internews				
Minecraft Pluggable Transport Improvement	19.RD	SGR-GX1968-FD-3	-	46,323
Total Department of State			-	46,323
Department of Transportation				
University Transportation Center - Center for Connected Multimodal Mobility (C2M2)	20.RD	69A3551747117	247,078	525,262
University Transportation Center - Center for Connected Multimodal Mobility (C2M2) - Ferrell	20.RD	69A3551747117	-	16,626
University Transportation Center - Center for Connected Multimodal Mobility (C2M2) - Jia	20.RD	69A3551747117	-	25,252
University Transportation Center - Center for Connected Multimodal Mobility (C2M2) - Li	20.RD	69A3551747117	-	62,715
University Transportation Center - Center for Connected Multimodal Mobility (C2M2) - Pisu	20.RD	69A3551747117	-	44,324
University Transportation Center - Center for Connected Multimodal Mobility (C2M2) - Sarasua	20.RD	69A3551747117	-	25,479
University Transportation Center - Center for Connected Multimodal Mobility (C2M2) (Pierluigi Pisu)	20.RD	69A3551747117	-	2,736
Pass-through programs from:				
Georgia Institute of Technology				
Flash Tracking Implementation Guidelines Complementing Existing Design Build Manual	20.RD	AWD-000182-S1 / PO 5067101	-	126,990
Louisiana State University				
Spatiotemporal Traffic Characteristics of Megaregion Mass Evacuations	20.RD	PO-0000105042	-	3,344
South Carolina Department of Transportation				
Adaptive Signal System Safety Impacts	20.RD	1936; SPR 737	19,405	47,399
Developing a DOT Specific UAS Simulator and a Flight Proficiency Exam	20.RD	SPR 1-21	-	12,304
Evaluating the Construction Cost and Schedule Impacts of SCDOT's Traffic Control Restrictions	20.RD	SPR 747	-	92,559
Evaluation of Open Graded Friction Courses: Construction, Maintenance, and Performance, Phase II	20.RD	1781; SPR 725	-	79,168
Impact of Utility Delays on Project Delivery	20.RD	SPR 756	22,973	75,229
Investigation and Assessment of Effective Patching Materials for Concrete Bridge Decks	20.RD	SPR 755	-	33,711
Optimization of Cement Modified Recycled Base (CMRB) Planning, Design and Testing	20.RD	SPR 754	-	111,771
SCDOT Scope of Services Template Research Proposal	20.RD	SPR 753	-	89,348
Strategic Deployment of Drone Technology and Software to Support SCDOT Operations	20.RD	SPR 3-20 P039407	-	33,114
Update to SCENARIO_PC	20.RD	2130; SPR 745	126,424	225,018
toXcel, LLC				
Vulnerable and Disabled Road Users: Considerations Inside and Outside the Vehicle	20.RD	2019-006	-	95,204
University of Michigan				
Predicting Driver Takeover Performance in Conditional Automation (Level 3) through Physiological Sensing	20.RD	SUBK00015064 / PO 3006413512	-	1,923
University of South Carolina				
Assessment of Structural Degradation for Bridges and Culverts	20.RD	18-3551 PO#2000037629/USC No.15520-FB55	-	(1,101)
Calibration of the AASTO Pavement Design Guide to South Carolina Conditions - Phase II	20.RD	17-3296/PO#2000031396/USC# 15520FB40	-	203,215
Safe and Cost-Effective Reduction of Load Postings for South Carolina Bridges	20.RD	20-4076 PO#2000053138 USC No. 10009980	-	69,011
Strengthening South Carolina's Bridges	20.RD	20-4050 PO#2000052727 USC No.10009919	-	81,262
Total Department of Transportation			415,880	2,081,863
National Aeronautics and Space Administration				
A New Efficient Galactic Accelerator	43.RD	80NSSC21K0020	-	25,711
An Investigation of Ion-Neutral Coupling During Active Auroral Conditions	43.RD	80NSSC19K0810	-	20,280
An Investigation of Ion-Neutral Coupling During Active Auroral Conditions	43.RD	80NSSC19K0810	-	81,780
An Investigation of Ion-Neutral Coupling During Active Auroral Conditions	43.RD	80NSSC19K0810	338,603	420,089
AZURE: Auroral Zone Upwelling Release Experiment	43.RD	NNX15AL71G	195	195
BL, LAC Objects at the Highest Redshifts	43.RD	80NSSC18K1619	-	17,441
Characterizing a Shock-Cloud Interaction on the Western Edge of the Vela Supernova Remnant	43.RD	80NSSC18K1716	-	3,725
Chasing the Most Powerful Blazars	43.RD	80NSSC20K0044	-	35,994
Chemical Evolution of the Building Blocks of the Solar System	43.RD	80NSSC20K0338	-	69,760
Compton Thick AGN with NUSTAR and XMM-Newton	43.RD	80NSSC21K0016	-	3,588
Compton-Thick AGN: The Final Quest	43.RD	80NSSC19K0531	-	162,279
Control and Modeling of Extensible Continuum Robots - NSTRF for Chase Frazelle	43.RD	80NSSC17K0173	-	44,084
Cosmology with Fermi-LAT	43.RD	80NSSC18K1720	-	6,659
CUSP Upwelling and Heating Due to Small Scale Electric Field Fluctuations	43.RD	80NSSC18K0781	26,867	67,397
Exploring the Causes of Water Vapor Variability in the Mesosphere, Derived Residual Mean Circulation and Implications for				
the Composition of the Thermosphere Using SABER and GOLD	43.RD	80NSSC20K1353	25,422	47,592

The accompanying notes are an integral part of this schedule

(continued)

Clemson University, Clemson, South Carolina
Schedule of Expenditures of Federal Awards
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Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
RESEARCH AND DEVELOPMENT CLUSTER, continued				
National Aeronautics and Space Administration, continued				
Heavily Obscured AGN: The Physics Behind the Obscuration	43.RD	80NSSC18K1637	-	25,148
Hunting High Redshift Blazars with Swift and SARA-CT/ORM	43.RD	80NSSC20K1495	-	22,177
Hunting High-Redshift BL Lacertae Objects	43.RD	80NSSC20K0221	-	58,377
Hunting High-Redshift BL Lacertae Objects	43.RD	80NSSC18K1717	-	11,785
Momentum Resolved Charge Exchange Cross Section Measurements and X-Ray Spectroscopy	43.RD	80NSSC19K0679	76,205	153,367
Response of the Mesosphere/lower Thermosphere/ionosphere to Tidal Variability Caused by the Madden-Julian Oscillation	43.RD	80NSSC19K0258	-	180,827
Single Source; Data Analysis for NASA LWS SET DIME Experiments	43.RD	80NSSC21K0179	-	59,460
Synthetic Biology for Recycling Human Waste into Nutraceuticals and Materials: Closing the Loop for Long-Term Space Travel	43.RD	NNX15AU46G	-	47,231
The Compton Thick AGN Legacy Project: A Complete Sample of NuSTAR-Observed Nearby Compton Thick AGN	43.RD	80NSSC20K0045	-	56,074
The First 5 Sigma Detection of Periodicities in Blazars	43.RD	80NSSC20K1562	-	43,052
The Guaranteed Contribution of Star-Forming Galaxies to the Neutrino and Gamma-Ray Backgrounds	43.RD	80NSSC18K1718	-	18,263
Towards to Full Identification of the 3FHL Catalog	43.RD	80NSSC19K0151	-	5,874
Towards to Full 3D Mapping of the > 10 GEV Extragalactic Sky: A Spectroscopic Follow-up Campaign of Unidentified 3FHL Sources	43.RD	80NSSC18K1719	-	24,575
Vortex - Vorticity Experiment	43.RD	80NSSC19K0776	-	34,086
VortEx - Vorticity Experiment	43.RD	80NSSC19K0776	21,294	51,425
Pass-through programs from:				
Center for the Advancement of Science				
Unlocking the Cotton Genome to Precision Genetics	43.RD	GA-2019-007	10,903	95,737
College of Charleston				
2018 SC Space Grant Consortium Graduate Research Assistantship	43.RD	521193-JD	-	1,019
Biotransformation of Space Mission Organic Waste and Martian Regolith into Nutraceuticals and Biocement	43.RD	521192-CMZheng	-	(83)
GRF: SC Space Grant Consortium Graduate Research Fellowship	43.RD	521383-GRF-CM001	-	12,481
Increased Impact-Resistance for Rigid-Flex PCB Robotics via Topology-Optimized, High-Performance Polymer Reinforcement	43.RD	521383-GRF-CM004	-	1,918
Kathryn D. Sullivan Earth & Marine Science Fellowship: The Influence of Butterflyfish and Coral Genome on the Progression and Transmission Success of Coral Disease	43.RD	521383-KS-CM001	-	6,792
MiniREAP 2016: A Novel "Full Spectrum" Absorbing Hybrid Active Layer for Improving the Efficiency of Thin-Film Solar Cells	43.RD	521179-RP-CMPilla	-	(23)
Mini-REAP: Simultaneous Production of Fuel and Oxygen through Developing Cu-based Cathode Catalytic Flow Cell Systems: An Atoms-to-Space Approach	43.RD	521179-RP-CM003	-	9,984
Modular Fault-tolerant Inverter for Electrified Aircraft Propulsion	43.RD	521340-CM001	3,807	17,393
Molecularly Informed Design of Nanosheet-Reinforced Polymer Nanocomposites for Wastewater Filtration Application	43.RD	521383-GRF-CM003	-	1,976
Nanomaterials-Based Hybrid Energy Storage Devices and Systems for Space Applications	43.RD	521296-Clemson	-	179,685
PA 2020: Characterization of Lunar Regolith Simulants and Their Feasibility for In Situ Resource Utilization	43.RD	521383-PA-CM003	-	21,242
PA 2020: Electrochemical Ammonia Stripping for Nitrogen Recovery from Yellow Water During Space Missions	43.RD	521383-PA-CM001	-	23,000
PA 2020: Student Participation in Developing Nanomaterials-Derived Technologies for Space Applications	43.RD	521383-PA-CM002	-	13,925
Palmetto Academy 2021: Investigating the Mechanism of Tool-Regolith Interaction for In Situ Characterization of Lunar Regolith	43.RD	521383-PA-CM004	-	6,173
Palmetto Academy 2021: Stabilization of Yellow Water Using Electro-synthesized Hydrogen Peroxide for Subsequent Nitrogen Recovery	43.RD	521383-PA-CM005	-	7,500
Palmetto Academy 2021: Student Participation in Developing Nanomaterials-Derived Technologies for Space Applications	43.RD	521383-PA-CM007	-	12,000
Palmetto Academy 2021: TERRA-BOTS: Tiny Elastic Reshaping Robotic Architectures -Built for Optimized, Task-specific Solutions	43.RD	521383-PA-CM006	-	15,000
Peroxide-Producing Microbial Fuel Cells for Space Life Support Systems Applications	43.RD	521365-CM	8,669	104,810
Rapid Laser: 3D Printing of Reversible Solid Oxide Electrochemical Cell Stacks for Producing Pure O2 from CO2 and Storing Electricity into Carbon	43.RD	521434-CM	-	56,457
REAP 2019: Development of an In Vitro Organoid Culture Model to Study the Effects of Microgravity and Space Radiation on the Intervertebral Disc	43.RD	521179-RP-CM001	-	662
REAP 2019: Next Generation PUFFER for Lunar Pit Exploration	43.RD	521179-RP-CM002	-	623
REAP 2020: Exploring the Potential of Anaerobic Osmotic Membrane Bioreactors for Regenerative Water Purification in Space	43.RD	521383-RP-CM001	-	12,313
REAP 2020: Rigid-Flex PCB Robots for Extreme Impact Resistance	43.RD	521383-RP-CM002	-	8,764
REAP 2021-22: Near-Earth Space Radiation Effects on Functional Ceramic Materials: A Combined Experimental-Monte Carlo Approach	43.RD	521383-RP-CM005	-	5,006
REAP 2021-22: Single-Atom-Alloy Based Electrocatalytic System for High-Yield Fuel Production and Oxygen Supply	43.RD	521383-RP-CM007	-	7,379
SC Space Grant Campus Director Administrative Budget	43.RD	521179-CD-CM	-	3,209
Space Grant Graduate Research Fellowship: Shape-Morphing Structures with Wind Energy for Passive Robotic Operations	43.RD	521193-CM001	-	13,780
STEM Outreach Award: Continuation of NASA Presence in FIRST and South Carolina	43.RD	521193-CM002	-	6,000
Undergraduate Student Research Award	43.RD	521383-UG-CM003	-	2,500
Validating Satellite Remote-Sensing of Aerosols with Ground-based Low-cost Sensors	43.RD	521383-GRF-CM005	-	1,427
Cornell University				
Waves and Instabilities from a Neutral Dynamo (WINDY)	43.RD	73921-10522	-	49,770
Embry-Riddle Aeronautical University				
Sporadic-E ElectroDynamics	43.RD	61559-2	-	43,313
HJ Science & Technology, Inc.				
Lab-on-a-Robot Platform for in-situ Planetary Compositional Analysis	43.RD	NNX13CP49C-2	-	(400)
Jet Propulsion Laboratory				
Advanced Stress Analysis of Mars 2020 Sample Tubes	43.RD	1641158	-	15,159
Chasing the Most Powerful Blazars	43.RD	RSA No. 1611075	-	1,111
Chasing the Most Powerful Blazars	43.RD	RSA No. 1612924	-	77
Smithsonian Astrophysical Observatory				
An Experimental Program to Achieve High Accuracy Atomic Rates for the X-ray Astrophysics Recovery Mission (XARM) and Beyond	43.RD	SV8-88008	-	57,256
COMPTON-THICK AGNS: THE HUNT CONTINUES	43.RD	GO0-21083X	-	5,631
Witnessing the Birth of a Blazar	43.RD	DD8-19104X	-	16,885
Witnessing the Birth of a Blazar with Chandra (Proposal No. 21700462)	43.RD	GO0-21106X	-	4,404
Touchstone Research Laboratory, Ltd.				
Precision Heated Tooling for OOA Curing of Thin Ply Composites	43.RD	80NSSC19C0531-1	-	460
Precision Heated Tooling for OOA Curing of Thin-Ply Composites	43.RD	80NSSC21C0021-1	-	36,547

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Clemson University, Clemson, South Carolina
Schedule of Expenditures of Federal Awards
For the year ended June 30, 2021

Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
RESEARCH AND DEVELOPMENT CLUSTER, continued				
National Aeronautics and Space Administration, continued				
Pass-through programs from, continued:				
University of Alaska - Fairbanks			-	-
In-Situ Measurements of Neutral and Plasma Dynamics Associated with Earth's Cusp-Region Thermospheric Mass Density Anomaly	43.RD	UAF 18-0025 PO518692	-	41,522
KiNET-X: Kinetic-Scale Energy and Momentum Transport Experiment	43.RD	UAF 19-0008 / P0528927	-	165,603
University of Georgia				
Project FUSION: Facilitating Unified Systems of Interdependent Organizational Networks	43.RD	SUB00001668	-	52,731
University of New Hampshire				
TOMEX Plus: Turbulent Oxygen Mixing Experiment Plus	43.RD	L0058	-	21,198
University of the District of Columbia				
NASA MIRO: Center for Advanced Manufacturing in Space Technology & Applied Research at UDC (CAM-STAR)	43.RD	SUB-0012020 / P2100289	-	23,056
Total National Aeronautics and Space Administration			511,965	2,981,267
Institute of Museum & Library Services				
Pass-through programs from:				
Humanities Council - South Carolina				
The Cooper River Canoe Project	45.RD	21-2035-3	-	2,000
The Teagle Foundation				
Creating a Humanities-Based Core Text Stream within the General Education Curriculum at Clemson University	45.RD	2005349	-	24,000
Total Institute of Museum & Library Services			-	26,000
National Science Foundation				
A Screened Lab Addition to Enhance New Ecological Research at Clemson's Baruch Institute	47.RD	1624705	-	(2,581)
A Sustainable ATE Coordination Network for Enhancing Personalized Learning Using Virtual and Augmented Reality- based Technology Innovations in Technical Education	47.RD	1700621	-	248,563
ABI Innovation: Fast Algorithms and Tools for Single-Molecule Sequencing Reads	47.RD	1759856	-	120,718
ABR: Collaborative research: Smart earpiece for supporting healthy eating behaviors	47.RD	1835974	-	117,529
ADVANCE Institutional Transformation at Clemson University	47.RD	1629934	-	521,157
Advanced Cyberinfrastructure - Research and Educational Facilitation: Campus-Based Computational Research Support	47.RD	1341935	-	(802)
AIR Option 2: Research Alliance Situational Intelligence for Smart Grid Optimization and Intelligent Control	47.RD	1312260	-	66,418
AIR-TT: Ultrapure Lignins Recovered from Paper-Mill Black Liquors as Renewable Biopolymers	47.RD	1701128	-	69,452
Algorithm Development and Analysis for Non-Newtonian Fluids Interacting with Elastic and Poroelastic Structures	47.RD	1818842	-	51,081
An Adaptive Partition- based Computational Framework for Stochastic Programs	47.RD	1854960	-	36,951
Broadband microwave flow cytometry: comprehensive nanopartical sensing and characterization	47.RD	1711463	-	80,544
Capillary Channeled Polymer Structures and Chemistries for High Throughput Measurement of Large Molecules	47.RD	1608663	-	739
CAREER: Cross-Layer Power-Bounded High Performance Computing on Emerging and Future Heterogeneous Computer Clusters	47.RD	1551511	-	147,476
CAREER: Characterizing Nanoparticle Surface Interactions using Dissolution Dynamic Nuclear Polarization-Enhanced Nuclear Magnetic Resonance	47.RD	1751529	-	71,085
CAREER: Cooperative Control and Decision-Making for Human-Agent Collaborative Teams	47.RD	1454139	-	117,925
CAREER: Deep Learning Empowered Nonlinear Deformable Model	47.RD	2011471	-	4,929
CAREER: Detecting Patterned Profiles for Functional and Dysfunctional Teamwork	47.RD	1654054	-	66,023
CAREER: Diagnosing the Undiagnosable: Using Enzyme Upregulation to Probe Cellular Behavior in Neuropathic Lysosomal Storage Disease	47.RD	2047697	-	5,121
CAREER: Dynamic Management of Compressed Arrays for High-Performance Computing Applications	47.RD	1943114	-	23,870
CAREER: Elastocapillary fluid mechanics: spreading, splashing, and instability	47.RD	1750208	-	74,754
CAREER: Elucidating Fundamental Structure-Property Relationships in Ionomer Nanocomposites for Redox Flow Batteries	47.RD	1848347	-	95,142
CAREER: Empowering Students to be Adaptive Decision-makers	47.RD	1745347	-	89,008
CAREER: Enabling Low-Cost, Maintenance-Free, Long-Term Embedded Sensing Without Batteries	47.RD	1453607	-	73,642
CAREER: Hierarchical Modeling for Rational Catalyst Design in Aqueous Conditions	47.RD	1554385	-	83,696
CAREER: Human Inspired Multirobot Navigation	47.RD	2047632	-	28,873
CAREER: Hybrid Experimental-Computational Modeling Framework for Transformative Research and Multidisciplinary Education in Cardiovascular Biomechanics	47.RD	1749017	-	138,808
CAREER: Innovative Methods for Designing Adaptive Clinical Trials	47.RD	1651912	-	46,351
CAREER: Integrated Studies of Polar Wave and Magnetosphere-Ionosphere-Thermosphere Couplings from New Observations and Whole Atmosphere Modeling	47.RD	1753214	-	106,421
CAREER: Large Scale Simulations Enabled Materials Engineering for Heterogeneous Ice Nucleation	47.RD	1653352	-	5,434
CAREER: Leveraging the Three- Dimensional Multi-Stability from Origami Folding to Synthesize Multi-Functional Material Systems	47.RD	1751449	-	137,381
CAREER: Modeling, Measuring and Controlling Human Comfort in Human-Autonomous-Machine Interaction (HaMI)	47.RD	1845779	-	83,716
CAREER: Multi-chrome metasurfaces for dynamic structural color and naked eye diagnostics	47.RD	2047015	-	4,787
CAREER: Multifunctional Peptide Nanocarriers for Delivery of Nucleic Acid Therapeutics	47.RD	2046694	-	16,505
CAREER: Multiscale Study of the Structure and Dynamics of Nanoparticle-Protein Coronae	47.RD	1553945	-	83,019
CAREER: Multiscale Surface Structuring by Ultrafast Lasers for Multifunctional Glass Surfaces	47.RD	2047000	-	5,910
CAREER: Perceptually Guided Hand Motion Synthesis	47.RD	1652210	-	46,911
CAREER: Phenotypic and developmental effects of enhancer variation on cichlid craniofacial evolution	47.RD	1942178	-	108,518
CAREER: Protecting Deep Learning Systems against Hardware-Oriented Vulnerabilities	47.RD	2047384	-	27,084
CAREER: Quantifying drought and vulnerability indicators for water security in a changing environment	47.RD	1653841	-	83,476
CAREER: Quantifying the Adaptability of Building Structures, Envelopes, and Foundations	47.RD	1553565	-	78,879
CAREER: Self-Protecting Artificial Implants and Invigorating the STEM Education Pipeline with Biomaterials	47.RD	1555224	-	24,758
CAREER: Structural dynamics of post-translationally modified Calmodulin and its role in target recognition	47.RD	1749778	-	152,559
CAREER: Towards Elastic Security with Safe and Efficient Network Security Function Virtualization	47.RD	1846291	-	498
Career: Towards Engineering Electronic Defects in Inorganic Luminescent Materials	47.RD	1653016	-	78,204
CAREER: Multiscale Simulations of Nanofluid Assembly for Smart Materials Design	47.RD	1944942	-	29,951
CAREER: Exploring the Unknowns: Responses of Soil Microbial Communities to Increased Plant Functional Trait Diversity in Managed Ecosystems	47.RD	1941714	-	87,692

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Clemson University, Clemson, South Carolina
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Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
RESEARCH AND DEVELOPMENT CLUSTER, continued				
National Science Foundation, continued				
CC* Cyber Team: Cyberinfrastructure Empowerment for Diverse Research, Scholarship, and Workforce Development (CI Empower)	47.RD	1659297	-	(30,552)
CC*Data: National Cyberinfrastructure for Scientific Data Analysis at Scale (SciDAS)	47.RD	1659300	360,058	486,277
CCF: EAGER: DeepGreen: Modeling and Boosting Accelerated Computing on Liquid Immersion Cooled HPC Systems	47.RD	1942182	-	31,902
CCRI: MEDIUM: Collaborative Research: F1/10 RACECAR: Community Platforms for Safe, Secure and Coordinated Autonomy	47.RD	1925500	-	100,988
Center for Aviation and Automotive Technological Education Using Virtual E-School [CA2VES]: A Resource to Meet Technician Workforce Needs	47.RD	1501695	-	(31,221)
Certification Algorithms for Polynomial System Solving	47.RD	1913119	-	16,483
CHS: Small: Looking Across the Uncanny Valley: Procedural and Data-Driven Methods for Gaze Modeling	47.RD	1423189	-	46,102
CHS: Medium: Collaborative Research: Augmenting Human Cognition with Collaborative Robots	47.RD	1900956	-	6,977
CHS: Small: Developing and Validating a Physically Accurate Light-Scattering Model for the Rendering of Bird and Other Dinosaur Feathers	47.RD	2007974	-	21,181
CHS: Small: Investigating the Behavioral Effects of Longitudinal Exposure to Immersive Consumer Virtual Reality	47.RD	1717937	-	127,902
CHS: Small: Investigating the Characteristics of User Representations and Long-Term Experiences in Personal Space Depth Perception in Virtual Reality	47.RD	2007435	-	60,857
CHS: Small: Towards Next-Generation Large-Scale Nonlinear Deformable Simulation	47.RD	2016414	-	25,674
CICI: Data Provenance: Collaborative Research: Provenance Assurance Using Currency Primitives	47.RD	1547164	-	(5,454)
CICI: RSARC: Secure Time for Cyberinfrastructure Security	47.RD	1738902	-	34,987
CNH-L: Coupled Social and Ecological Consequences of Conservation Easements	47.RD	1518455	-	45,427
Collaborative Proposal: Response of mercury cycling to disturbance and restoration of low-gradient forested watersheds	47.RD	1852020	-	20,688
Collaborative Research: Jicamarca Radar Studies of Gravity Waves from D Region to Lower F Region	47.RD	1143514	-	(14)
Collaborative Research: A Regularized Poisson Boltzmann Model for Fast Computation of the Ensemble Average Polar Solvation Energy	47.RD	1812597	-	45,694
Collaborative Research: Advancing Theoretical Understanding of Accelerated Nonlinear Solvers, with Applications to Fluids	47.RD	2011490	-	42,563
Collaborative Research: An Intelligent Restoration System for a Self-healing Smart Grid (IRS-SG)	47.RD	1408141	-	(505)
Collaborative Research: Bound-Bound and Bound-Free Opacities of Heavy Lowly-Charged r-Process Ions	47.RD	1815932	-	71,293
Collaborative Research: Branching in RNA Secondary Structures	47.RD	1815832	-	44,340
Collaborative Research: CEDAR - Along-Term Investigation of Auroral and Tidal Forcing of E-Region Thermospheric Winds at High Latitudes	47.RD	1853408	-	76,107
Collaborative Research: CEDAR--Experimental and Theoretical Investigation of Midlatitude Ionospheric Instability	47.RD	2012994	-	28,346
Collaborative Research: CICI: Secure and Resilient Architecture: SciGuard: Building a Security Architecture for Science DMZ Based on SDN and NFV Technologies	47.RD	1642143	-	59,772
Collaborative Research: Combining Operando Spectroscopy and Multi-Scale Modeling to Elucidate the Mechanism of Aqueous Phase Reforming of Oxygenates	47.RD	1764296	-	54,369
Collaborative Research: Controlling Cellular Physiology and Enzyme Localization for an Enhanced Oleochemical Biosynthesis in Yeast	47.RD	1706134	-	31,639
Collaborative Research: Creativity in Teams : Identifying the Role of Meetings in Fostering Effective Cognitive and Social Processes in Teams	47.RD	1951298	-	16,084
Collaborative Research: CRISP Type 2: Coordinated, Behaviorally-Aware Recovery for Transportation and Power Disruptions (CBAR-tpd)	47.RD	1822436	177,640	223,987
Collaborative Research: CSSI Frameworks/Software: Future proofing the finite element library deal.II - development and community building	47.RD	2015848	-	105,529
Collaborative Research: Deconvolving the southern South American Pleistocene-Holocene dust production pathways	47.RD	1911340	-	5,538
Collaborative Research: Development and Application of a Framework for Integrated Geodynamic Earth Models	47.RD	1925575	-	10,266
Collaborative Research: Dimensions US-BIOTAQ-Sao Paulo: Scales of Biodiversity-Integrated Studies of Snake Venom Evolution and Function Across Multiple Levels of Diversity	47.RD	1822417	-	60,082
Collaborative Research: Dynamic Data Analytics for the Power Grid via Koopman and Perron-Frobenius Operators	47.RD	2031573	-	4,558
Collaborative Research: Efficient Coupling of Multilevel Partial Differential Equation Solvers and Advanced Sampling Methods	47.RD	2028346	-	19,602
Collaborative Research: Efficient Learning of Process-Structure-Property Models in Value-Driven Materials Design	47.RD	1761136	-	114,822
Collaborative Research: Elements: SciMem: Enabling High Performance Multi-Scale Simulation on Big Memory Platforms	47.RD	2103967	-	5,652
Collaborative Research: Elucidating the chemical plasticity of fine roots in response to soil heterogeneities and developing a better parameter to forecast fine root decomposition	47.RD	1754679	-	148,073
Collaborative Research: Emergency Response in the Arctic (ERA): Investments for Global Capabilities and Local Benefits (Transfer from RPI)	47.RD	2106726	-	47,346
Collaborative Research: Feasibility and Fundamentals of Femtosecond-Laser Shock Peening Without Protective Coating in Air Environment	47.RD	1762581	-	90,714
Collaborative Research: High Resolution Spectroscopy and Spectro-Astrometry of Warm Gas in Herbig Ae/Be Stars: A Search for Forming Gas Giant Planets	47.RD	1517014		
Collaborative Research: Improved Geochronology-Based Sediment Provenance Analysis Through Physico-Mechanical Characterization of Zircon Transport	47.RD	1946496	-	9,271
Collaborative Research: Litter Arthropods of High Appalachia	47.RD	1916263	-	129,192
Collaborative Research: Microbicidal Carbon Dots for Combating Anti-Biotic Resistance and Beyond	47.RD	1701424	-	55,182
Collaborative Research: MRA: Scale, Space, and Time: A Unifying Approach to Aquatic Invasions	47.RD	2017795	-	8,901
Collaborative Research: Network Cluster: Bedrock controls on the deep critical zone, landscapes, and ecosystems	47.RD	2012227	-	12,412
Collaborative Research: Non-Ideal Majorana Fermions: A Practical Approach to Topological Quantum Computation	47.RD	2014154	-	36,075
Collaborative Research: Novel Laser and Nonlinear Properties of Anderson Localization Optical Fibers	47.RD	1808232	-	62,464
Collaborative Research: REU Site: Resilience and Adaptation to Coastal Change Across Virtual Communities (C2-Virtual-C)	47.RD	2041427	-	10,328
Collaborative Research: Student Pathways in Engineering and Computing for Transfer Success	47.RD	1834081	-	274,009
Collaborative Research: Student Perspectives on Researcher Identity and Transformed Epistemologies (SPRITE)	47.RD	1531607	-	3,825
Collaborative Research: Tessellated Structural Architectural Systems for Rapid Construction, Repair, and Disassembly	47.RD	1762899	-	66,082
Collaborative Research: Understanding the Multiscale Behavior of Triboelectric Devices	47.RD	1662587	-	35,913
Collaborative Research: What Do Leaders Want?: Collecting and Coding Issue Positions and Demands in the Militarized Interstate Dispute (MID) Data, 1816¿2010	47.RD	1729138	-	7,149
Collaborative Research: Who's Not at the Table? Building Research Capacity for Underserved Communities in Engineering	47.RD	1551605	-	16,501
COVID-19 - Collaborative Research: RAPID: Compounding Human and Natural Disasters: Implication on agriculture sectors	47.RD	2030362	-	17,657
Comparative Biomechanics of Hawk Moths with Minute to Giant Proboscises and Diverse Feeding Habits	47.RD	2042937	-	4,416
Computational-Experimental Insight across Time and Length Scales of Dynamics in Ionic Polymers	47.RD	1611136	-	2,256
CPS: Synergy: Collaborative Research: Semi-Automated Emergency Response System	47.RD	1812524	35,408	115,651
CPS: Synergy: Security of Distributed Cyber-Physical Systems with Connected Vehicle Applications	47.RD	1544910	-	(343)
CRII: CHS: Redesigning Democratized Technology: The Broadening of Citizen Participation in Bottom-Up Technological Innovation	47.RD	1849718	-	52,306
CRII: CHS: Understanding and Supporting the Use of Self-Driving Vehicles by Persons with Visual Disabilities	47.RD	1849924	-	39,459

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Clemson University, Clemson, South Carolina
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RESEARCH AND DEVELOPMENT CLUSTER, continued				
National Science Foundation, continued				
CRII: CPS: Bilateral Adaptation Between Models for Human-Perceived Safety/ Comfort and Autonomous Driving Controllers	47.RD	1755771	-	89,709
CRISP Type 1: Data-driven Real-time Simulation for Adaptive Control of Interdependent Infrastructure Systems	47.RD	1638321	-	28,934
CS For All: RPP: A Scalable RPP for Preparing and Supporting Teachers to Teach Culturally Responsive and Rigorous CS Courses in SC High Schools	47.RD	1738760	-	177,765
CSR: Large: Collaborative Research: Smart Earpiece for Supporting Healthy Eating Behaviors	47.RD	1565268	-	23,133
Dimensions: Collaborative Research: Functional Diversity of Chemosymbiosis in Lucinid Bivalves from Coastal Biomes	47.RD	1342763	-	(248)
Disentangling the Ecological Drivers of Teleost Body Form Diversity	47.RD	1830127	-	749
D-ISN: TRACK 1: Modeling Effective Network Disruptions for Human Trafficking	47.RD	2039584	23,390	51,804
DMREF: Collaborative Research: An Integrated Multiscale Modeling And Experimental Approach To Design Fouling-Resistant Membranes	47.RD	1534304	-	153,444
Dynamic Wetting Effects in the Spectrum of the Sessile Drop: Organizing Principles from the Symmetry-breaking Perspective	47.RD	1935590	-	60,979
EAGER CHS: Examining Self-Harm and Suicide Contagion Risks of Viral Social Media Challenges on Youth and Young Adults	47.RD	1832904	-	5,308
EAGER: Autonomous Self-Healing of Commodity Acrylic Copolymers	47.RD	1744306	-	1,330
EAGER: Collaborative Research: Building a Community of Mentors in Engineering Education Research Through Peer Review Training	47.RD	2037807	-	27,354
EAGER: Malicious Behavior Detection in Hybrid Dynamic Spectrum Access	47.RD	1947065	-	28,651
EAGER: SaTC-EDU: Mathematically-grounded metaphors to teach AI-related cybersecurity	47.RD	2039616	-	63,966
EAGER: SSDIM: Multiscale Methods for Generating Infrastructure Networks	47.RD	1745300	-	12,942
EAGER: Towards a Traffic Analysis Resistant Internet Architecture	47.RD	1643020	-	38,410
EAGER-QAC-QSA: Quantum Algorithms for Correlated Electron Phonon System	47.RD	2038011	-	16,162
EAGERSitS: Quantifying the Value of Information for Sensor Placements to Improve Soil Signals for Agricultural Water Management	47.RD	1841629	-	56,356
Embodied Sensing and Control in Fish-like Swimming Robots via Passive Degrees of Freedom	47.RD	2021612	-	56,589
Encrypted Control for Privacy Preserving and Securing Cyber-physical Systems	47.RD	1912702	-	26,915
Explaining Choice, Persistence, and Attrition of Black Students in Electrical, Computer, and Mechanical Engineering	47.RD	1734347	59,500	92,965
Exploiting Multi-Stability to Enable Mechanical Intelligence for Versatile and Efficient Control of Soft Robotic Locomotion and Manipulation	47.RD	1933124	-	56,116
Exploring Non-Normative Forms of Capital, Wealth and Knowledge Used by Engineering Students	47.RD	1463808	-	5,539
COVID-19 - Exploring the Strategies Used by Two-year Colleges to Support Academic Continuity in STEM Education During the COVID-19 Crisis	47.RD	2037809	-	36,000
Exploring the Strategies Used by Two-year Colleges to Support Academic Continuity in STEM Education During the COVID-19 Crisis	47.RD	2037809	-	13,613
Fabrication of High Performance Metasurfaces by Nanoimprinting of Refractive Index	47.RD	1825787	-	123,485
FMSG: Internet of People and Things ¿ Bridging manual to semiautomated processes through Cybermanufacturing Collaborative Intelligence	47.RD	2036873	-	41,903
Fundamental Study of Nonlinear Electrokinetic Phenomena in Insulator-based Dielectrophoretic Microdevices	47.RD	1704379	-	76,890
FW-HTF-P: Wearable Adaptive Cognitive Assistance to Auditory Situational Awareness for Workers Exposed to Complex and Dynamic Noises	47.RD	1928550	-	42,274
FW-HTF-RL: Preparing the Future Workforce for the Era of Automated Vehicles	47.RD	2041215	149,071	398,387
FW-HTF-RM: Collaborative Research: Future of Construction Work at the Human-Technology Frontier	47.RD	1928527	-	117,247
GP-EXTRA: Building An Affective Pathway To The Geosciences Through Experiential Learning Opportunities For Non-Geoscience Majors	47.RD	1540702	-	10,204
Graduate Research Fellowship - Pitz	47.RD	1744593	-	100,760
GRFP - Adam Haberski	47.RD	1744593	-	50,737
GRFP - Deyrel Diaz	47.RD	1744593	-	15,690
GRFP - Haley Hostetter	47.RD	1744593	-	50,120
GRFP - Kelli McCourt	47.RD	1744593	-	48,797
GRFP - Sarah Donaher	47.RD	1744593	-	49,864
Guest-Induced Electrical Conductivity and Photovoltaic Activity of Metal-Organic Frameworks	47.RD	1809092	-	44,579
High Throughput Purification and Quantification of Bionanoparticles on Capillary-Channeled Fiber Stationary Phases	47.RD	2107882	-	9,843
Hydrothermal Brines: New Media for the Synthesis and Crystal Growth of Materials	47.RD	1808371	-	148,035
I Am a Scientist: Moving African American youth beyond participating in STEM activities to committing to a STEM identity	47.RD	1906708	-	51,500
I-Corps: Integrated Strain Sensor for Dynamic Hip Screws	47.RD	1933649	-	14,020
II NEW: Infrastructure to Support Research in Network-Aware Data-Intensive Computing	47.RD	1405767	-	8,183
Inclusive Data Science Education for Rural Elementary Students: A Research Practice Partnership for Agile Learning	47.RD	2031175	7,514	56,151
Information-Based Complexity Analysis for Large-Scale Nonlinear Optimization	47.RD	1913006	-	70,273
Instrument Development: Ultra-Sensitive, Single-Pass Electron Paramagnetic Resonance Spectrometers	47.RD	1152892	-	(6,227)
Interaction of Tool Wear and the Machining Affected Zone in Nickel-Based Superalloys	47.RD	1760809	-	165,217
Investigating Functional Peptides for Asymmetric Hypervalent Iodine Catalysis	47.RD	1664920	-	59,324
IRES: Track 1: Self-Healable Materials Development	47.RD	1952528	-	7,309
IUI Track-2 FEC: The Creation of Next-Generation Tools for Neuroscience-Noninvasive Radioluminescence Approaches to Optogenetics	47.RD	1632881	522,429	963,040
IUSE/ PFE: RED: Clemson University: Learning Teams and Innovation Ventures for Adaptable Training in Engineering (CULTIVATE)	47.RD	1730576	-	263,704
Large Scale Networking (LSN) Workshop on Operationalizing SDN	47.RD	1747856	-	(1,715)
MCA-PGR: Spatial and Temporal Resolution of mRNA Profiles During Early Nodule Development	47.RD	1444461	-	82,177
Metal Coordination and DNA Interactions Control Sulfur and Selenium Antioxidant Mechanisms	47.RD	1807709	-	60,571
Methods Development for Systematic Investigation of Factors Driving Outcomes in Informal STEM Environmental Education Programs	47.RD	1612416	-	(314)
Methods for improved size resolution for particle impactors	47.RD	1804304	-	67,042
Modeling and measuring critical data literacies in informal learning environments	47.RD	2024965	-	7,373
Modifying the floral microenvironment: elevational divergence in floral thermoregulatory mechanisms	47.RD	2015459	-	67,350
MRI: Acquisition of a Cyberinstrument for AI-Enabled Computational Science & Engineering	47.RD	2018069	-	315,574
MRI: Development of Enodia: A Highly Reconfigurable, HPC- Backed Instrument Enabling Multifaceted Interactive Visualization	47.RD	1828611	6,104	66,755
MTM2: Drivers of functional redundancy across microbiomes	47.RD	2025541	-	80,841
Multi-Point Monin-Obukhov Similarity and Spectral Dynamics in the Convective Atmospheric Surface Layer	47.RD	1561190	-	88,034
New Preconditioned Solvers for Large and Complex Eigenvalue Problems	47.RD	1819097	-	69,127
Novel Graphene-based Label-free Biosensor Array for Smart Health and Drug Discovery	47.RD	1606882	-	6,452
Novel microcantilever sensor using plasminically enhanced nonlinearity	47.RD	1809891	-	85,435
NRI: FND: 3D Concrete Printing with Macro-Micro Robots	47.RD	1924721	-	134,496
NRI:FND:COLLAB: Drones and the Design of Public Outdoor Spaces	47.RD	1734247	-	67,532

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Clemson University, Clemson, South Carolina
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Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
RESEARCH AND DEVELOPMENT CLUSTER, continued				
National Science Foundation, continued				
NRT: Technology-Human Integrated Knowledge Education and Research (THINKER)	47.RD	1829008	-	420,105
NRT-DESE: Preparing Resilient and Operationally Adaptive Communities through an Interdisciplinary, Venture-based Education (PROACTIVE)	47.RD	1633608	-	639,140
NSF Graduate Fellowship - Katerina Zapfe	47.RD	1744593	-	49,434
NSF Graduate Fellowship - Stephanie Damas	47.RD	1744593	-	48,588
NSF Graduate Fellowship - Tyler Grimm	47.RD	1744593	-	54,569
NSF Graduate Research Fellowship Program	47.RD	1744593	-	51,647
NSF INCLUDES DDLP Statewide Consortium: Supporting Underrepresented Populations in Precalculus by Organizational Redesign toward Engineering Diversity	47.RD	1744497	-	50,341
Overcoming Impediments to Computer Science Students' Understanding of Code: Scaling Up Automated Methods and Broadening Participation	47.RD	1914667	-	91,805
PFI:AIR - TT: Novel Low-Power III-Nitride Heater Cantilever Based Selective VOC Sensor	47.RD	1602006	-	12,633
Phase I I/UCRC Clemson University Site: Advanced Mammalian Biomanufacturing Innovation Center (AMBIC)	47.RD	1624641	27,580	163,558
PHASE II IUCRC Clemson University: Center for Robots and Sensors for Human Well-Being	47.RD	1939058	-	27,227
Planning Grant: Engineering Research Center for Computer And Network Resiliency and Security for Transportation (CAN-RESIST)	47.RD	1937000	-	41,404
Planning Grant: Engineering Research Center for Exploring Human-Machine Integrated Systems in Digitally Intensive Manufacturing Environments (HMIS-DIME)	47.RD	1936998	-	38,594
Production and Exploration of Rydberg Highly Charged Ions	47.RD	1806494	-	65,001
Quantifying dense gas dispersion in urban areas	47.RD	1703548	-	77,532
COVID-19 - RAPID: Aptamer-Linked Nano-Plasmon Sensor for Rapid Detection of SARS-CoV-2	47.RD	2030828	40,387	112,372
RAPID: Critical Assessment of Drainage Infrastructure Performance in a Sustained Flooding Event: The Case of Hurricane Florence	47.RD	1855588	-	13,872
COVID-19 - RAPID: Cyber-Hostility and COVID-19	47.RD	2031002	-	109,044
RAPID: Reconstruction of Hurricane Florence Flood Hydrographs (HF2Hs) for South Carolina's Critical Infrastructures Using Data Analytics Algorithms and In-situ Field Measurements	47.RD	2035685	-	83,770
RAPID: Revisiting the compounding storm surge and extreme precipitation events on coastal flooding during hurricane Florence using field data	47.RD	1855374	-	29,932
RCN: Advancing Research and Education Through a National Network of Campus Research Computing Infrastructures - The CaRC Consortium	47.RD	1620695	13,848	57,222
Research: Developing Engineering Experiences and Pathways (D.E.E.P) in Engineering Technology Career Formation	47.RD	1825126	8,900	66,009
REU Site at Clemson, IMPRESS (IMPlanting the ResEarch Seed in Students)	47.RD	2050042	-	69,324
REU Site: Nature's machinery through the prism of Physics, Biology, Chemistry and Engineering	47.RD	1757658	-	105,641
REU Site: Research Experience for Undergraduates in Advanced Material Sciences	47.RD	1950557	-	87,325
REU Site: Solid-State Devices for Electronics, Photonics, and Magnetics Technology	47.RD	1560070	-	28,211
REU Site: Summer Undergraduate Research Program at Clemson University	47.RD	1560300	-	19,200
Reversible Anion and Ion-Pair Recognition under Electronic Control	47.RD	1660329	-	8,930
RI: Small Dynamic Payload Transport and Manipulation by Teams of Cooperating Mobile Robotic-Cranes	47.RD	1710898	-	(52)
RI: Small: Collaborative Research: A Modular Approach to Robot Systems Incorporating Compliant and Soft Elements	47.RD	1718075	-	99,497
RI: Small: Vine-Like Continuum Robots	47.RD	1527165	-	(6,657)
RII Track-2 FEC: Advanced Biomanufacturing: Catalyzing Improved Host Development and High Quality Medicines through Genome to Phenome Predictions	47.RD	1736123	-	69,938
RII Track-2 FEC: Advanced Biomanufacturing: Catalyzing Improved Host Development and High Quality Medicines through Genome to Phenome Predictions	47.RD	1736123	497,480	935,368
RII Track-4: Event Based Approach to Model Indoor Airflow Patterns	47.RD	1832971	-	30,194
RII Track-4: Exploring Ferromagnetism in Two-Dimensional Van Der Waals Materials	47.RD	1929138	-	58,326
RTG: Coding Theory, Cryptography, and Number Theory	47.RD	1547399	-	331,576
SaTC: CORE: Medium: Collaborative: Cryptographic Provenance for Digital Publishing	47.RD	1940679	-	79,949
SaTC: EDU: Collaborative: Enhancing Security Education through Transiting Research on Security in Emerging Network Technologies	47.RD	1723663	-	652
SCH: INT: Collaborative Research: An intelligent Pervasive Augmented reaLity therapy (iPAL) for Opioid Use Disorder and Recovery	47.RD	2019389	2,393	3,016
SCH: INT: Collaborative Research: Crowd in Action: Human-Centric Privacy-preserving Multi-scale Data Analytics for Environmental Public Health	47.RD	1949640	-	66,007
SDI-CSCS: Collaborative Research: S2OS: Enabling Infrastructure-Wide Programmable Security with SDI	47.RD	1700499	-	16,399
Self-Healable Thermoplastic Copolymers	47.RD	2003005	-	1,781
SHB: Type II (INT): Collaborative Research: Creating Learning Systems with Mobile Technology to Improve Perioperative Services	47.RD	1237077	-	(2,709)
SHF: Small: Using Error-Bounded Lossy Compression to Improve High-Performance Computing Systems and Applications	47.RD	1910197	-	115,814
Structure Regulation of Ionic Copolymers: Unlocking Ionic Clusters through Solvent Shear Adaptation, a Computational-Experimental Insight	47.RD	1905407	-	63,527
COVID-19 - The Center for Aviation and Automotive Technological Education using eLearning: Providing E-learning Resources and Increasing Knowledge about Their Effectiveness	47.RD	2033801	19,667	416,937
The Geometry of Measures and Analytic Properties of Associated Operators	47.RD	1800015	-	31,606
Tigers Teach Noyce Scholarship	47.RD	1136293	-	2,936
Transforming the Kirigami Art into a Design Framework for Multi-functional Adaptive Composites	47.RD	1760943	-	106,348
Uncertainty Principles in Reproducing Kernel Hilbert Spaces	47.RD	2000236	-	79,658
Uncovering Fundamental Transport Principles in Novel, Ultraclean Lignin-Based Hydrogels for Bioseparations	47.RD	1915787	-	75,234
Understanding Particle Scale Motion Initiation Physics for Loose-laid Building Rooftop Aggregates in Severe Windstorms	47.RD	1760999	-	123,695
UNS: Formation and Toxicity of Disinfection Byproducts in Desalinated Waters	47.RD	1511051	-	(92)
Unveiling The Cosmic History of Light	47.RD	1715256	-	81,532
Urbanization and Rural Land Rights Negotiations	47.RD	1918352	-	14,406
US Ignite: Track 1: Enabling Connected Vehicle Applications through Advanced Network Technology	47.RD	1531127	-	4,362
What leads to better outcomes in informal STEM-based environmental education programs for youth?	47.RD	1906610	141,531	446,148
Pass-through programs from:				
American Physical Society				
Outreach Mini-Grant Program	47.RD	OMG-2018-7	-	9,828
Carnegie Mellon University				
Learning to See Seeing to Learn: A Sociotechnical System Supporting Taxonomic Identification Activities in Volunteer-Based Water Quality Biomonitoring	47.RD	1122372-373033	-	4,380
Columbia University				
Collaborative Research: Mergers of Massive Black Holes	47.RD	1(GG013911) / SAPO G15369	-	50,709

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RESEARCH AND DEVELOPMENT CLUSTER, continued				
National Science Foundation, continued				
Pass-through programs from, continued:				
Cornell University				
SCH: EXP: Home+, An Intelligent and Interoperable Suite of Robotic Furnishings, Learning and Evolving with Their Users	47.RD	81402-10758	-	82,289
East Carolina University				
IUSE: EHR: Assessing Virtual Reality Field Experiences for Enhanced Learning in the Geosciences	47.RD	A19-0220-S001	-	63,217
Iowa State University				
CPS: Medium: Data-driven Causality Mapping, System Identification and Dynamics Characterization for Future Power Grid	47.RD	021700A	-	66,078
Enabling a Flexible, Non-Disruptive Demand Control to Improve Grid Security and Performance	47.RD	019456A	-	30,949
Johns Hopkins University				
AMBIC Reference Cell, Product, Media, Feeds (CLEMSON)	47.RD	PO# 2003603375	-	47,617
JHU I/UCRC for advance mammalian biomanufacturing- Redox Speciation and Electrochemical Probing in AMBIC Media	47.RD	2004594165	-	51,424
JHU I/UCRC for advanced mammalian biomanufacturing	47.RD	2004168266	-	76,465
JHU I/UCRC for advanced mammalian biomanufacturing - Enhancing Stability in CHO cells: The linkages between culture stress, chromatin, and gene expression	47.RD	2004594243	-	48,736
JHU I/UCRC for advanced mammalian biomanufacturing- 2020-16/20: Mechanistic-informed Hybrid Models for CHO Fed-batch and Perfusion Nutrient Control	47.RD	2004987881	-	20,028
JHU I/UCRC for advanced mammalian biomanufacturing: Changes in Metal Speciation Within AMBIC 1.1 Culture Media	47.RD	2004615676	-	76,821
Understanding & Controlling ER Stress in Highly Secreting CHO Cells	47.RD	PO# 2003683366	-	8,084
Louisiana Tech University				
Research Initiation: Influence of Self-efficacy and Social Support on Persistence and Achievement in Chemical Engineering Sophomores	47.RD	32-4111-54147-CU	-	17,964
Sophomore Fast-Forward: A Summer Bridge Program to Support Retention in Engineering	47.RD	32-0969-54130-CU	-	13,442
New Mexico State University				
iCREDITS: interdisciplinary Center of Research Excellence in Design of Intelligent Technologies for Smartgrids	47.RD	Q02121	-	1,978
North Carolina Central University				
Excellence in Research: Unveiling the Potent Photo-activated Antiviral Functions of Carbon Dots and Derived Hybrid Dots	47.RD	A19-0037-S001 / P0108460	-	9,000
Pennsylvania State University				
Simulation-Based Design of Polymer Nanocomposites for Structural Applications	47.RD	6091-CU-NSF-4438	33,633	51,753
Social Movement Impact on Policy Outcomes	47.RD	S001590-NSF	-	4,096
Purdue University				
Collaborative Research: Digitization TCN: Digitizing collections to trace parasite-host associations and predict the spread of vector-borne disease	47.RD	10001564-004	-	159
Expanding Access to and Participation in the Multiple-Institution Database for Investigating Engineering Longitudinal Development	47.RD	10000949-012	-	15,876
Hazards Sees: Bridging Information, Uncertainty, and Decision-Making in Hurricanes using and Interdisciplinary Perspective	47.RD	10000900-008	-	73,740
South Carolina EPSCoR/IdeA				
Computational Modeling Guided Biomaterials Development for Therapeutic Vascularization	47.RD	20-GE06	-	35,295
Computationally Directed Synthesis of Substituted Ferrites for Enhanced Energy Transfer	47.RD	20-GE04	-	35,577
Summer Undergraduate Research Experience in Nanobiotechnology	47.RD	20-SA01	-	4,213
South Carolina State University				
Louis Stokes South Carolina Alliance for Minority Participation (SCAMP): A Senior Alliance Enhancing Opportunities to Transition Students into Success STEM Pathways	47.RD	18-581065-SCAMP-CU-SC	-	42,807
The Samuel Roberts Noble Foundation				
Research - PGR Function Genomics of Beneficial Legume Microbe Interactions	47.RD	2017-G04-003 (BTI 2139351)	-	123,020
The University of Memphis				
Exploring Coupled Physical, Biological and Chemical Processes that Control Lead Fate and Transport through Plastic Plumbing Materials	47.RD	A21-0043-S001	-	3,941
University of Arizona				
PIRE: Dust Stimulated Draw-Down of Atmospheric CO2 as a Trigger for Northern Hemisphere Glaciation	47.RD	467895	-	82,710
University of California- Davis				
Computational Infrastructure for Geodynamics	47.RD	201504240-01 / A17-0253-S002	-	22,455
University of Georgia				
Science Coordinators Advancing a Framework for Outstanding Leadership Development (SCAFFOLD)	47.RD	SUB00002448	-	97,065
University of Kentucky				
RII Track-2 FEC: A Multiscale, Multiphysics Modeling Framework for Genome-to-Phenome Mapping via Intermediate Phenotypes	47.RD	3200002098-19-053 / PO 7800004458	-	486,690
University of North Carolina - Chapel Hill				
FABRIC: Adaptive Programmable Research Infrastructure for Computer Science and Science Applications	47.RD	5115814	-	89,826
University of Rochester				
RAISE - EQuIP: A high-speed, reconfigurable, fully integrated circuit platform for quantum photonic applications / URF (AWD00002483)	47.RD	417415G / UR FAO GR510842	-	48,729
University of San Diego				
Collaborative Research: Military Veteran Students' Pathways in Engineering Education	47.RD	140065-U2015-001 / PO# 26339	-	25,691
University of South Carolina				
RII Track 1: Materials Assembly and Design Excellence in South Carolina: MADE in SC	47.RD	18-3494 22000-FB02/PO#2000036759	-	1,174,517
University of Utah				
CloudLab Phase II: Community Infrastructure to Expand the Frontiers of Cloud Computing Research	47.RD	10045119-CLEM PO# U000099152	-	535,273
CNH-L: Adaptation, Mitigation, and Biophysical Feedbacks in the Changing Bonneville Salt Flats	47.RD	10040652-CU / PO # U000094568	-	32,766
Virginia Polytechnic Institute				
Collaborative Proposal: Multi-Perspective Evacuation Performance Measurement	47.RD	479463-19244	-	11,475
Total National Science Foundation			2,126,533	21,607,989
Environmental Protection Agency				
Destruction of PFAS in Leachate and Groundwater	66.RD	83963001	-	195,491
Forest Watershed Mgmt Practices & DW Quality	66.RD	CR-83586401	-	(195)
Pollution Prevention Grants Program	66.RD	NP-01D16320	-	5,153
Pollution Prevention Incentives States	66.RD	00D84518	-	31,298

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RESEARCH AND DEVELOPMENT CLUSTER, continued				
Environmental Protection Agency, continued				
Pass-through programs from:				
South Carolina Department of Health and Environmental Control				
Developing a Watershed Based Plan for Edisto Island and the Town of Edisto Beach	66.RD	EQ-0-548	-	2,070
Development and Implementation of the Tidal Saltwater SC Adopt-a-Stream Program	66.RD	None	-	5,758
EJ Strong: Strengthening Environmental Justice Communities for Disaster in South Carolina	66.RD	EQ-1-679	-	1,661
South Carolina Volunteer Stream Monitoring Program (SC Adopt-a-Stream)	66.RD	None	-	42,563
Total Environmental Protection Agency			-	283,799
Nuclear Regulatory Commission				
Nuclear Faculty Development at Clemson University	77.RD	31310018M0037	-	38,068
US NRC Fellowship Education Grant at Clemson University	77.RD	31310018M0006	-	187,363
Total Nuclear Regulatory Commission			-	225,431
Department of Energy				
Additive Manufacturing of Circumferentially Embedded Optical Probe Modules for In Situ Monitoring of Coal-Fueled Steam Turbines	81.RD	DE-FE0031826	-	165,893
All-Digital Plug and Play Passive RFID Sensors for Energy Efficient Building Control	81.RD	DE-EE0007683	20,251	91,954
Crystal Growth and Quantum Phases of Frustrated Rare Earth Oxides	81.RD	DE-SC0020071	54,261	97,784
Developing a Thermochemical Database of Radionuclide Reactions at the Mineral-Water Interface for Improved Nuclear Waste Repository Performance Assessment	81.RD	DE-NE0008940	-	92,973
Discerning Influences from Enthalpy and Entropy at Aqueous Interfaces Involved in Biomass Conversions in Porous Catalysts	81.RD	DE-SC0021170	-	45,745
Dynamic Stochastic Optimal Power Flow (DSOPF)	81.RD	DE-AR0001079	-	75,844
Electrocatalytically Upgrading Methane to Benzene in a Highly Compacted Microchannel Protonic Ceramic Membrane Reactor	81.RD	DE-FE0031871	2,463	180,510
EM-Enhanced HyPor Loop for Fast Fusion Fuel Cycle	81.RD	DE-AR0001376	4,299	82,972
Enabling Partnership between South Carolina and NREL for Advancing Opportunities in Plastics Recycling Research (EPSCOR for Plastics Recycling)	81.RD	DE-SC0021367	-	57,461
Energize: An Interactive Evaluation Tool for Engaging the General Public with Energy Decision Making	81.RD	DE-NE0008568	-	41,263
Energy Efficiency for the Growing South Carolina Manufacturing Industries	81.RD	DE-EE0007727	-	246,463
Fellowship and Scholarship Support - Nicole Hostetter	81.RD	DE-NE0000125	-	34,926
Fully Integrated High Speed Megawatt Class Motor and High Frequency Variable Speed Drive System	81.RD	DE-EE0007254	94,525	306,990
Functionally Designed Ultra-Lightweight Carbon Fiber Reinforced Thermoplastic Composites Door Assembly	81.RD	DE-EE0007293	52,106	215,843
High Speed Medium Voltage CHP System with Advanced Grid Support	81.RD	DE-EE0008409	182,381	211,426
Human Factors and Technologies Design to Improve User Acceptance of Pooled Rideshare (PR) for Increasing Transportation System Energy Efficiency	81.RD	DE-EE0009205	95,065	144,643
Hydrogen Isotope Fractionation Using Graphene and Related 2-D Materials	81.RD	DE-SC0018151	-	10,191
Integrated TBC/EBC for SiC Fiber Reinforced SiC Matrix Composites for Next Generation Gas Turbines	81.RD	DE-FE0031281	-	160,150
Ionic Polymers Under Dynamic Conditions	81.RD	DE-SC0019284	-	134,356
Laser 3D Printing of Highly Compacted Protonic Ceramic Electrolyzer Stack	81.RD	DE-EE0008428	-	389,723
Lignin Fractionation and Valorization: Focusing on both Value and Quality	81.RD	DE-EE0008502	206,658	463,465
Nacelle Testing for Offshore Wind Turbines with Hardware-In-the-Loop	81.RD	DE-EE0008962	-	247,179
Nano-structured Ceramic Membranes for Enhanced Tritium Management	81.RD	DE-NE0008703	-	96,611
Optimizing Melt Processed Phosphate Glass Waste Forms via Composition-Property-Structure Correlations	81.RD	DE-NE0008939	-	61,420
Process Intensification Scale-Up of Direct Lit Electrolysis	81.RD	DE-AR0001375	-	30,880
Quantifying Radionuclide Sorption to Engineered Barrier Materials under Elevated Temperature and Ionic Strength Conditions	81.RD	DE-NE0008941	-	182,056
Radionuclide Waste Disposal: Development of Multi-scale Experimental and Modeling Capabilities	81.RD	DE-SC0012530	64,378	60,512
Robust in Situ Strain Measurements to Monitor Carbon Dioxide (CO2) Storage	81.RD	DE-FE0028292	-	460,282
Sampling Rare Events In Aqueous Systems Using Molecular Simulations	81.RD	DE-SC0015448	-	54,512
Self-healable Copolymer Composites for Extended Service of H2 Dispensing Hoses	81.RD	DE-EE0008827	-	288,136
Test and Validate Distributed Coaxial Cable Sensors for in situ Condition Monitoring of Coal-Fired Boiler Tubes	81.RD	DE-FE0031765	71,646	654,945
The 3P Program: Phenotyping x Prediction = Productivity	81.RD	DE-AR0001134	660,366	1,304,462
Tool for Reliability Assessment of Critical Electronics in PV (TRACE-PV)	81.RD	DE-EE0009348	-	26,908
Pass-through programs from:				
Achates Power, Inc.				
New Two-Cylinder Prototype Demonstration and Concept Design of a Next Generation Class 3-6 Opposed Piston Engine	81.RD	None	-	272,251
Applied Engineering Concepts, Inc.				
1b Physical layer Authentication of Wired Networks (PAWN)	81.RD	None	-	(1)
Physical Layer Authentication of Wired Networks (PAWN) Phase II	81.RD	PAWN-20-0002	-	26,408
Battelle Savannah River Alliance, LLC				
Clemson University ICAR Collaboration "Soft Smart Tools Using Additive Manufacturing"	81.RD	TOA # 514464	-	8,038
Detroit Diesel Corporation				
Thermal Barrier Coatings	81.RD		-	(1,663)
Thermal Barrier Coatings for Improving Thermal Efficiency of a Heavy-Duty Engine	81.RD	PO#1590029839//PO#4-1590032107	-	39
Georgia Institute of Technology				
Demonstration of a 5 MVA Modular Controllable Transformer for a Resilient and Controllable Grid	81.RD	AWD-103072-G1 / PO 5058541	-	37,016
Handix Scientific, LLC				
A Microfluidic Ice Nucleating Particle Counter for Continuous Measurements	81.RD	1801 // Prime # DE-SC0018474	-	44,743
Iowa State University				
Sensor Enabled Predictive Analytics	81.RD	017793A	-	16,446
Lawrence Livermore National Laboratory				
Characterization of Plutonium Migration under Field Conditions	81.RD	B633477	-	(156)
Lexington Technology Center				
Lexington Technology Center 2018-19 Faculty Professional Development	81.RD	2018-19	-	5,133
Los Alamos National Laboratory				
Autonomous Monitoring of Wellbore Integrity Applying Time Reverse Nonlinear Elastic Wave Spectroscopy (TR NEWS) and Fiber Optic Sensing and Communication	81.RD	476893	-	27,117

The accompanying notes are an integral part of this schedule

(continued)

Clemson University, Clemson, South Carolina
Schedule of Expenditures of Federal Awards
For the year ended June 30, 2021

Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
RESEARCH AND DEVELOPMENT CLUSTER, continued				
Department of Energy, continued				
Pass-through programs from, continued:				
National Tech & Engine Solutions of Sandia				
Adaptive Protection and Control for High Penetration PV and Grid Resilience	81.RD	2143420	-	162,412
NaSOW p.r. 1886058	81.RD	1678873	-	32,971
PROTECTION OF INVERTER-DOMINATED ISLANDS WITH PV AND STORAGE IN MICROGRID CONTINUTED	81.RD	PO# 2004274	-	48,213
Oak Ridge National Laboratory				
Go! Program: Controlling Quantum Interactions at Interfaces Over Low Dimensional Materials for Photocatalytic Reactions	81.RD	TO# 4000171652/ PO#4200000754	-	50,404
Microextraction sample preparation technique for elemental andisotopic analysis	81.RD	4000185303	-	47,350
Pennsylvania State University				
Maximizing Vehicle Fuel Economy Through The Real-Time, Collaborative, And Predictive Co-Optimization Of Routing, Speed, And Powertrain Control	81.RD	5989-CU-EARPA-0801	-	(1,792)
Research Foundation for the State University of New York				
ARPA-E: Hybrid Electrochemistry-Advanced Combustion for High-Efficiency Distributed Power (HE-ACED)	81.RD	82595/2/1149460	-	33,000
Semplastics EHC, LLC				
High Strength, Encapsulated, Commercially Useful Components and Particles Made from Coal Combustion Residuals	81.RD	CCR-2020-01	-	41,443
Solution Spray Technologies, LLC				
Novel Thermal Barrier Coatings for Gasoline Spark Ignition Engines Phase II funding	81.RD	None	-	111,328
South Carolina Office of Regulatory Staff				
Watt Family Innovation Center (CEVAC) Smart Shading	81.RD	A-003-21-MG	-	10,000
South Carolina Universities Research and Education				
SRR Technical Support Provided by Clemson University	81.RD	SRRA001/SRRA021685	-	6,964
Texas A&M University				
IoT Based Comfort Control And Fault Diagnostics System For Energy Efficient Homes	81.RD	M2001448	-	59,214
University of Arkansas				
Integrated Process Optimization for Biochemical Conversion	81.RD	UA2020-191	-	105,474
University of Connecticut				
In-situ Measurement and Validation of Uranium Molten Salt Properties at Operationally Relevant Temperatures	81.RD	PO# 317174 / KFS# 5649590	-	31,387
University of Maryland				
Low-cost Vacuum Insulated Glass (VIG) for Retrofit of Single Pane Windows	81.RD	76494-Z7044201	-	17,622
University of Minnesota				
Energy Frontier Research Center for Inorganometallic Catalyst Design	81.RD	A004527501	-	69,915
Energy Frontier Research Center for Inorganometallic Catalyst Design	81.RD	A004527501	-	25,154
University of Nebraska - Lincoln				
Systems Analysis of the Physiological and Molecular Mechanisms of Sorghum Nutrient Use Efficiency, Water Use Efficiency and Interactions with the Soil Microbiome	81.RD	25-1215-0123-006	-	2,936
University of North Carolina - Charlotte				
Optimal Reconfiguration and Resilient Control Framework for Real-Time Photovoltaic Dispatch to Manage Critical Infrastructure (REDIS-PV)	81.RD	20190382-01-CLE	-	178,797
University of North Carolina - Greensboro				
How does mercury methylation respond to intensive forest management and the creation of anoxia in floodplain soils?	81.RD	21200543	-	7,030
University of South Carolina				
Center for Hierarchical Waste Form Materials (CHWM)	81.RD	17-3256/USC#13020-FC78/PO#2000030148	-	146,278
University of Texas				
Federal Facilities Data Analytics Research and Applications Program (FF-DARAP)	81.RD	UTA20-000903	-	24,392
University of Texas at San Antonio				
Cybersecurity Manufacturing Innovation Institute - CyManII	81.RD	1000003894	-	454,459
West Virginia University				
Clean Energy Smart Manufacturing Innovation Institute (CESMII) - Hybrid Modeling for Energy Efficient CNC Grinding	81.RD	20-309-CU / PO# MM000338928	-	9,112
Total Department of Energy			1,508,399	8,828,132
Department of Education				
Engineers for a Global System: Global Learning and Engineering+Language Programs (at Clemson University)	84.RD	P016A200057	-	18,784
GAANN: Molecular Engineering in Sustainability and Health	84.RD	P200A180076	-	407,097
GAANN-Leadership development for Ph.D. students in Electrical and Computer Engineering	84.RD	P200A180009	-	332,708
Developing a Sentence Writing Intervention for Young Struggling Writers	84.RD	R324B200016	-	46,143
STEM Teacher Learning Progression (CU-TLP)	84.RD	S423A200008	-	168,572
Lexington Technology Center				
Lexington Technology Center 2019-2020 Faculty Professional Development	84.RD	2019-2020	-	2,181
University of Virginia				
Build the FRaME: Using Feedback, Reflection, and Multimedia to Teach Evidence-Based Practices for Effective Classroom Management	84.RD	GM10187.PO#2292144	-	35,713
Total Department of Education			-	1,011,198
Department of Health and Human Services				
Advanced Nursing Education Workforce (ANEW)	93.RD	5T94HP32896-03-00	40,451	631,736
Arsenic's Effects on the Intestinal Stem Cell Niche	93.RD	1R15ES031766-01A1	-	11,813
Assessing Cognitive and Psychosocial mechanisms of Useful Field of View Cognitive Training using Ecological Momentary Assessment	93.RD	7R21AG060216-03	-	118,669
Building the Evidence Base for Vomit Clean-Up Procedures in Long-term Care Facilities.	93.RD	5R01HS025987-03	403,624	484,650
CanSim: A Novel Simulator for Training Cannulation Skills in Dialysis Care	93.RD	5K01DK111767-05	-	126,970
Cell and matrix interactions in diabetic vascular tissue engineering models	93.RD	5R01HL133303-03	-	253,746
Center of Biomaterials for Tissue Regeneration (CBTR)	93.RD	5P20GM103444-10 REVISED	25	8,465
COBRE Human Genetics - Admin Core	93.RD	1P20GM139769-01	21,019	73,429
COBRE Human Genetics - Alexandrov	93.RD	1P20GM139769-01	-	53,910
COBRE Human Genetics - Greenwood Genetics - Flanagan Street	93.RD	1P20GM139769-01	49,957	63,082
COBRE Human Genetics - Konkel	93.RD	1P20GM139769-01	-	23,713
COBRE Human Genetics - Morgante	93.RD	1P20GM139769-01	-	21,403

Clemson University, Clemson, South Carolina
Schedule of Expenditures of Federal Awards
For the year ended June 30, 2021

Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
RESEARCH AND DEVELOPMENT CLUSTER, continued				
Department of Health and Human Services, continued				
COBRE Human Genetics - Research Core	93.RD	1P20GM139769-01	-	77,990
COBRE:EPIC - YR4 Main Carryover	93.RD	5P20GM109094-05 REVISED	-	27,477
COBRE:EPIC-YR4 Carryover (Whitehead-Pilot)	93.RD	5P20GM109094-05 REVISED	-	35,683
COBRE:EPIC-YR5 Admin	93.RD	5P20GM109094-05	-	213,939
COBRE:EPIC-YR5 C Ingram-Smith	93.RD	5P20GM109094-05	-	167,483
COBRE:EPIC-YR5 Core 1 (CUGBF)	93.RD	5P20GM109094-05	-	244,872
COBRE:EPIC-YR5 Core 2 (CLIF)	93.RD	5P20GM109094-05	-	138,826
COBRE:EPIC-YR5 ERosowski Pilot	93.RD	5P20GM109094-05	-	64,919
COBRE:EPIC-YR5 J Morris	93.RD	5P20GM109094-05	-	180,709
COBRE:EPIC-YR5 K Paul	93.RD	5P20GM109094-05	-	172,793
COBRE:EPIC-YR5 L Kozuboswki	93.RD	5P20GM109094-05	-	166,239
COBRE:EPIC-YR5 M Morris	93.RD	5P20GM109094-05	-	29,810
Craniofacial Dysmorphology Associated with Phelan-McDermid Syndrome using Three-Dimensional Morphometrics	93.RD	5R03DE027497-02 REVISED	-	26,856
Critical functions of the gut microbiota that mediate recovery from recurrent Clostridium difficile infection	93.RD	5K01DK111794-04	-	153,591
CYP2B6 Inhibits Proper Distribution of Lipids Leading to Obesity and Fatty Liver Disease	93.RD	2R15ES017321-04	-	57,903
Defining and harnessing macrophage pathways for Aspergillus clearance in vivo	93.RD	5K22AI134677-02	-	109,745
Detecting and Monitoring Implant Infection Using X-ray Excited Luminescence Chemical Imaging (XELCI)	93.RD	5R01AR070305-05	7,501	215,656
Development of a Multiplexed Assay in Kinetoplastid Parasites to Identify Probes for Glycolysis	93.RD	1R01AI156382-01	1,798	2,741
Development of an Automated Diagnostic Platform for SARS-CoV-2 Monitoring in Vulnerable Areas	93.RD	1U01AA029328-01 REVISED	49,681	148,587
Development, Validation, and Application of a CDS Ontology to Facilitate CDS Rules Reuse, Management, and Maintenance in Simulated Primary Care Settings	93.RD	5R01GM138589-02	-	171,599
Elucidating the Necessary Components and Mechanisms of Cognitive Training.	93.RD	7U01AG062370-03 REVISED	1,676	120,192
Enabling Plant Natural Product Biosynthesis by Debugging Heterologous Protein Expression in Yeast	93.RD	5R35GM133803-02	-	162,811
Entamoeba Metabolism: The Role of Acetate Kinase and ADP-Forming Acetyl-CoA Synthetase	93.RD	1R15GM114759-01A1	-	84,869
Exploration of the hypothesis-generation process as guided by secondary data analysis in clinical research: Can the process be more efficient?	93.RD	7R15LM012941-02	28,029	73,922
Genetics of Cocaine and Methamphetamine Sensitivity in Drosophila	93.RD	5U01DA041613-05	-	424,755
Glycosome specialization in African trypanosomes	93.RD	1R56AI143687-01A1	-	214,441
Human Factors Considerations in the Design and Implementation of Telemedicine-Integrated Ambulance-based Environments for Stroke care	93.RD	1R03HS026809-01 REVISED	37,629	56,110
Improving hiPSC Cardiomyocyte Engraftment and Integration with Nanowired Human Cardiac Organoids-Fellowship for Robert Coyle	93.RD	1F31HL145979-01	-	13,458
Inhibition of Human Islet Amyloid Polypeptide Aggregation	93.RD	5R35GM119691-05	-	333,907
Integrating Craniofacial Morphology, Oral function, Temporomandibular Biomechanics and Mechanobiology to Determine Sex-specific TMJ Pathophysiology in Humans	93.RD	2R01DE021134-06A1	-	3,512
Mechanisms of Long-term Arsenic Exposure on Stem Cells	93.RD	1R15ES027651-01	-	44,991
Mechanistic Pharmacodynamic Modeling for Drug Combination Responses	93.RD	1R35GM141891-01	-	109,835
Medial Arterial Calcification: Mechanisms and Therapy	93.RD	5R01HL145064-03 REVISED	300,315	533,801
MENTOR: Medical Enrichment Through Opportunities in Research	93.RD	5T35AI134643-03	-	11,626
Nanowired Human Cardiac Spheroids for Heart Repair	93.RD	5R01HL133308-04	162,807	244,841
Neighborhood Environments and Cognitive Decline Among Middle-Aged and Older Adults in China	93.RD	5R03AG065637-02	28,192	67,130
Neuron-Specific Nanotherapeutics for Spinal Cord Injury Repair	93.RD	5R01NS111037-03	78,039	236,335
New Enzymes for DNA Demethylation	93.RD	1R15GM121997-01 REVISED	-	71,465
New Generation DelPhi: large systems and beyond electrostatics	93.RD	5R01GM093937-09 REVISED	-	101,634
Oral Microbiomes and Dental Caries in a Human Immunodeficiency Virus Infected Population	93.RD	5R01DE028154-04	118,253	331,388
Predicting the Heterogeneity of Cell-Fate Decisions	93.RD	7R01GM104184-05	-	35,478
Project EMPOWER - Engaging Medicine Providers On Ways to Enhance Recovery	93.RD	5H79TI081664-03	93,217	134,546
Realizing Improved Patient Care Through Human-Centered Design in the OR	93.RD	5P30HS024380-04 Revised	-	44,346
Reducing Disparities in Birth Outcomes: A Randomized Controlled Trial on Centering Pregnancy	93.RD	5R01HD082311-05 REVISED	195,817	277,305
Regulation of the Physiology and Function of the Digestive Vacuole in Toxoplasma Gondii	93.RD	5R01AI143707-02	32,352	389,485
Reverse Engineering Quantitative Genetic Variation	93.RD	5R01GM128974-04	-	441,887
SC BioCRAFT Phase III-BET Core	93.RD	5P30GM131959-02 REVISED	-	364,815
SC BioCRAFT Phase III-CTMA	93.RD	5P30GM131959-02 REVISED	-	320,396
SC BioCRAFT Phase III-Main	93.RD	5P30GM131959-02 REVISED	48,218	262,118
SC BioCRAFT PhaseIII-Pilot (Alexander)	93.RD	5P30GM131959-02 REVISED	-	14,707
SC BioCRAFT PhaseIII-Pilot (Bhattacharya)	93.RD	5P30GM131959-02 REVISED	-	55,663
SC County Health Extension: High Obesity Prevention and Elimination	93.RD	5NU58DP006562-04-00	-	829,712
SC TRIMH - Year 1 thru 3 Admin	93.RD	5P20GM121342-03 REVISED	126,903	619,640
SC TRIMH - Year 1 thru 3 Foley Pilot	93.RD	5P20GM121342-03 REVISED	-	142,184
SC TRIMH - Year 1 thru 3 Harmon	93.RD	5P20GM121342-03 REVISED	-	181,077
SC TRIMH - Year 1 thru 3 Peng	93.RD	5P20GM121342-03 REVISED	-	174,218
SC TRIMH - Year 1 thru 3 Powder Pilot	93.RD	5P20GM121342-03 REVISED	-	109,342
SC TRIMH - Year 1 thru 3 Richardson	93.RD	5P20GM121342-03 REVISED	-	163,336
SC TRIMH - Year 1 thru 3 Ye	93.RD	5P20GM121342-03 REVISED	-	315,376
SC TRIMH - Years 1 thru 3 AFT	93.RD	5P20GM121342-03 REVISED	-	301,002
SC TRIMH - Years 1 thru 3 MCM	93.RD	5P20GM121342-03 REVISED	-	393,807
SC TRIMH - Years 1 thru 3 PAC	93.RD	5P20GM121342-03 REVISED	59,979	123,183
SC TRIMH - Years 1 thru 3 Sanabria	93.RD	5P20GM121342-03 REVISED	-	243,945
SLC7A5-MTOR Regulation of Neural Development	93.RD	1R15NS096562-01A1	-	12,534
Species-specific Chromatin Structure and its Environmental Interaction in Craniofacial Skeletal Development and Variation Using Cichlid Fishes	93.RD	1R15DE029945-01	-	66,019
Strategies for continuous biologics purification with new affinity membranes	93.RD	1R15GM131341-01	-	164,807
Supplement - Medial Arterial Calcification: Mechanisms and Therapy	93.RD	5R01HL145064-03 REVISED	46,300	46,300
SutureCoach: Examining Vascular Suturing Skills Assessment, Training, and Transfer of Training via Objective Metrics	93.RD	5R01HL146843-02	-	195,809
Systems Mechanobiology Modeling for Patient-Specific Cardiac Fibrosis Predictions	93.RD	5R01HL144927-03 REVISED	25,602	575,231
Targeting flagellar motility in the treatment of kinetoplastid diseases	93.RD	1R15AI137979-01A1	-	112,286
The Role of CAR and PXR in Gender Predominant P450 Expression and Induction	93.RD	2R15ES017321-03	-	529
Theranostic Approach to Treat Abdominal Aortic Aneurysms	93.RD	5R01HL133662-04	97,932	345,503
Undergraduate Education and Device Innovation Through Clinical and Translational	93.RD	5R25EB016589-05 REVISED	-	2,710
Understanding and Addressing Racial Disparities in Guideline-Indicated Management of Symptomatic Peripheral Artery Disease	93.RD	5K01HL146900-02	-	134,029

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Clemson University, Clemson, South Carolina
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RESEARCH AND DEVELOPMENT CLUSTER, continued				
Department of Health and Human Services, continued				
Pass-through programs from:				
Albert Einstein College of Medicine				
Comprehensive Pediatric Hypertension Diagnosis and Management	93.RD	311812 / PO 822501	-	7,093
Centers for Disease Control and Prevention				
Multi-level modeling to inform interventions for control of multidrug-resistant organisms within healthcare networks	93.RD	1843-03-CLE	-	8,864
Circa Bioscience, LLC				
Development of a Novel Bio-Adhesive Mesh System for Abdominal Hernia Repair	93.RD	C120168-1	-	102,267
Coastal Carolina University				
Southeast Xlerator Network	93.RD	31-2083 SXN-2-Yr2	-	1,625
Cornell University				
Quantifying Molecular Consequences of Human Missense Variants with Large-scale Interactome Perturbation Studies	93.RD	82513-11007	-	109,265
Duke University				
Inflammasomes Mediate Inflammation in Bladder Outlet Obstruction	93.RD	2037268	-	702
Elastrin Therapeutics				
Targeted Chelation for Reversal of Vascular Calcification	93.RD	R41HL147653	-	41,272
Fred Hutchinson Cancer Research Center				
COVID-19 - CoVID-19 Prevention Network (CoVPN) Site Preparedness Funding - Clemson Protocol-Specific Site	93.RD	0001060381	-	71,372
COVID-19 - CoVPN 3006 Protocol Funding (PF) - Clemson Protocol-Specific Site	93.RD	0001062451	-	41,934
Icahn School of Medicine				
Data Coordination and Integration Center for LINCS-BD2K - DSR	93.RD	0255-7895-4609	-	(1,992)
Drug Combination Signatures for Prediction and Mitigation of Toxicity	93.RD	0255-8869-4609	-	(11,159)
Indiana University				
Cavopulmonary Assist to Reverse the Fontan	93.RD	8778 / PO0266438	-	75
Medical University of South Carolina				
Identifying and Reducing Errors in Perioperative Anesthesia Medication Delivery	93.RD	A00-3876-S001/MUSC18-134-8D662	-	282,634
Impact of Integrated HIV/NCD Screening on HIV Testing Uptake and Engagement in HIV Care: an RCT in Kisarawe, Tanzania	93.RD	A00-2861-S001 MUSC16-104-8C312/PO#296562	-	37,768
Implementation of Home-Based Palliative Care in Limited Resource Settings	93.RD	A21-0042-S002	-	36,836
Multi-site Study of Dyslexia	93.RD	A00-0250-S001 (MUSC19-19-89225)	-	51,685
South Carolina Cancer Disparities Research Center (SC CADRE)	93.RD	A00-3431-S002 PO#399813	-	35,920
South Carolina Clinical and Translational Research Institute (SCTR)	93.RD	A00-2219-S005	-	24,029
South Carolina Clinical and Translational Research Institute (SCTR)	93.RD	A00-2219-S005	-	72,231
Using Connectomics to Characterize Risk for Alzheimer's Disease	93.RD	A00-3356-S001/MUSC17-119-8D017	-	30,118
New York University				
Map Leukemia-immune Cell Talks with Nanoplasmon Ruler in CAR T-Cell Immunotherapy	93.RD	F1429-02 / PO# iB00425635	-	52,962
NUBAD, LLC				
Aminoglycosides with Reduced Ototoxicity	93.RD	CLEM-004	-	5,343
Aminoglycosides with reduced ototoxicity via miRNA targeting	93.RD	CLEM-005	-	79,447
Delivery of chemically modified PNA oligomers	93.RD		-	56,832
Nucleobase Aminosugars with Reduced Ototoxicity	93.RD	NARO	-	49,058
Supplement Request LIDIA.AZANKIA	93.RD	None	-	11,091
Pennsylvania Department of Health				
Maternal and Child Health Services Block Grant to the States ;PA Department of Health, Olweus Bullying Prevention Program for Community Youth Organizations	93.RD	SAP#: 4100080792	31,153	306,413
Prisma Health Upstate				
Project TRANSFORM (Teaching Recovery-informed Addiction Care and Negating Stigma FOR Medical Professionals	93.RD	5219-1	-	45,082
Purilogics, LLC				
Affinity membrane for rapid, high recovery purification of gene therapy viral vector	93.RD	SI0006	-	31,897
High-capacity Multimodal Anion-exchange Membranes for Purification of Biologics	93.RD	PSI0003	-	25,374
SBIR Phase II: Protein A membrane Absorbers for Rapid Protein Purification	93.RD	SI0005	-	103,738
Research Foundation for the State University of New York				
Single Molecule Analysis of MAGUK Structure and Ligand Binding	93.RD	81534/2/1147013	-	49,655
South Carolina Department of Health & Human Services				
Quality Assurance Services for the Bureau of Long Term Care Services (Federal) - Year 5	93.RD	A2021119999A (Federal) - FY21	-	588,586
South Carolina Department of Social Services				
CSS Employment Initiative - Year 1	93.RD	4400025040	-	1,489,923
ICSS Employment and Training - Year 5	93.RD	4400011567 Year 5	-	743,068
ICSS Employment and Training Institute (CQI) - Year 5	93.RD	4400011567 Training Inst (CQI) Year 5	-	129,770
SpineFrontier, Inc.				
X-ray Visualized Interbody Spacer Indicating Biomechanical Load (X-VISIBL) Fusion Device	93.RD	CLU001	-	53,612
TGen Tech, LLC				
Decellularized Xenograft Leaflet Patch for Pulmonary Valve Repair in Pediatric Patients	93.RD	TGen2020-101	-	16,095
Xenograft pulmonary valved conduit with regeneration potential	93.RD	1R41HL147771-01	-	22,247
The Miriam Hospital				
Optimizing Just-in-Time Adaptive Intervention to Improve Dietary Adherence in Behavioral Obesity Treatment: A Micro-randomized Trial	93.RD	7107147197	-	35,917
Tissue Testing Technologies, LLC				
Ice-free Vitrification and Nanowarming of Large Osteochondral Grafts for Transplantation	93.RD	1-R44-AR073136-02	-	200,977
Ice-free vitrification and nanowarming technology for banking of cardiovascular structures.	93.RD	1-R44-HL142455-01A1	-	26,611
Tufts University				
Comparative and Cost-Effectiveness of Population Strategies to Improve Diet and Reduce Cancer	93.RD	HH1501 / PO EP0198452	-	6,999
University of California-Merced				
Focused x-ray Luminescence at uCT Resolution and uM-level of Sensitivity	93.RD	SA29066	-	116,722
University of Colorado - Denver				
Rocky Mountain Center for Total Worker Health	93.RD	FY17.347.005 / FY21.347.006_AMD4	-	6,192
University of Florida				
Probiotics That Moderate PH and Antagonize Pathogens to Promote Oral Health	93.RD	UFDSP00011201 00125985	-	71,117

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Clemson University, Clemson, South Carolina
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RESEARCH AND DEVELOPMENT CLUSTER, continued				
Department of Health and Human Services, continued				
Pass-through programs from, continued:				
University of Georgia				
Microglial RGS10 as a therapeutic target for Lewy body diseases	93.RD	SUB00002385	-	7,081
Modeling the effectiveness of meditation and hypertension reduction on the risk of Alzheimer Diseases	93.RD	SUB00002420	-	62,817
University of Missouri - Columbia				
Influenza Host Specific Glycan Motif Identification Through Systems Biology	93.RD	C00066265-2	-	11,733
University of North Carolina - Charlotte				
Characterization of Various Multifunctional Nucleic Acid Nanoparticles and Understanding Their Immunotoxicity	93.RD	20170356-02-CLE	-	(7,844)
Characterization of Various Multifunctional Nucleic Acid Nanoparticles and Understanding Their Immunotoxicity	93.RD	20170356-02-CLE	-	53,563
University of South Carolina				
Carolina Center on Alzheimer's Disease and Minority Research (CCADMR) - Admin Core	93.RD	20-3952 PO#2000050319	-	4
Carolina Center on Alzheimer's Disease and Minority Research (CCADMR) - Admin Core	93.RD	21-4139 PO#2000054510	-	12,314
Carolina Center on Alzheimer's Disease and Minority Research (CCADMR) - Research Education Core (Training)	93.RD	21-4153 PO#2000054716	-	16,839
COVID-19 - DHEC SARS-COV-2 Antibody Statewide Surveillance	93.RD	21-4184 PO#2000056090/USC 10010327	-	45,204
Effects of Musculoskeletal Surgery Rate of Medicare Costs	93.RD	21-4393 PO#2000057729	-	27,468
SC INBRE Administrative Supplement to Support Collaborative INBRE/COBRE Research	93.RD	20-3997 10009649 PO#2000050804	-	8,086
SC INBRE Collaborative Administrative Supplement - (Role of Hsp90 in Resistance of Cryptococcus neoformans to Fluconzaole)	93.RD	21-4208 PO#2000055291/USC No. 10010430	-	43,325
SC INBRE SIRP Award - Modulation of Polymersome Shape to Enhance Blood-Brain Barrier Uptake	93.RD	21-4283 PO#2000055942/USC No. 10010557	-	2,948
SC INBRE SIRP Award: Identification of mRNA Co-Expressed with miRNA from Birth to Maturity	93.RD	21-4284 PO#2000055943/USC 10010558	-	2,972
South Carolina IDeA Networks of Biomedical Research Excellence (SC INBRE) Year 1 - Administrative Core	93.RD	21-4211 PO #2000055332/USC No.10010420	-	143,784
South Carolina IDeA Networks of Biomedical Research Excellence (SC INBRE) Year 5 - Administrative Core	93.RD	20-3943 PO #2000049450/USC No.10009215	-	52,425
University of South Florida				
PACT - Preventing Alzheimer's disease with Cognitive Training (Cognitive Training to Reduce Incidence of Cognitive Impairment in Older Adults)	93.RD	6118-1093-00-C	-	45,186
University of Texas El- Paso				
Phase II of BUILDing SCHOLARS - Student Training Core	93.RD	226141328B	-	539
Upstate Affiliate Organization d/b/a				
Managing Abstinence in Newborns (MAiN) 2.0, Expansion	93.RD	A202212651A-01CU; GHS Grant # G001217	-	62,520
Virginia Polytechnic Institute				
DPM Research: Monitoring Responses to Ventilation and Control by Water Sprays, and Capacity Building for Mine Ventilation Expertise	93.RD	431827-19244	-	1,048
VRM Labs, Inc.				
Protective film-forming disinfectant based on chitosan/water/ethanol tertiary solutions	93.RD	VRM2021	-	14,847
XLerate Health, LLC				
R-FIX (Rib-FIXation System) for severe progressive spinal deformity	93.RD	NONE	-	20,782
Total Department of Health and Human Services			2,086,469	21,008,260
Corporation for National and Community Service				
National Service and Civic Engagement Research Cooperative Agreement	94.RD	17REHSC001	-	1,220
Pass-through programs from:				
Furman University				
Implementation Evaluation for Greenville Health System School Based Health Centers	94.RD	1003017.02	-	569
Total Corporation for National and Community Service			-	1,789
Agency for International Development				
Pass-through programs from:				
Cornell University				
Feed the Future Innovation Lab for Crop Improvement (CIIL)	98.RD	89915-11295	-	501,977
Louisiana Tech University				
Preclinical Evaluation of Combination Therapy of Rolipram and Minocycline for Arresting Secondary Injury Cascade after Traumatic Brain Injury	98.RD	32-4111-56210-CU	-	88
Total Agency for International Development			-	502,065
TOTAL RESEARCH AND DEVELOPMENT CLUSTER			10,422,400	86,193,393
Department of Education				
Student Financial Assistance Cluster				
Federal Supplemental Educational Opportunity Grants	84.007	Unknown	-	1,119,602
Federal Work Study Program	84.033	Unknown	-	642,930
Federal Work Study Program - Federal Job Location and Development	84.033	Unknown	-	60,000
Federal Perkins Loan Program Federal Capital Contributions	84.038	Unknown	-	4,849,682
Federal Pell Grant Program	84.063	Unknown	-	14,999,935

The accompanying notes are an integral part of this schedule

(continued)

Clemson University, Clemson, South Carolina
Schedule of Expenditures of Federal Awards
For the year ended June 30, 2021

Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
Department of Education, continued				
Student Financial Assistance Cluster, continued				
Federal Direct Student Loans	84.268	Unknown	-	108,907,248
Teacher Education Assistance for College and Higher Education Grants (TEACH Grants)	84.379	Unknown	-	10,364
Total Student Financial Assistance Cluster			-	130,589,761
Special Education Cluster				
Pass-through programs from:				
South Carolina Department of Education				
SC CREATE: Centers for the Re-Education and Advancement of Teachers in Special Education and Related Services Personnel	84.027	SC CREATE Y18	-	4,806
South Carolina Educational Interpreter Center	84.027	Funds Reservation #4000037496	-	48,398
Total Special Education Cluster			-	53,204
Total Department of Education			-	130,642,965
Department of Agriculture				
SNAP Cluster				
Pass-through programs from:				
South Carolina Department of Social Services				
SNAP-ED: CATCH (Coordinated Approach to Child Health)	10.561	4400025162	-	83,672
SNAP-ED: Cooking Matters	10.561	4400025174	-	150,608
SNAP-ED: Go-NAP SACC Community Partnership	10.561	4400025164	-	145,946
SNAP-ED: Implementation of Formative Research and Evaluation	10.561	4400025173	-	142,734
SNAP-ED: Implementation of Walk with Ease	10.561	4400025326	-	121,242
SNAP-ED: Policy, System, Environment (PSE) Strategies and Outreach	10.561	4400025172	-	124,228
SNAP-ED: Sesame Street Healthy Habits	10.561	4400025325	-	122,010
SNAP-ED: CATCH (Coordinated Approach to Child Health)	10.561	4400022980	-	45,769
SNAP-ED: Cooking Matters	10.561	4400022911	-	47,479
SNAP-ED: Go-NAP SACC Community Partnership	10.561	4400022920	-	47,084
SNAP-ED: Implementation of Formative Research and Evaluation	10.561	4400022910	-	47,348
SNAP-ED: Implementation of Sesame Street Healthy Habits for Life	10.561	4400022878	-	42,984
SNAP-ED: Implementation of Walk with Ease	10.561	4400022879	-	43,096
SNAP-ED: Policy, System, Environment (PSE) Strategies and Outreach	10.561	4400022909	-	47,670
Total SNAP Cluster			-	1,211,870
Total Department of Agriculture			-	1,211,870
Department of Transportation				
Highway Planning and Construction Cluster				
Pass-through programs from:				
South Carolina Department of Transportation				
State Work Zone Safety Training Program	20.205	CBSA-002	-	330,318
Transportation Technology Transfer Service (T3S) 2021	20.205	SPR 2-21	-	174,786
Transportation Technology Transfer Service (T3S) 2020	20.205	SPR 1-20	-	285,768
Total Highway Planning and Construction Cluster			-	790,872
Total Department of Transportation			-	790,872
OTHER PROGRAMS				
Department of Agriculture				
2020 National Animal Health Laboratory N	10.025	AP21VSD&B000C003	-	50,506
Assisting Rural Groups and Cooperatives through the South Carolina Center for Cooperative and Enterprise Development	10.771	RCDG	20,347	77,370
Business Acumen Training, Professional Networking, and Innovation Support for Emerging Agricultural and Food System Entrepreneurs in Rural South Carolina.	10.351	Case #841224685	-	61,193
Development and Promotion of Mass Timber Noise Barriers for Highways	10.674	19-DG11083150-014	-	80,500
FY 20 NAHLN Infrastructure Agreement	10.025	AP20VSD&B000C028	-	131,000
FY 21 SC NAHLN Infrastructure	10.025	AP21VSD&B000C048	-	7,112
FY20 D1 SC ADT	10.025	AP20VSSPRS00C033	-	98,487
FY20 D1 SC LPAI	10.025	AP20VSSPRS00C076	-	135
FY20 D1 SC UMB	10.025	AP20VSSPRS00C071	-	254,515
FY21 D1 SC ADT	10.025	AP21VSSPRS00C013	-	715
FY21 D1 SC UMB	10.025	AP21VSSPRS00C028	-	9,023
Implement NAHLN Order Message Receiver in USALIMS	10.025	AP20VSD&B000C001	-	58,452
National Animal Disease Preparedness and Response Program - 2019 Training and Exercise	10.025	AP20VSCEAH00C003	-	9,168
Production and Marketing Risk Management Education for South Carolina Livestock Producers	10.460	RM18RMEPP522C055 (FMMI #: 4500081841)	-	4,180
SC FY19 Cogongrass Survey, Outreach and Education	10.025	AP19PPQFO000C471	-	11,214
SC FY19 Forest Pest Outreach PPA Goal 5.0	10.025	AP19PPQFO000C248	-	20,169
SC FY19 Jr. Invasive Inspectors PPA Goal	10.025	AP19PPQFO000C249	-	10,753
SC FY20 Asian Longhorned Beetle	10.025	AP20PPQFO000C558	-	604,336
SC FY20 CAPS Infrastructure	10.000	AP20PPQFO000C029	-	41,279
SC FY20 CAPS Survey	10.025	AP20PPQFO000C028	-	15,833
SC FY20 Cogongrass	10.025	AP20PPQFO000C518	-	133,720
SC FY20 Forest Pest Outreach 5.0200.01	10.025	AP20PPQFO000C112	-	37,197

The accompanying notes are an integral part of this schedule

(continued)

Clemson University, Clemson, South Carolina
Schedule of Expenditures of Federal Awards
For the year ended June 30, 2021

Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
OTHER PROGRAMS, continued				
Department of Agriculture, continued				
SC FY20 Grape Commodity Survey 1S.0213.	10.025	AP20PPQFO000C149	-	31,664
SC FY20 Honey Bee Survey 1S.0560.30	10.025	AP20PPQFO000C130	-	11,311
SC FY20 IFA Survey	10.025	AP20PPQFO000C164	-	40,003
SC FY20 Jr. Invasive Outreach 5.0286.01	10.025	AP20PPQFO000C111	-	24,091
SC FY20 Pramorum Survey 1S.0212.01	10.025	AP20PPQFO000C190	-	20,000
SC FY20 Solanaceous Survey 1S.0212.01	10.025	AP20PPQFO000C299	-	35,000
SC FY20 Stone Fruit Survey 1S.0216.01	10.025	AP20PPQFO000C252	-	19,389
SC FY21 CAPS Infrastructure	10.025	AP21PPQFO000C174	-	7,246
SC FY21 CAPS Survey	10.025	AP21PPQFO000C175	-	2,523
SC FY21 Imported Fire Ant	10.025	AP21PPQFO000C247	-	5,852
SC NAHLN FY20 LIMS Agreement	10.025	AP20VSD&B000C025	-	61,000
South Carolina Farm Financial Benchmarking Project	10.319	2018-38504-28734	-	34,718
South Carolina Meat-Poultry Inspection Department - All Other	10.475	BASE21 (12-37-A307)	-	207,386
South Carolina Meat-Poultry Inspection Department - All Other	10.475	BASE20 (12-37-A307)	-	81,019
South Carolina Meat-Poultry Inspection Department - Compliance	10.475	BASE21 (12-37-A307)	-	96,784
South Carolina Meat-Poultry Inspection Department - Compliance	10.475	BASE20 (12-37-A307)	-	33,731
South Carolina Meat-Poultry Inspection Department - Cross Utilization FY20	10.475	Cross Utilization - FY20	-	162,375
South Carolina Meat-Poultry Inspection Department - Cross Utilization FY21	10.475	Cross Utilization - FY21	-	195,815
South Carolina Meat-Poultry Inspection Department - Laboratory	10.475	BASE21 (12-37-A307)	-	11,136
South Carolina Meat-Poultry Inspection Department - Laboratory	10.475	BASE20 (12-37-A307)	-	4,119
South Carolina Meat-Poultry Inspection Department -In Plant	10.475	BASE20 (12-37-A307)	-	289,157
South Carolina Meat-Poultry Inspection Department- In-Plant	10.475	BASE21 (12-37-A307)	-	840,250
South Carolina Meat-Poultry Inspection Department-PHDCIS20	10.475	PHDCIS20 (12-37-A307)	-	608
Web Based Nutrition Education and Evaluation Reporting System (WebNEERS)	10.500	2017-41510-26791	9,943	24,911
Smith-Lever	10.511	NI19SLBCXXXXG038	-	2,399,443
Smith-Lever	10.511	NI20SLBCXXXXG024	-	3,551,673
EFNEP	10.514	NI19EFNEPXXXG016	-	847,493
EFNEP	10.514	NI20EFNEPXXXG061	-	762,364
RREA	10.515	NI19RREAFXXXG063	-	18,072
RREA	10.515	NI20RREAFXXXG047	-	64,999
Pass-through programs from:				
Kansas State University				
2020 4-H Military Partnerships and Outreach Support Program	10.500	A00-0983-S053-A01	-	14,219
4-H Military Partnerships and Outreach Support Program - Expedition Sewee	10.500	A00-0983-S077-A01	-	1,337
4-H Military Partnerships and Outreach Support Program- Wounded Warriors Youth Camps & Deployed Soldiers Youth Camps	10.500	A00-0983-S085	-	24,679
The Longleaf Alliance				
Education and Outreach to Increase Longleaf Pine Ecosystem Restoration in SC	10.902	33.2019.01.00	-	11,508
University of Florida				
Southern Plant Diagnostics Network	10.304	UFDSP00011536 / P0019073	-	37,006
University of Georgia				
Advanced Soil Health Training for South Carolina Agriculture Professionals	10.215	SUB00001983	13,008	14,453
SC SARE 2020-2021 Model State Program - Program Assistant (MSA20)	10.215	SUB00002353	-	17,692
Southern Region SARE Professional Development Program - Model State Program Assistant	10.001	SUB00001747	-	579
Southern Region SARE Sustainable Agriculture Training Program - 2019-2020 Model State Program - Program Assistant	10.215	SUB00001991	-	25,082
Southern Region SARE Sustainable Agriculture Training Program 2019-2020 Model State Program - Training (MSP19)	10.215	SUB00002039	-	6,792
University of Illinois				
Integrating Established and Novel Strategies for Forest Health and Invasive Species Education and Extension Programing in the Eastern United States	10.500	093214-17205	-	9,798
University of Tennessee				
Farm and Ranch Stress Assistance Network: Southern Region	10.525	9500095927	-	27,929
Total Department of Agriculture			43,298	11,792,063
Department of Commerce				
Pass-through programs from:				
South Carolina Department of Natural Resources				
Community-based Living Shoreline Creation in the Urbanized Watershed of Charleston County, South Carolina to Support Habitat Resiliency and Ecosystem Services	11.463	SCDNR FY2020-034 P24018453919	-	1,200
Total Department of Commerce			-	1,200
Department of Defense				
Exploiting Structural Information in Algorithm Designs for Large-Scale Nonlinear Optimization	12.300	N00014-20-1-2089	84,150	156,069
Total Department of Defense			84,150	156,069
Department of the Interior				
CESU - Metals Conservation in Fort Pulaski: Treatment of Iron Architectural Features and Museum Artillery	15.945	P20AC01065	-	56,720
Digitize and Transcribe Historical Documents, Oversized Documents, Video Tapes, Audio Tapes, and Photographic Materials	15.945	P17AC01647	-	3,736
Total Department of the Interior			-	60,456

The accompanying notes are an integral part of this schedule

Clemson University, Clemson, South Carolina
Schedule of Expenditures of Federal Awards
For the year ended June 30, 2021

Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
OTHER PROGRAMS, continued				
Department of Justice				
Clemson University Police Department Justice and Mental Health Collaboration Program (JMHCP) Initiative	16.745	2019-MO-BX-0035	-	49,612
Pass-through programs from:				
National 4-H Council				
4-H Health Rocks! Mentoring Program	16.726	NMP10/2019-JY-FX-0026/4-H ID 17780	-	6,083
South Carolina National Mentoring Program	16.726	2019-MU-FX-0002/ 4-H 17781	-	55,911
South Carolina Department of Public Safety				
COVID-19 - Clemson University Police Coronavirus Preparedness and Response Program	16.034	1CF20059	-	30,432
Total Department of Justice			-	142,038
State Department				
Strategic Partnership in US Politics and International Affairs Between Clemson University and the University of Belgrade	19.900	SRB10020GR0064	-	14,455
Total State Department			-	14,455
Treasury Department				
Pass-through programs from:				
State of South Carolina				
COVID-19 - Coronavirus Relief Fund	21.019	Unknown	-	49,561,693
Total Treasury Department			-	49,561,693
National Endowment for the Arts				
Call My Name: African Americans in Early Clemson University History	45.130	ZR-256734-18	-	4,981
Call My Name: Digitizing African American Heritage in the Greater Clemson, South Carolina Community	45.149	PY-263730-19	-	3,404
COVID-19 - Emergency Relief Funding for New Postdoctoral Position in Public Humanities and African American Life in Upstate South Carolina	45.149	PB-275361-20	-	30,000
Pass-through programs from:				
South Carolina Humanities				
Preservation Across the Disciplines, 2019-2020 Clemson Humanities Hub	45.129	19-1940-1	-	250
Total National Endowment for the Arts			-	38,635
Small Business Administration				
Small Business Development Center - Federal Operating Grant 2020	59.037	Federal 2020 SBAHQ20B0059	-	78,496
COVID-19 - Small Business Development Center Cares Act	59.037	SBAHQ20C0077 Clemson Cares Act	-	288,890
Total Small Business Administration			-	367,386
Department of Veterans Affairs				
Paralympic Soccer Club Initiative	64.034	SPORTS-20-016	-	154,254
Clemson University-VA-SPORTS-19	64.034	SPORTS-19-094	-	53,364
Pass-through programs from:				
Move United, Inc.				
MOVE UNITED (FKA Adaptive Sports) USA National Veteran Airgun Outreach Series	64.000	none	-	3,643
Total Department of Veterans Affairs			-	211,261
Environmental Protection Agency				
Multipurpose Grants to States and Tribes	66.204	01D17320	-	10,112
Multipurpose Grants to States and Tribes	66.204	AA01D02620	-	28,003
Consolidated Pesticide Certificate and Training	66.700	98463820	-	180,121
Consolidated Pesticide Enforcement Cooperative Agreements - Enforcement	66.700	98463620	-	203,251
Consolidated Pesticide Enforcement Cooperative Agreements - Special Programs	66.700	98463720	-	149,015
Pass-through programs from:				
eXtension Foundation				
Category 1A: Agricultural Plant Pest Management	66.716	SA-2020-46	-	2,694
Understanding Pesticide Use and Safety	66.716	SA-2021-54	-	3,300
Tennessee Valley Authority				
Establish a Landscape Conservation Fellowship for the Tennessee River Basin Biodiversity Network.	66.000	13373 / PO# 6678289	-	6,776
Total Environmental Protection Agency			-	583,272
Department of Energy				
All-digital Sensor System for Distributed Downhole Pressure Monitoring in Unconventional Fields	81.089	DE-FE0031781	105,806	312,239
Pass-through programs from:				
Cummins, Inc.				
Advancing Platooning with ADAS Control Integration and Assessment--Cummins--AOI 3d	81.086	none	-	103,894
Total Department of Energy			105,806	416,133

The accompanying notes are an integral part of this schedule

(continued)

Clemson University, Clemson, South Carolina
Schedule of Expenditures of Federal Awards
For the year ended June 30, 2021

Federal Grantor/Pass-Through Grantor/Program Title	Assistance Listing Number	Pass-through Entity Identifying Number	Passed through to Subrecipient	Total Federal Expenditures
OTHER PROGRAMS, continued				
Department of Education				
Education Stabilization Fund				
COVID-19 - Higher Education Emergency Relief Fund (HEERF) - Student Portion	84.425E	P425E200221-20C	-	6,699,598
COVID-19 - Higher Education Emergency Relief Fund (HEERF) - Institutional Portion	84.425F	P425F200181	-	13,316,365
Total Education Stabilization Fund			-	20,015,963
Exemplary Personnel for Education, Research, and Teaching in Special Education (ExPERTiSE)	84.325	H325D140044	-	23,032
Pass-through programs from:				
Monaview Elementary				
Monaview Magic Initiative	84.287	1st PO #203214 // 2nd PO #211132//3rd PO# 221447	-	14,451
National Writing Project				
NWP 2019¿2020 Year 3 i3 Scale-Up C3WP Professional Development	84.411	01-SC11-2019i3C3WP	-	79,123
Scaling Up the National Writing Project's College-Ready Writers Program: Expanding Access, Reach, and Leadership for Ongoing Improvement	84.411	01-SC11-2020i3C3WP	-	193,141
South Carolina Department of Education				
Agriculture Teacher Education and Professional Development	84.048	21ClemsonAgEd	-	23,961
Agriculture Teacher Education and Professional Development	84.048	20Clemson Agriculture Education	-	3,258
Future Farmers Association (FFA) Program Assistant	84.048	20ClemsonFFA Program Assistant	-	920
Future Farmers of America (FFA) Program Assistant	84.048	21ClemsonFFA	-	12,874
Nita M. Lowey 21st CCLC After-School Program at Cedar Grove Elementary and Palmetto Elementary	84.287	21 21st CCLC-41 H63010006921	40,368	93,716
Nita M. Lowey 21st CCLC After-School Program at Cedar Grove Elementary and Palmetto Elementary	84.287	20 21st CCLC-41 H63010006920	5,248	5,248
Nita M. Lowey 21st CCLC After-School Program at Chastain and Liberty Elementary	84.287	21 21st CCLC-50 H63010006921	51,110	108,890
Nita M. Lowey 21st CCLC After-School Program at Chastain Road Elementary and Liberty Elementary	84.287	20 21st CCLC-50 H63010006920	-	451
Nita M. Lowey 21st CCLC After-School Program at Spearman Elementary and West Pelzer Elementary	84.287	21 21st CCLC-20 H63010006919	51,609	105,158
Nita M. Lowey 21st CCLC After-School Program at Spearman Elementary and West Pelzer Elementary	84.287	20 21st CCLC-20 H63010006920	2,239	3,132
The Ohio State University				
Refining and Expanding HEROES: A Literacy Intervention for Young Students with IEPs	84.411	60073281 / PO# RF01590246	-	83,076
Total Department of Education			150,574	750,431
Department of Health and Human Services				
Advanced Nurse Education-Sexual Nurse Assault Examiner program	93.247	5T96HP32502-03-00	139,705	228,440
Mental Health Awareness Training	93.243	5H79SM081359-03	79,087	79,087
REAL Counselor Training and Development: Reinforcing Education through Addictions-focused Learning	93.243	1H79FG000032-01	-	58,111
Reducing Fall Risk in Rural, Older South Carolinians	93.761	90FPSG0047-01-00	-	567
Rural Communities Opioid Response Program-Neonatal Abstinence Syndrome	93.912	6G26RH40075-01-02	19,530	19,530
Pass-through programs from:				
Christopher Reeve Paralysis Foundation				
Clemson University: Tutor, Talk and Train	93.325	2020 COVID-19: Addressing Social Isolation	-	6,303
Fact Forward				
Accelerating Progress: Strengthening Teen Pregnancy Initiatives Among High Need South Carolina Populations (Tier lA)	93.297	1 TP1AH000133-05-00	-	6,606
Accelerating Progress: Strengthening Teen Pregnancy Prevention Initiatives among High Need SC Populations (Tier 1A)	93.297	1 TP1AH000133-04-00	-	8,754
South Carolina Department of Agriculture				
Food Safety Modernization Act (FSMA) Position Year 5 - Implementation of the Produce Safety Rule in South Carolina to Enhance Safety in Growing, Harvesting, Packing, and Storing Fresh Fruits and Vegetables	93.103	P16010PSRI17-1 Yr5	-	49,999
South Carolina Department of Health and Environmental Control				
Academic Detailing	93.354	CY-19-018 FR#4000043462/LR-2020-06	545,723	545,723
Total Department of Health and Human Services			784,045	1,003,120
US Department of Homeland Security				
Pass-through programs from:				
South Carolina Emergency Management Division				
FEMA Public Assistance - 4542 Severe Storms, Tornadoes, and Straight-line Winds (Type A - Debris Removal)	97.000	FEMA 4542-PA-SC Project #32	-	83,833
FEMA Public Assistance - 4542 Severe Storms, Tornadoes, and Straight-line Winds (Type A - Debris Removal)	97.000	FEMA PA-04-SC-4542-PW-00032	-	27,048
Total US Department of Homeland Security			-	110,881
Total Other Programs			1,167,873	85,225,056
Total Federal Expenditures			11,590,273	304,064,156

Clemson University
Clemson, South Carolina
Notes to the Schedule of Expenditures of Federal Awards
June 30, 2021

Note 1.   Basis of Presentation

The accompanying Schedule of Expenditures of Federal Awards (the "Schedule") includes the federal award activity of Clemson University (the "University") and is presented on the accrual basis of accounting. The information in the Schedule is presented in accordance with the requirements of Title 2 U.S. Code of Federal Regulations Part 200, *Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards* (Uniform Guidance)*.* Because the Schedule presents only a selected portion of the operations of Clemson University, it is not intended to and does not present the financial position, changes in net position, or cash flows of the University.

Note 2.   Summary of Significant Accounting Polices

Expenditures in the Schedule are recognized following the cost accounting principles contained in the Uniform Guidance, wherein certain types of expenditures are not allowable or are limited as to reimbursement. Negative amounts shown on the Schedule represent adjustments or credits made in the normal course of business to amounts reported as expenditures in prior years.

Expenditures for student financial aid programs include the federal share of students' Federal Supplemental Educational Opportunity Grant (FSEOG) program grants and Federal Work Study (FWS) program earnings, certain other federal financial aid for students and administrative cost allowances, where applicable.

Expenditures for nonfinancial aid awards include indirect costs, related primarily to facilities operation and maintenance and general, divisional and departmental administrative services, which are allocated to direct cost objectives (including federal awards) based on negotiated formulas commonly referred to as facilities and administrative cost rates. Facilities and administrative costs allocated to such awards for the year ended June 30, 2021, were based on predetermined fixed rates negotiated with the University's cognizant federal agency. The University has elected not to use the 10-percent de minimis indirect cost rate as allowed under the Uniform Guidance.

Note 3.   Federal Perkins Loan Program (Assistance Listing Number 84.038)

The Federal Perkins Loan Program is administered directly by the University and balances and transactions relating to the program are included in the University's financial statements. Federal expenditures reported on the face of the Schedule include loans outstanding at the beginning of the year, loan cancellations, interest subsidies, and administrative expenses. Due to the expiration of the Federal Perkins Loan Program on September 30, 2017, the University did not disburse any Perkins loans to students during the year ended June 30, 2021. The balance of loans outstanding under the Federal Perkins Loan Program was $3,938,916 as of June 30, 2021. Schools have the option of continuing to collect on outstanding loan balance or can voluntarily liquidate the program. The University has no current plans to begin the Perkins liquidation process. However, the University is required to periodically return excess cash on hand from the program to the Department of Education.

Note 4.   Federal Direct Student Loans Program (Assistance Listing Number 84.268)

The University participates in the Federal Direct Student Loans (Direct Loans) program of the U.S. Department of Education (USDE), which includes subsidized and unsubsidized Federal Stafford Loans and Federal PLUS Loans. Under the Direct Loans program, the University is responsible only for certain administrative duties, accordingly, the disbursements under the program and the outstanding loan balances are excluded from the financial statements of the University.

Note 5.   Contingencies

The University receives funds under various federal grant programs and such awards are to be expended in accordance with the provisions of the various grants. Compliance with the grants is subject to audit by various government agencies which may impose sanctions in the event of non-compliance. Management believes that they have complied with all aspects of the various grant provisions and the results of adjustments, if any, relating to such audits would not have any material financial impact.

**Independent Auditor's Report on Internal Control Over Financial Reporting
and on Compliance and Other Matters Based on an Audit of
Financial Statements Performed in Accordance with
*Government Auditing Standards***

Members of the Board of Trustees
Clemson University
Clemson, South Carolina

We have audited, in accordance with the auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States, the financial statements of the business-type activities and discretely presented component units of Clemson University (the "University"), as of and for the year ended June 30, 2021, and the related notes to the financial statements, which collectively comprise the University's basic financial statements, and have issued our report thereon dated September 27, 2021. Our report includes a reference to other auditors who audited the financial statements of the Clemson University Foundation, the Clemson University Land Stewardship Foundation, and IPTAY, as described in our report on Clemson University's financial statements. This report does not include the results of other auditors' testing of internal control over financial reporting or compliance and other matters that are reported on separately by those auditors. The financial statements of the Clemson University Foundation, the Clemson University Land Stewardship Foundation, and IPTAY were not audited in accordance with *Government Auditing Standards*.

Internal Control over Financial Reporting

In planning and performing our audit of the financial statements, we considered the University's internal control over financial reporting (internal control) as a basis for designing audit procedures that are appropriate in the circumstances for the purpose of expressing our opinions on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of the University's internal control. Accordingly, we do not express an opinion on the effectiveness of the University's internal control.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A *material weakness* is a deficiency, or a combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected on a timely basis. A *significant deficiency* is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

Compliance and Other Matters

As part of obtaining reasonable assurance about whether the University's financial statements are free from material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the financial statements. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under Government Auditing Standards.

Purpose of this Report

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the entity's internal control or on compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the entity's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

Elliott Davis, LLC

Greenville, South Carolina
September 27, 2021

![elliott davis]

**Independent Auditor's Report on Compliance for
Each Major Federal Program; Report on Internal Control Over
Compliance; and Report on the Schedule of Expenditures of
Federal Awards Required by the Uniform Guidance**

Members of the Board of Trustees
Clemson University
Clemson, South Carolina

Report on Compliance for Each Major Federal Program

We have audited Clemson University's (the "University") compliance with the types of compliance requirements described in the *OMB Compliance Supplement* that could have a direct and material effect on each of the University's major federal programs for the year ended June 30, 2021. The University's major federal programs are identified in the summary of auditor's results section of the accompanying schedule of findings and questioned costs.

Management's Responsibility

Management is responsible for compliance with federal statutes, regulations, and the terms and conditions of its federal awards applicable to its federal programs.

Auditor's Responsibility

Our responsibility is to express an opinion on compliance for each of the University's major federal programs based on our audit of the types of compliance requirements referred to above. We conducted our audit of compliance in accordance with auditing standards generally accepted in the United States of America; the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States; and the audit requirements of Title 2 *U.S. Code of Federal Regulations Part 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards* (Uniform Guidance). Those standards and the Uniform Guidance require that we plan and perform the audit to obtain reasonable assurance about whether noncompliance with the types of compliance requirements referred to above that could have a direct and material effect on a major federal program occurred. An audit includes examining, on a test basis, evidence about the University's compliance with those requirements and performing such other procedures as we considered necessary in the circumstances.

We believe that our audit provides a reasonable basis for our opinion on compliance for each major federal program. However, our audit does not provide a legal determination of the University's compliance.

Opinion on Each Major Federal Program

In our opinion, the University complied, in all material respects, with the types of compliance requirements referred to above that could have a direct and material effect on each of its major federal programs for the year ended June 30, 2021.

Report on Internal Control Over Compliance

Management of the University is responsible for establishing and maintaining effective internal control over compliance with the types of compliance requirements referred to above. In planning and performing our audit of compliance, we considered the University's internal control over compliance with the types of requirements that could have a direct and material effect on each major federal program to determine the auditing procedures that are appropriate in the circumstances for the purpose of expressing an opinion on compliance for each major federal program and to test and report on internal control over compliance in accordance with Uniform Guidance, but not for the purpose of expressing an opinion on the effectiveness of internal control over compliance. Accordingly, we do not express an opinion on the effectiveness of the University's internal control over compliance.

A *deficiency in internal control over compliance* exists when the design or operation of a control over compliance does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, noncompliance with a type of compliance requirement of a federal program on a timely basis. A *material weakness in internal control over compliance* is a deficiency, or combination of deficiencies, in internal control over compliance, such that there is a reasonable possibility that material noncompliance with a type of compliance requirement of a federal program will not be prevented, or detected and corrected, on a timely basis. A *significant deficiency in internal control over compliance* is a deficiency, or a combination of deficiencies, in internal control over compliance with a type of compliance requirement of a federal program that is less severe than a material weakness in internal control over compliance, yet important enough to merit attention by those charged with governance.

Our consideration of internal control over compliance was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control over compliance that might be material weaknesses or significant deficiencies. We did not identify any deficiencies in internal control over compliance that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

The purpose of this report on internal control over compliance is solely to describe the scope of our testing of internal control over compliance and the results of that testing based on the requirements of the Uniform Guidance. Accordingly, this report is not suitable for any other purpose.

Report on Schedule of Expenditures of Federal Awards Required by the Uniform Guidance

We have audited the financial statements of the business-type activities and the aggregate discretely presented components of the University, a component unit of the State of South Carolina, as of and for the year ended June 30, 2021, and the related notes to the financial statements, which collectively comprise the University's basic financial statements. We issued our report thereon dated September 27, 2021, which contained unmodified opinions on those financial statements. We did not audit the financial statements of the Clemson University Foundation (a discretely presented component unit), the Clemson University Land Stewardship Foundation (a discretely presented component unit), and IPTAY (a discretely presented component unit). Those statements were audited by other auditors whose reports have been furnished to us, and our opinions, insofar as they relate to the amounts included for these discretely presented components units, are based solely on the reports of the other auditors. Our audit was conducted for the purpose of forming opinions on the basic financial statements as a whole. The accompanying Schedule of Expenditures of Federal Awards is presented for purposes of additional analysis as required by the Uniform Guidance and is not a required part of the basic financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic financial statements. The information has been subjected to the auditing procedures applied in the audit of the financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the Schedule of Expenditure of Federal Awards is fairly stated in all material respects in relation to the basic financial statements as a whole.

Elliott Davis, LLC

Greenville, South Carolina
March 4, 2022

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Clemson University
Clemson, South Carolina
Schedule of Findings and Questioned Costs
For the year ended June 30, 2021

Section I. Summary of Auditor's Results

Financial Statements

Type of report the auditor issued on whether the financial statements audited
were prepared in accordance with GAAP: Unmodified

Internal control over financial reporting:

- Material weakness identified? _____ yes __X__ no
- Significant deficiency identified? _____ yes __X__ none reported

Noncompliance material to financial statements noted? _____ yes __X__ no

Federal Awards

Internal control over major federal programs:

- Material weakness identified? _____ yes __X__ no
- Significant deficiency identified? _____ yes __X__ none reported

Type of auditor's report issued on compliance for major federal programs: Unmodified

Any audit findings disclosed that are required to be
reported in accordance with 2 CFR 200.516 (a)? _____ yes __X__ no

Identification of major federal programs:

Assistance Listing Numbers	Name of federal program or cluster
10.RD; 11.RD; 12.RD; 15.RD; 16.RD; 19.RD; 20.RD; 43.RD; 45.RD; 47.RD; 66.RD; 77.RD; 81.RD; 84.RD; 93.RD; 94.RD; 98.RD	Research and Development Cluster
10.511	Smith-Lever
21.019	Coronavirus Relief Fund
84.425E; 84.425F	Higher Education Emergency Relief Fund (HEERF)

Dollar threshold used to distinguish between
Type A and Type B Programs $3,000,000

Auditee qualified as low-risk auditee? __X__ yes _____ no

Clemson University
Clemson, South Carolina
Schedule of Findings and Questioned Costs
For the year ended June 30, 2021

Section II. Financial Statement Findings

No matters were reported.

Section III. Federal Award Questioned Costs and Findings

No matters were reported.

Clemson University Clemson, South Carolina *Summary Schedule of Prior Audit Findings For the year ended June 30, 2021*

In accordance with *Government Auditing Standards*, issued by the Comptroller General of the United States, the following is the status of known material findings and recommendations from prior year audits:

Finding 2020-001 Disbursement Reporting

Federal Agency: Department of Education

Program: Student Financial Assistance Cluster

Condition:

> Pell Grant Awards' Disbursement Record were not reported to the COD (Common Origination and Disbursement) within the 15 day requirement detailed within Federal Register Volume 84, Number 212. The University underwent an upgrade of the integrated scheduling software that is utilized for the automatic reporting of Pell Grant Award disbursement records to the COD. At the time of the software upgrade, the scheduled reporting of Pell Grant Award disbursements to the COD was deactivated by IT, without the knowledge of the job owner, to allow for proper implementation of the software upgrade. Upon final completion of the software upgrade, the scheduled reporting of Pell Grant Award disbursements was not reactivated resulting in the delayed reporting of Pell Grant Award Disbursements.

Current Action Taken/Current Status:

> The error was discovered by Student Financial Aid as part of their regular disbursement review processes and was corrected in 11 days. It is standard procedure for the IT staff to notify the job owner when offline maintenance occurs on the scheduler (UC4/Automic). The IT staff has been advised that there should be no exceptions to this rule, including same day changes. IT staff will notify the job owner when maintenance on the scheduler (UC4/Automic) is complete and the owner will verify that all jobs are back online.

Finding 2020-002 Special Tests and Provisions – Disbursements: Financial Student Aid Credit Balance Payment

Federal Agency: Department of Education

Program: Student Financial Assistance Cluster

Condition:

Federal Student Aid (FSA) credit balances were not paid to the student within the 14 day regulatory requirement established under 34 CFR Section 668.164(h), which specifies that credit balances must be paid to the student or parent as soon as possible, but no later than: (i) Fourteen (14) days after the balance occurred if the credit balance occurred after the first day of class of a payment period; or (ii) Fourteen (14) days after the first day of class of a payment period if the credit balance occurred on or before the first day of class of that payment. Students enrolled in a study abroad program through the University are required to submit a Verification of Enrollment form prior to the payment of FSA credit balances to ensure the students are attending classes at their respective study abroad institutions. SFA considered the period to begin upon receipt of the Verification of Enrollment (VOE) form, after which refunds were paid in a timely manner.

Current Action Taken/Current Status:

Student Financial Aid (SFA) created a disbursement rule for all Title IV funds to prevent disbursement of aid until the VOE is received to prevent a credit balance.