

Division of Information Technology
University of South Carolina

ANNUAL REPORT FY 20–21



Information
Technology



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DIVISION OF INFORMATION TECHNOLOGY IT STRATEGIC PRIORITIES: 2018–2021



Strategic Priority 1

Advance the academic and research missions of the university

The preeminent priority of the Division of Information Technology will be to make substantive contributions to the teaching and research missions of the university.



Strategic Priority 2

Enhance the student digital experience

The Division of Information Technology will equip students with the technology necessary to achieve academic success.



Strategic Priority 3

Improve administrative efficiencies

The Division of Information Technology will work to streamline administrative systems and processes to minimize overhead and duplicated work.



Strategic Priority 4

Establish best-in-class service delivery model

The services offered by the Division of Information Technology should be easily accessible, competitively priced, and repeatable.



Strategic Priority 5

Provide a reliable and flexible technology infrastructure

The Division of Information Technology will plan for future growth and innovation by providing a technology infrastructure that can be expanded, upgraded, and replaced to meet growing needs.

MESSAGE FROM THE VICE PRESIDENT FOR INFORMATION TECHNOLOGY AND CHIEF INFORMATION OFFICER



Doug Foster

The past fiscal year was unlike any other. Due to the COVID-19 pandemic, we were challenged to develop new ways to deliver teaching, conduct research, and complete our job responsibilities that support the educational environment at the university.

Many employees worked remotely for the majority of the year. While we missed the togetherness and the camaraderie that a close physical environment can provide, our employees remained resilient and adapted to all challenges placed before them. Employees of the Division of Information Technology, and across the university, demonstrated the ability to perform under pressure and accomplished much, despite our unusual physical working arrangements.

Over the past year, we completed a major upgrade to the wireless network on the Columbia campus, providing faster, more reliable service to our students and employees. We expanded and upgraded technology used to deliver instruction in nearly 500 classrooms on the Columbia campus. We also introduced CarolinaAnalytics, a central platform for data analytics and business intelligence for use by the entire system. We made significant

improvements in our Research Computing efforts, providing 99.999 percent uptime on high performance computing resources, despite the shift to remote work. We also began work on the Carolina Enclave for Secure Research, which will provide a segmented and monitored environment that allows researchers to store and analyze sensitive data. This is an exciting development for our university, and a result of several partnerships across the system to help design and define requirements.

We are especially proud of our part in the work to develop capabilities for students, faculty, and staff across the system to select their preferred first name, preferred last name, gender identity, and personal pronouns in our identity and access management system. This improvement is another step in support of diversity, equity, and inclusion at our university.

The Division of Information Technology is committed to the continuous improvement of our services to best meet the needs of our Gamecock community. We will continue to strive to offer cutting edge IT services and evolve with the ever-changing landscape. I am proud to be a part of this great university and lead such a talented group of employees.

I welcome your comments and suggestions on how information technology can be improved. I can be reached at drfoster@mailbox.sc.edu. Thank you for your continued support.

ADVANCING THE ACADEMIC AND RESEARCH MISSIONS OF THE UNIVERSITY

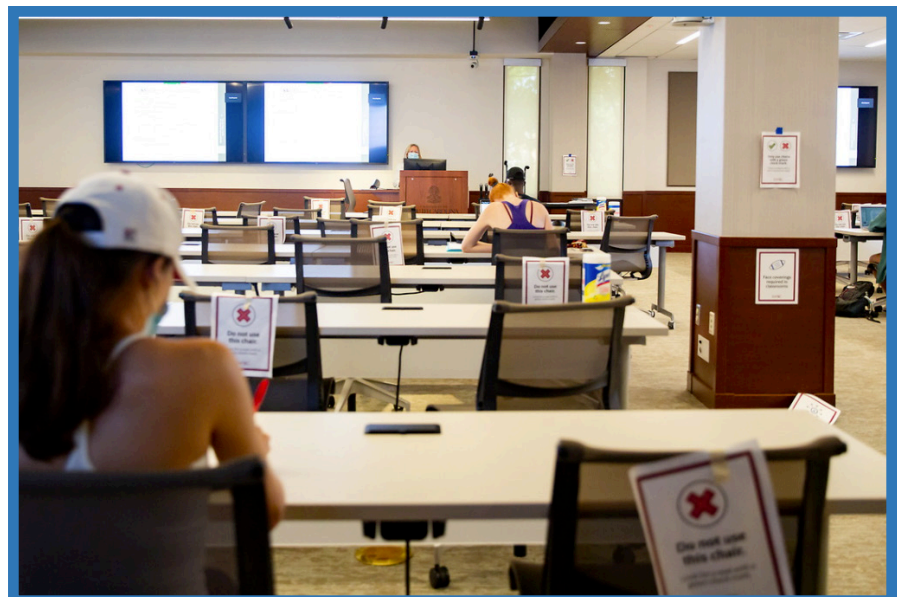
Strategic Priority 1 of the Division of Information Technology is to make substantive contributions to the teaching and research missions of the university. During the 2020–21 fiscal year, there was significant progress towards this priority. A highlight of some of our accomplishments in this area follows.

ADVANCEMENT OF TEACHING AND LEARNING ENVIRONMENTS

The Division of Information Technology began a multi-year initiative to advance teaching and learning environments on the Columbia campus. **LITE**, which stands for Learn, Innovate, Teach and Enhance, was introduced using funding from university Strategic Initiatives. The goal of LITE is to upgrade 500 classrooms over the span of the initiative. The improved classroom designs include upgrades to many of the audiovisual presentation technologies faculty have used for years. LITE classrooms also include technologies that combine face-to-face and online teaching into one experience, while addressing accessibility and student engagement requirements. The approach of modernization, standardization, and flexibility provides a consistent instructional technology experience for faculty teaching in various spaces throughout campus, while accommodating on-campus, online, hybrid, and hyflex course delivery modalities. As of June 30, 2021, a total of 65 classrooms were upgraded by the division.



A total of 494 classrooms on the Columbia campus were converted to hybrid-capable teaching and learning spaces before the Fall 2020 semester began.



IMPROVEMENTS TO TECHNOLOGY IN THE CLASSROOM

In addition to the classroom upgrades made possible through LITE, the dedicated Collaborate Technologies and Academic Support unit successfully transitioned 494 classrooms on the Columbia campus to hybrid-capable teaching and learning spaces before the Fall 2020 semester began. The unit standardized the deployment of hardware and utilized a single delivery platform to existing technologies to provide the flexibility for remote participation by students who were unable to attend classes in person. The unit also added an option to record instruction and digital presentations for later review, ensuring students have a positive digital experience, and maximizing their chances of success.



DEVELOPMENT OF CAROLINA ONLINE

The Division of Information Technology worked with the Provost, academic, and administrative units across the system to develop and define requirements for Carolina Online, the university's comprehensive effort to allow students to earn degrees and professional credentials online. Division employees not only assisted with the development of the online learning environment, but also collaborated with instructional designers to ensure the Learning Management System had a consistent look and feel across the platform. They also designed and implemented a call center for Carolina Online.

ESTABLISHED LEARNING MANAGEMENT SYSTEM ADVISORY COUNCIL

In 2020, the division established a [Learning Management System Advisory Council](#). This decision-making body consists of instructors and administrative areas that work to ensure the services, functions, tools, systems, and personnel of the Division of Information Technology deliver quality learning management system requirements. The group also responds to the strategic goals and evolving needs of students, faculty, and academic programs. It also works to continuously improve the teaching and learning experience across the UofSC system.

INTRODUCED POWERFUL TOOLS FOR RESEARCHERS

The Research Computing team implemented a highly responsive, fully integrated tool for interactive desktop environments on the Hyperion High Performance Cluster (HPC). This new tool, called Open OnDemand, provides a web interface to a virtual desktop that allows users to easily access the HPC cluster for transferring data, managing jobs, and spinning up interactive Linux VMs

to perform workload processing. Open OnDemand also provides access to extended programming and visualization tools like Jupyter Notebooks.

Research Computing configured a state-of-the-art NVIDIA DGX A100 GPU system in the Hyperion HPC cluster. This DGX node allows users to process on eight cutting-edge NVIDIA GPUs simultaneously. This vastly increases the scale of machine learning and artificial intelligence projects that can be accommodated on the Hyperion cluster, and is a great boon to researchers applying for grants. The NVIDIA DGX A100 is the most powerful GPU server resource on the market.

The BIOPAC life science research data acquisition and analysis systems have been cited in more than 20,000 scientific articles and studies and are researchers' tools of choice worldwide. To enable UofSC researchers in their quest for discovery, Research Computing built and supported infrastructure to host this tool on AWS cloud to accelerate research at UofSC.

Research Computing implemented Statistical and Machine Learning support approaches to explore and identify new patterns/ combinations of predictors associated with HIV medical care utilization. Researchers can now learn essential patterns and trends beyond what was previously possible using data mining to improve statistical software and computational capabilities.

Research Computing support for research in the College of Pharmacy (COP) included introducing a GPU pipeline that enabled a 100x speedup. In the study, COP conducted research to identify markers, defects, and nucleotides to provide targeted therapeutics for cancer treatment. The GPU accelerated bioinformatics pipelines utilized new software tools from Oxford Nanopore to accomplish the 100x speedup. The overall pipeline consists of a cleaning phase, alignment, and detection. The next proposed steps are to utilize deep learning

neural networks for predictive sequences for damaged DNA- Single Nucleotide Polymorphisms and insertion-deletion mutations to predict mutations in cancer cells and build a treatment that accounts for the mutations.

CAROLINA ENCLAVE FOR SECURE RESEARCH IS BORN

Research Computing and partners from the College of Engineering and Computing implemented the first stage of UofSC's secure computing and data storage environment, the Carolina Enclave for Secure Research (CESR). This segmented, highly controlled and monitored environment allows researchers to store and analyze regulated research data from sources such as health institutions, government agencies, and private industry partners. CESR will meet the high-water mark of security standards to ensure that regulated information is protected as per local, federal, and international laws while ensuring data confidentiality, integrity, and availability.

While the initial focus of CESR is addressing NIST SP 800-171 Revision 2 requirements for Department of Defense research, Research Computing and the College of Engineering and Computing are partnering with the

UofSC Institute for Families in Society to build support to address sensitive health-related research with HIPAA requirements. CESR aligns with the [strategic goals and objectives of the university](#), as illustrated below.

IMPLEMENTATION OF DEDICATED RESEARCH NETWORK

In partnership with researchers from Integrated Information Technology, teams from the Division of Information Technology designed and implemented a 100 gigabit per second Science Demilitarized Zone (Science DMZ) research network to link sites in the university data center, University Library's MIRC Center, and the data center in the College of Engineering and Computing. The work was funded by a National Science Foundation grant awarded to Principal Investigator Jorge Crichigno and Co-Principal Investigator Paul Sagona. The science DMZ is a high-speed, secure network with an emphasis on cyber security for the transfer of big data. Given the exponential increase of research and engineering data, current general-purpose networks are incapable of providing acceptable rates to move large flows of data nationally and internationally. Science DMZs are the solution to this problem. Experts from Research Computing and the Division of Information Technology



Network Infrastructure team designed, procured, and installed specialized systems to perform continuous testing and measuring on ScienceDMZ performance while connecting to national and international sites.

Globus, a service for secure, reliable research data management and transfers, was integrated as a core service of the Science DMZ. This allows university researchers simple, high-speed web access to their files stored on university High Performance Computing (HPC) resources and enables high-speed parallel data transfers directly from UofSC resources to a large network of Globus-enabled and Internet2-connected research institutions.

EXPANSION OF RESEARCH WORKSHOP SERIES

In further support of the research missions of the university, the Research Computing team expanded their Workshop Series. The team shifted delivery of workshops to a virtual platform. This shift, coupled with effective marketing of the workshop series, resulted in an average fourfold increase in workshop attendance, from 8–10 attendees attending a typical in-person workshop to 25–40 attendees at the virtual workshops.



ENHANCING THE STUDENT DIGITAL EXPERIENCE

Strategic Priority 2 of the Division of Information Technology is to equip students with the technology necessary to achieve academic success. Objectives include engaging students in decision-making, establishing consistent use of learning tools, and more.

ENHANCEMENTS TO BANNER STUDENT INFORMATION SYSTEM

The Banner Student Information System is a database of student records that includes information related to admissions, financial aid, registration, billing, academic records, and more. Division of Information Technology teams implemented a variety of enhancements to Banner to better serve students, faculty, and staff across the system. One enhancement was integration with StarRez, a housing system used by the Aiken, Beaufort, and Upstate campuses. The system allows for a more modern, one-stop, customizable experience for students. The Division of Information Technology integrated Banner with the new University Library Shared System, Alma, for all eight campuses. The new statewide Shared Library Services Platform is designed with advanced technologies and increased accessibility for students, faculty and staff. The transition to the new system is an example of a trend in academic libraries nationwide to leverage

technology, work more collaboratively and strategically, improve the user experience, and maximize the benefits of collections and limited resources. Teams also integrated Banner with a new Textbook Adoption system that is used by the Law School, the Columbia campus, and the Beaufort campus. The system allows instructors to view real-time adoption rates and submission progress. Faculty can now experience a personalized course list to easily search, research, and submit textbook adoptions. Finally, the division integrated the Banner system with PeopleGrove, a new [UofSC Mentorship Hub](#) administered by the Career Center.

IMPROVED DIGITAL ACCESSIBILITY

The university made a commitment to provide accessible content in all digital spaces. Digital accessibility does not only help a few individuals; offering accessible digital content ensures the digital experience at UofSC is a little more welcoming, a little

more caring and a little less frustrating—for everyone. In the past year, the university completed Phase 1 of the [Digital Accessibility Program](#). This included the hiring of a Director of Digital Accessibility and the formation of a Digital Accessibility Committee that meets regularly to discuss resolution of digital accessibility issues and

next steps. The division, in partnership with UofSC Communications and Public Affairs, offered campus-wide education programs and launched a new accessibility website. In addition, university policy [IT 5.00 - Digital Accessibility](#) was adopted by the Board of Trustees that defines accessibility compliance at the university.

IMPROVING ADMINISTRATIVE EFFICIENCIES

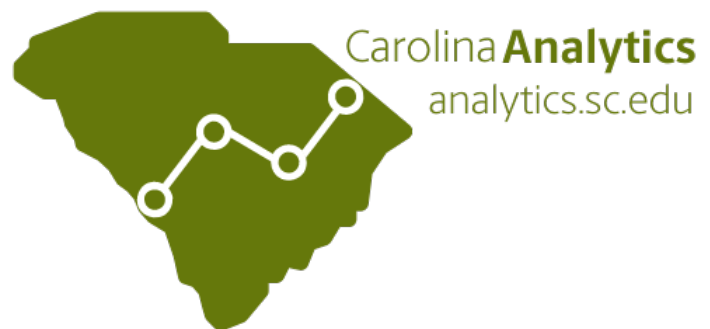
Strategic Priority 3 of the Division of Information Technology is to work to streamline administrative systems and processes to minimize overhead and duplicated work.

SYSTEM-WIDE DATA ANALYTICS AND DASHBOARDS

Through a partnership with HelioCampus, the Business Intelligence Strategist and Chief Data Officer launched the university's new central platform for data analytics and business intelligence, [CarolinaAnalytics](#). The platform offers more than three dozen dashboards, as well as access to canonical data extracts to expedite reporting and analysis of Student Core Data and Blackboard Learning Management System (LMS) data. In the next two years, Financial Core and Human Resources Core will round out the expertly-linked data domains—all on the university's cloud-based Tableau Server—to expedite user access and explore highly reliable, near-real-time data.

AVAILABILITY OF TABLEAU SKUNKWORKS SPACE & LICENSES

The Division of Information Technology began offering Tableau-based skunkworks analytics project spaces through CarolinaDataWorks. Any administrative unit can request no-cost project space on the university's cloud-based Tableau Server for departmental analytics initiatives, and leverage canonical data extracts to enrich departmental data sources with accurate and timely student and LMS data. During the 2020–21 academic year, the Office of Institutional Research, Assessment and

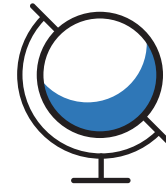
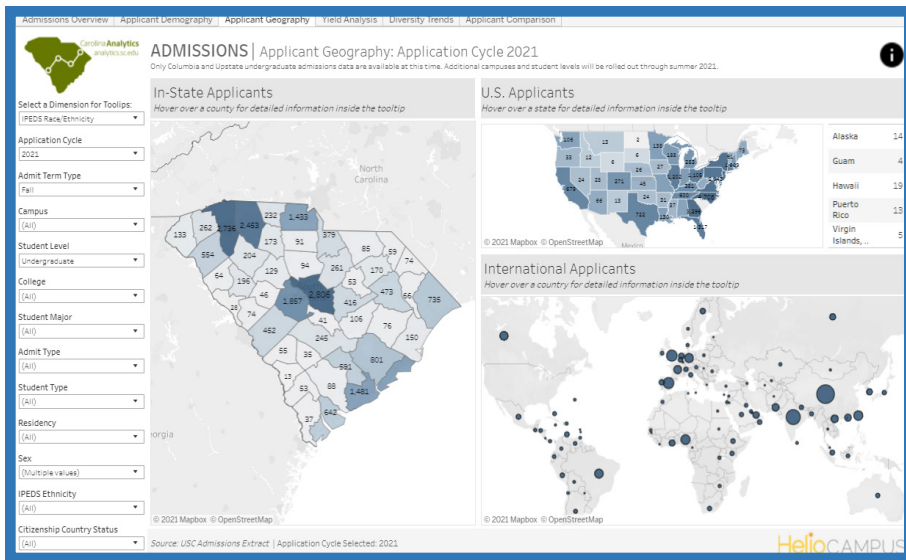


Analytics leveraged CarolinaDataWorks to create executive dashboards for [A Path to Excellence](#), the university's strategic plan, as well as Academic Program Reviews for Columbia-based colleges and schools.

In addition, the division began offering all three types of Tableau end user licenses through Software Distribution. The Viewer and Explorer licenses are available at no cost, while the Creator license is offered at standard educational rate. This availability streamlines the ability of organizational units to obtain licenses.

DATA STEWARDSHIP PROGRAM MANAGER LAUNCHES SERVICES

The university's first manager that is focused on identifying, orienting, training, and supporting the university's 127 (and counting) Data Stewards launched in 2020. The manager guides Data Stewards through data classification, data sharing agreements, and working through data-related decisions,



An example of a comprehensive and informative dashboard used by the Admissions Office at UofSC.

including support in making data available for analytics, reporting, and business intelligence.

OFFICE 365 SUPPORT TEAM

The demand for digital and online collaboration tools greatly increased during the 2020–21 fiscal year. In order to address demand, an Office 365 support team was developed. The Office 365 support team created more than 1,500 new Microsoft Teams throughout the fiscal year. A total of 309,414 meetings were hosted on the Teams platform. In addition, a total of 5,065,755 Team chats were processed and 200,660 one-

on-one calls were conducted. Finally, the Office 365 support team investigated and expanded the services offered in the university’s Microsoft environment.

EASE OF FEE PAYMENT FOR INTERNATIONAL STUDENTS

The university introduced PayMyTuition, a fee payment solution that allows international students to pay tuition and get refunds electronically with international currency. The enhancement decreased stress for international students by reducing payment processing time from several weeks to a few days.

ESTABLISHING BEST-IN-CLASS SERVICE DELIVERY

Strategic Priority 4 is to ensure the services offered by the Division of Information Technology are easily accessible, competitively priced, and repeatable.

SERVICE MANAGEMENT IMPROVEMENTS

The IT Transformation team made many improvements to IT service management and delivery functions. The team implemented Resource Management, the process of proactively planning, allocating, and scheduling resources such as funding and personnel. This allows the division to optimally utilize employees’ time, ensuring

they are not spread too thin. Resource Management also reduces risk and keeps projects running smoothly, improving the efficiency and effectiveness of IT services.

IT Transformation teams also completed significant work on the Configuration Management Database (CMDB). They added a number of VDI hosts, servers, virtual machines, and computers from across

the system to the CMDB, which acts as a database to show relationships among various IT assets. The CMDB now contains more than 1,500 servers, 500 computers, 335 printers, 400 databases, 70 service maps, and more. This expansion allows the division to identify dependencies among IT processes, applications, and other IT infrastructure.

INTRODUCED AGILE METHODOLOGY

The division also began implementing Agile methodology to manage IT projects. Agile allows teams to manage work in small “sprints,” enabling them to more effectively plan, implement, and support change. Agile allows for greater collaboration between team members and ensures a variety of viewpoints are considered before work is implemented.

PROVIDING A RELIABLE AND FLEXIBLE TECHNOLOGY INFRASTRUCTURE

Strategic Priority 5 is to plan for future growth and innovation by providing a technology infrastructure that can be expanded, upgraded, and replaced to meet growing needs.

\$3 MILLION UPGRADE TO WIRELESS NETWORK

The Infrastructure Services team made significant improvements to the wireless network in residence halls on the Columbia campus. The Division of Information Technology upgraded wireless capabilities in 26 buildings. The team installed a total of 4,000 wireless access points in only two and one-half months.

The improvements made wireless more reliable, faster, and more secure. A survey administered after the Spring 2021 semester showed an overall satisfaction rate of wireless connectivity in residence halls of 76 percent, a huge improvement from the 45 percent satisfaction rate a year earlier.

EXPANSION OF IT SERVICE DESK

In order to improve efficiency, 15 IT service desks from across the system came together to provide students and employees a single point-of-contact for all service requests. The Division of Information Technology, the College of Social Work, the College of Pharmacy, the College of Information and Communication, Honors College, Darla Moore School of Business, the School of Law, the College of Nursing, Athletics, the Institute for Families in Society, the College of Engineering and Computing, the Arnold School of Public Health, the College of Arts and Sciences, the School of Music, and University Libraries now use a single ticketing system and service desk to report IT issues and make IT requests.

INTRODUCTION OF EDUROAM

As part of the wireless improvement project, the division introduced the Eduroam network. Eduroam is now the primary way students, faculty, and staff connect their laptops, phones, and other devices to wireless. Many higher education institutions across the globe use Eduroam as their primary wireless network. More than 10,000 Eduroam hotspots are available at universities, research centers and schools across the world. It provides a higher level of security than conventional wireless networks and allows employees and students to use their UofSC credentials to connect to the Eduroam wireless network when they visit other institutions, at no cost.

TECHNOLOGY INFRASTRUCTURE ENHANCEMENTS

Division employees made several improvements to the overall technology infrastructure. These improvements help reduce downtime, increase reliability, and provide a more stable environment. Some enhancements include:

- Improvements to temperature monitoring of technology distros—distros are network connectivity distribution points that are located in various locations across campus. They connect end-user devices to the core network. Notifications for humidity, temperature fluctuations, power outages, and power fluctuations were installed on distros, as well as water intrusion monitors. This work improved dependability and efficiency.
- Increased automation for monitoring, metric data, and network asset entry
- Upgrades to network switches and wireless access points in the Greek Village
- The merging of several areas within the division to improve efficiency—telephony, networking, infrastructure planning, and wiring teams now form the Enterprise Data Network team.



JOURNEY TO THE CLOUD

The Infrastructure Team completed a 12-month collaborative effort of researching and documenting the university's strategy and vision of moving to the cloud. They built foundational infrastructure in both AWS and Azure cloud services to support compute, desktop, and storage workloads. The university worked with IBM to create an enterprise application mapping and migration strategy that began in April 2021. The team also completed a comprehensive assessment of network closets across campus in preparation for hybrid cloud/cloud infrastructure. They drafted a Request for Proposals (RFP) to engage a vendor to replace the on-campus virtual infrastructure. When completed, a hybrid Infrastructure as a Service will provide more resiliency and disaster recovery capabilities for critical university systems.

The division introduced a cloud telephony solution for university call centers to accommodate COVID remote work requirements and moved restricted file share data from the College of Nursing and University Health Services to the cloud.

CONTINUED IMPROVEMENTS TO UNIVERSITY DATA CENTER

In order to ensure university data and systems are protected, the division continually improves the university data center. To ensure the physical security of the data center,



Four individuals from the division were elected to the [UofSC Staff Senate](#). Their representation allows the division to participate in university governance and add to essential strategic conversations and decisions that support the institution. From left to right: Antonio Peterson, Bridget Leslie, Caroline Maulana, and Barry Duvall. Leslie is the Staff Senate Treasurer.

the division implemented a procedure to terminate all individual access to the physical servers on June 30 of each year. Individuals who need to enter the data center are now required to apply and be re-evaluated each year. The division also introduced improvements to metrics for power and climate for the data center.

VPN SPEED INCREASED

The division upgraded the Virtual Private Network (VPN) to increase speed. The VPN builds a data “tunnel” from a public network (e.g. hotel, airport, or coffee shop) to a private network (e.g. UofSC’s network). When connected to the university’s VPN, students and employees can securely access university resources while off campus. The data transmitted through a VPN is encrypted to provide security and protection from unauthorized access or data “snooping.”

NEW IT SECURITY FRAMEWORK

The University Information Security Office officially transitioned the university’s security compliance standard to the Cyber Security Framework (CSF) from the State of South Carolina Standard. These standards are used by each state agency to incorporate information security and privacy protection controls into business practices. In addition, the team transitioned the method used to annually report on cyber security efforts to a continuous reporting model that allows for a supporting compliance dashboard. The team uses the dashboard to report enterprise compliance with the new security standard and provide reporting to university leadership.

The university’s implementation of the CSF was recently reviewed by an external consulting firm and the university’s Audit and Advisory Services Office. The groups

DIVISION OF IT DEMOGRAPHICS

The Division of Information Technology values equity, fairness and diversity among employees and constituents. The following information represents the demographical make-up of the division as compared to the previous fiscal year.

	FY 19-20	FY 20-21
Full time employees	164	158
Female employees	29%	27%
Male employees	71%	73%
African American/Black employees	14%	11%
White employees	79%	83%
Other races	7%	6%
Ages 20–29	5%	1%
Ages 30–39	18%	19%
Ages 40–49	36%	35%
Ages 50–59	22%	28%
Ages 60+	19%	17%

reviewed control selection process, compliance measurement methodology, and overall implementation status. The assessment report was extremely positive, citing no problems with the CSF implementation.

MATURED SECURITY AWARENESS PROGRAM

The University Information Security Office introduced a new IT security training platform that better supports training and reporting metrics. The Securing the Human platform now includes training videos to keep employees up-to-date on current security issues and topics and includes new content that can be assigned based on

situational needs, whether that is position specific or adhoc. It also provides the ability to establish annual training refreshers.

DEPLOYMENT OF ASSET VISIBILITY PROJECT

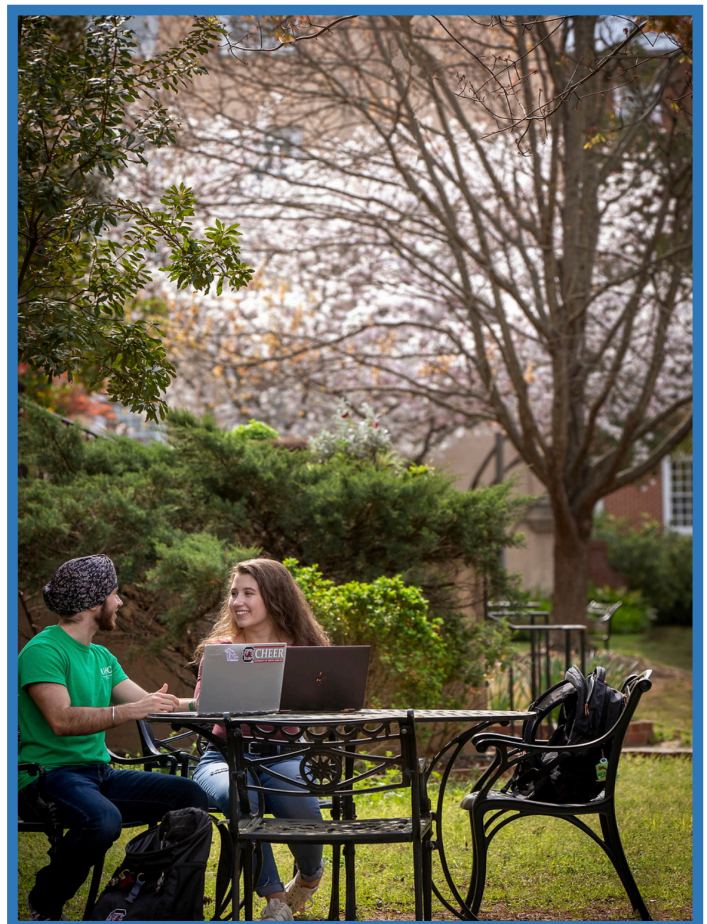
The University Information Security Office launched an asset visibility program to develop an accurate database of the technology equipment, materials, and supplies. The program, under deployment across the system, will allow the easy tracking of assets and the ability to maintain a current inventory. The project also allows the Information Security Office to monitor devices to ensure security standard compliance.

NEW OPTIONS TO SHARE PREFERRED NAMES AND PERSONAL PRONOUNS

The division collaborated with the Office of Diversity, Equity and Inclusion and the Office of Multicultural Student Affairs to promote a more inclusive university environment. Students, faculty, and staff can now add gender identity, preferred personal pronouns, and preferred first and last names to their account information.

Individuals can select one of 13 gender identities and 11 sets of personal pronouns. They can also indicate the name(s) by which they wish to be addressed in personal and casual communication, such as a nickname or more preferred last name.

Currently, preferred names and personal pronouns only appear in Office 365 applications, portions of the university student employee directory, and the email alias system. Work is underway to make these data available in Blackboard, Banner, and PeopleSoft.



IT EMPLOYEES SUPPORT MISSION & RESEARCH

Division of Information Technology employees not only provide services to the division, but they use their knowledge and skills to advance the university and the community.



Amy Jumper, IT services specialist, was presented the first CIO Award of Excellence. The award honors an individual within the division that demonstrates leadership, initiative, and dedication. When the COVID-19 pandemic first affected the university, Jumper stepped up to provide specialized IT support and worked diligently to make sure users across the university were properly connected and well versed in different collaborative platforms such as Microsoft Teams. Jumper was also awarded a Presidential Coin of Excellence from former President Bob Caslen. *CIO Doug Foster and Jumper are pictured above.*

Laurel Eddins, strategic services director, and **Liz Shirkey**, executive director of IT transformation, presented “[Optimizing IT: Enhancing the Digital Experience](#)” at the EDUCAUSE Annual Conference. **Eddins**, along with Continual Service Improvement Analyst **Joyce Shealy**, completed the ITILv4 practicing professional certification program.

Mike Kelly, chief data officer, conducted two webinars for international audiences on analytics and data governance topics, including a webcast for InsideHigherEd and a webinar on practical data governance for Academic Impressions. **Kelly**, along with Business Intelligence Strategist **Caroline Maulana**, and a colleague from the Office of Institutional Research, presented “[A New Data Strategy: The Foundation for Readiness and Action](#)” at the North Carolina/South Carolina regional conference of the Association for Institutional Research.

The **IT Security Team** placed 18th in the Security Operation Center Team World Championship. The competition consisted of teams competing on detecting, investigating, and remediating hyper-realistic Advanced Persistent Threat level attacks on live-fire enterprise networks.

David Reddy, research facilitator, and **Jun Zhou**, research scientist, presented “[Building Science Gateways for Humanities](#)” at the Practice and Experience in Advanced Research Computing (PEARC) 2020 Virtual Conference.

Bob Doran, senior research scientist, was listed as a co-author on the manuscript “Genomic variation in captive deer mouse (*Peromyscus maniculatus*) populations,” which was accepted for publication in the professional journal *BMC Genomics*. He was also listed as co-author on the manuscript “Depletion of COPI complex in tumor cells induces mitochondrial ROS production and co-localization of lipid droplets with the autophagic protein LC3 prior to apoptosis” submitted for publication in *Molecular Biology of the Cell*. Other members of the Research Computing team co-authored additional publications and have several more under review.

Research Computing was an Outreach Exhibitor with a virtual booth at Discover UofSC 2021, which incorporated virtual posters on staff research and highlights of Research Computing capabilities and services.



SUPPORT OF COVID-19 RESPONSE EFFORTS

The Division of Information Technology worked with areas across the system to ensure students, faculty, and staff had resources to make them successful during the university closure due to COVID-19.

Several division employees served on university Future Planning Committees, that were charged with examining the impact of the pandemic and developing recommendations regarding the safe return of students and employees to campus. The division, along with the Provost, also purchased 400 laptop computers to be used in a loaner program for students without access to technology.

The Media Services team prepared and provided virtual platforms to the university President and other administrators to allow for several virtual Town Hall meetings that provided critical communication to students, parents, and employees. The Media Services team also assisted in providing virtual Board of Trustees meetings and Information Technology Media Services team provided onsite video production services to prerecord and edit video segments used for virtual commencement ceremonies throughout the UofSC system, including unique ceremonies for specific schools and campuses.

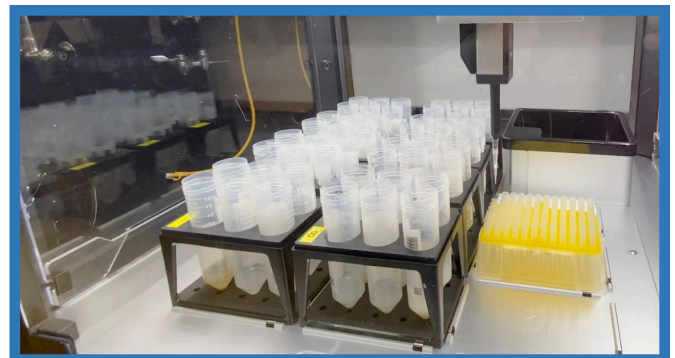


The Division of Information Technology assisted the College of Pharmacy in the development of a web-based portal that allowed students, faculty, and staff to register for, and receive results from, Saliva Assay Free Expedited (SAFE) testing. This non-invasive alternative to nasal swab tests enabled rapid processing, typically within 24 hours.

Ben Torkian, senior applications scientist, completed his graduate degree and published his dissertation “Computational Tools for Analyzing Correlations Between Microbial Biological Diversity and Ecosystems.”

The Research Computing team continues to assist university researchers who are working to better understand the virus. Support ranges from assisting in building research proposals to providing computing resources to support research needs. One such example is the Research Computing team’s direct support of the [wastewater treatment plant project](#) and assistance with multiple COVID-19 Fast Grant applications. Research Computing also designed and implemented infrastructure for COVID-19 applications in the AWS cloud for research data collection and provided knowledge transfer and training for students to sustain and expand the platform.

The Enterprise Applications and IT Security teams successfully designed and deployed several projects to support University Health Services and Human Resources with COVID-19 testing, return to work requirements, employee remote status updates, and mandatory testing criteria for students and employees. Division employees also helped develop and implement the SAFE Portal.



FUNDING FOR STRATEGIC INITIATIVES

The Division of Information Technology was awarded more than \$16 million from the university Strategic Initiatives funding. The allocations were awarded for improvements to classroom technology and support on the Columbia campus, improvements to the wireless network, expansion of research computing and cloud infrastructure, and the introduction of additional cyber security programs.

CLASSROOM TECHNOLOGY UPGRADES

The division began the LITE initiative, which was discussed on page five of this report, and to hire nine individuals to expand classroom support services. At the end of the fiscal year, 65 of the planned 100 classroom upgrades for the first year of the initiative had been completed. Improvements create a confluence of physical and online learning environments that provide students and instructors advanced opportunities for anytime, anywhere teaching and learning.

The division also deployed an Embedded Zone Classroom Support Model that divides the Columbia campus into five distinct zones, based on concentrations of classrooms, and hired full-time support technicians who are embedded within classroom buildings located within each zone. This model drastically reduces response and resolution times.

HYBRID CLOUD COMPUTING SOLUTION

The division used Strategic Initiatives funding to expand cloud services and reduce reliance on the university data center. Before the fiscal year ended, the division completed two comprehensive cloud assessments to determine best steps forward and create a roadmap for implementation. In addition,

the division is currently working to redesign network architecture and identify a service provider to host and manage Cloud services.

HIGH PERFORMANCE COMPUTING EXPANSION

The division used Strategic Initiatives funding to expand high performance computing capacity and capabilities. An assessment of the university data center identified power limitations on campus, so the division is investigating additional options and will promptly begin expansion once a viable solution is identified.

CYBER SECURITY ADVANCEMENTS

The University Information Security Office has utilized almost all funds allotted to improve cyber security efforts. Forescout, an asset identification and discovery tool, is almost completely deployed. The team procured a Microsoft A5 license upgrade that will enable new security capabilities. They are working on a Privacy Program assessment and hired consultants to assess the Identity and Access Management plan and develop a future-state roadmap. Finally, the team will soon issue a RFP for a managed detection and response solution focusing on 24x7x365 security monitoring for sensitive areas.

BY THE NUMBERS

Current active users on High Performance Computing (HPC) Clusters	500+
Number of jobs submitted to Hyperion HPC cluster since inception	10 million
Uptime of university HPC resources in FY 20–21	99.999%
Workshops & training provided by eLearning Services in FY 20–21	116

PLANNING FOR THE FUTURE

The Strategic Priorities reported on in this document were developed in 2018 and covered a four-year period, which ends in 2021. The leadership of the Division of Information Technology understands the importance of future planning. Therefore, work has already begun on establishing new Strategic Priorities that will provide direction, set goals, and guide day-to-day decisions from the years 2022 to 2025.

Division leadership spent many hours discussing, analyzing, and developing new Strategic Priorities for the division. There are only four new Strategic Priorities, rather than five. Two of the priorities are exactly the same as the current ones—“advance the academic and research missions of the university” and “enhance the student digital experience.” Both of these priorities are extremely important to the fulfilling the overall mission of the university. You will notice that “advancing IT maturity” has more objectives than others. This is because IT maturity is where we have the greatest ability and opportunity to evolve.

The work of the Division of Information Technology will continue to make decisions and take action on opportunities that allow us to best serve the university. We look forward to reporting on our progress toward these new goals and objectives in our next annual report.

Advance the academic and research missions of the university

Objectives:

- Improve the efficacy of learning environments
- Expand research and high-performance IT capabilities
- Establish innovative pre- and post-award workflows in support of the awards process
- Expand investment in local and cloud resources for academic and research missions

Enhance the student digital experience

Objectives:

- Enable, promote consistent use of learning tools
- Implement a technology portal that combines various resources into one centralized, searchable location
- Develop a student-centric function for app development

Establish unified enterprise architecture

Objectives:

- Integrate university systems
- Create a roadmap for the implementation of unified enterprise architecture
- Transform the enterprise applications function

Advance IT maturity

Objectives:

- Install business process transformation as an IT capacity
- Support business intelligence and analytics capabilities
- Optimize people, processes, and technology
- Realize a “three zeros” ITSM program
- Recruit, retain, and develop top talent that is diverse, equitable, and inclusive
- Rationalize IT service offerings
- Implement an IT governance framework
- Achieve compliance with information security program requirements
- Improve communication and marketing practices
- Establish a strategy for UofSC IT leadership and leadership development
- Establish a center of excellence for organizational change management
- Establish a center of excellence for service delivery partners
- Create an information privacy program
- Develop a best-in class digital accessibility program
- Transform IT into a scaled Agile organization



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