Office of Information Technology & Information Security Office

Annual Report

2019-2020

Photo by Brandon Martin

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Introduction

Keeping Students, Faculty, Staff and the Rice Community Connected

The past year introduced technology challenges across every level of teaching, learning and administrative operations to deliver on Rice's mission and support health protocols. This pivot demanded rapid collaboration, planning and execution across every aspect of technology services. Strategic focus pivoted to building positive, secure and data-driven learning, research and work experiences, for all Rice stakeholders, while ensuring that previous technology investments and efforts continued uninterrupted to prepare for new challenges and opportunities.

Teaching and Learning

Preparing Learning Spaces for Dual Delivery

In support of dual delivery for the fall semester, 51 Registrar-controlled classrooms, 55 departmental spaces and four provisional campus facilities (PCFs) were equipped with technology that enabled remote participation. Small classrooms were redesigned as "teaching studios," providing specialized remote delivery infrastructure. This technology investment will continue to provide classroom recordings, technology-enriched instruction and collaboration to transform the educational experience.

In support of classroom technology design and effectiveness, the Learning Environments team worked closely with faculty to test solutions and provide active feedback. The University Committee on Information Technology played a critical role in the final design. Faculty support and technology adoption was provided through newly created instructional videos and one-on-one training. Classrooms and structures were equipped prior to the start of the semester within the board approved budget of $1.2 million.

The partnership with faculty was critical to the success of the initiative. Satisfaction surveys revealed that faculty thought "the necessary technology was in place from the start, has been working and [was] supported by IT well" and that "it was great to have students back in the classroom again." The feedback enabled the team to make continuous improvements to the technology throughout the semester. OIT is very thankful for the faculty who played a key role in the pilot: Caleb McDaniel, Farès el-Dahdah, Helade Scutti Santos, Kathleen Matthews, Lesa Tran Lu, Paul Clement Treacy, Rachel Tolbert Kimbro, Renata Fortuna Ramos, Richard Stoll and Scott Rixner.

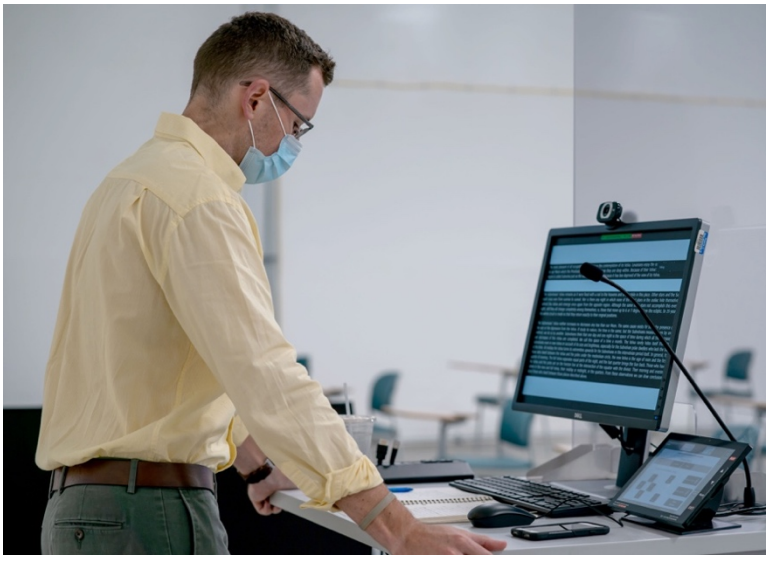


Photo by Brandon Martin

Technology TA Program

Students played a critical role in the expansion of support services to assist faculty with new instructional tools. The Technology TA program was established, receiving 270 requests from faculty for support. Learning Environments hired over 175 Rice students to fill Tech TA and Scheduler roles. The undergraduate Technology TAs help faculty with technology aspects of their course. The students are organized through student schedulers. The program has been highly regarded from faculty, students and staff in Rice News and Rice Thresher articles.

The program has evolved beyond its original design into a partnership between the faculty and the students. Tech TAs are now assisting faculty with polling and breakout rooms, as well as monitoring chat rooms and answering questions. When Tech TAs encounter an unfamiliar issue, they collaborate with OIT online in real time. Both faculty and students declared the program a success, and Learning Environments is looking at new ways the program can add value in future semesters.

Faculty Feedback

"I am very grateful for his help. I could not have conducted the class online without his assistance." *–Lecturer, Architecture*

"Knowledgeable. Patient. Kind." *–Faculty Fellow, Baker Institute*

"The Tech TA assigned for my class was absolutely fantastic. I could not have navigated Zoom without him. He was expert at the more technical side of zoom - not just the basics. He was always on time and enthusiastic and his help allowed me to focus on teaching and content. I am so grateful for his help this semester." *–Associate Professor, History*

Expansion of Student Internship Program

In alignment with Rice's V2C2, OIT launched its third annual student internship program. The program empowers students to build professional relationships, gain practical work experience and contribute to the continuous improvement of Rice's IT systems and processes. Through the program, interns develop high-demand IT skills such as web and application development, information security, change management, business intelligence and data analytics.

This summer, OIT expanded the program to include 13 interns ranging from undergraduate to doctoral students and offered opportunities to work on IT projects in Rice departments outside of OIT, such as Facilities, Engineering and Planning (FE&P) and the Office of Research. Under the mentorship of Rice staff, the students utilized their unique and creative perspectives to launch their projects in innovative ways. Siyu Guo helped the Enterprise Data and Business Intelligence team clean data, build pipelines and construct views across different platforms to give their clients access to important and meaningful data. Information Security Office interns, Sibo Wang and Christine Tharian, worked directly with monitoring systems and created dashboards and triggers to alert the team to real-time suspicious activity on the network.

Despite all interns working remotely, a sense of community between mentors and interns was fostered through Slack channels and Zoom meetings throughout the summer. At the end of the program, there was a great sense of enthusiasm and desire to continue the projects from many interns. This led to the program being extended into the fall semester for the first time. Some of the internships also evolved into long-term student positions. OIT plans to continue expanding and evolving the program to provide more experiential learning opportunities for students in the future.

Research Computing

Championing COVID-19 Research

Thanks to the fundraising work of Dean Peter Rossky, Rice was one of only three universities selected to receive a high-performance computing (HPC) system from the AMD HPC Fund for COVID-19 research. The Center for Research Computing (CRC) implemented and is supporting access to the new HPC system and associated cloud resources. The new technology delivers twice the computational performance of the existing CRC's cluster for workloads such as molecular dynamics and machine learning, which are critical to many areas of COVID-19 work.

Together with the University Committee on Information Technology, the CRC quickly established a faculty review panel to align the resources' usage with the terms of the grant and ensure operations remained responsive to the needs of research computing community. CRC staff facilitated early access to testing resources for developers in the Center for Theoretical Biological Physics to port and test their internal applications in preparation for availability of the final system. As additional Rice researchers gain access to the system, its impact on V2C2 research focus area will only deepen.

Photo by Jeff Fitlow

Supporting Real-Time Data Analysis

In support of science and engineering research which requires access to real-time data analysis facilities, the Center for Research Computing (CRC) collaborated with select faculty to successfully apply for a National Science Foundation Campus Cyberinfrastructure grant. The proposed Interactive Data Analysis Platform provides a computing environment specifically designed for data science and machine learning with an emphasis on on-demand, interactive computing and collaboration. It builds on the existing research technology ecosystem managed by the CRC, in particular the diverse storage services and the Science DMZ research network for friction free collaboration with external partners.

The platform will integrate with the Open Science Grid, a national distributed computing partnership for data-intensive research, allowing Rice researchers to opportunistically take advantage of an international pool of computing resources. Any unused local resources will similarly be shared back to the community. In order to provide additional resources during periods of high demand, the CRC also secured a grant with Oracle for Research to develop technology that will allow selected workloads on the platform to burst onto Oracle Cloud Infrastructure. OIT expresses much gratitude for the principal investigators who contributed to this award: Christopher Tunnell, Jonathan Blair Ajo-Franklin, Klara Jelinkova, Meng Li and Yingyan Lin.

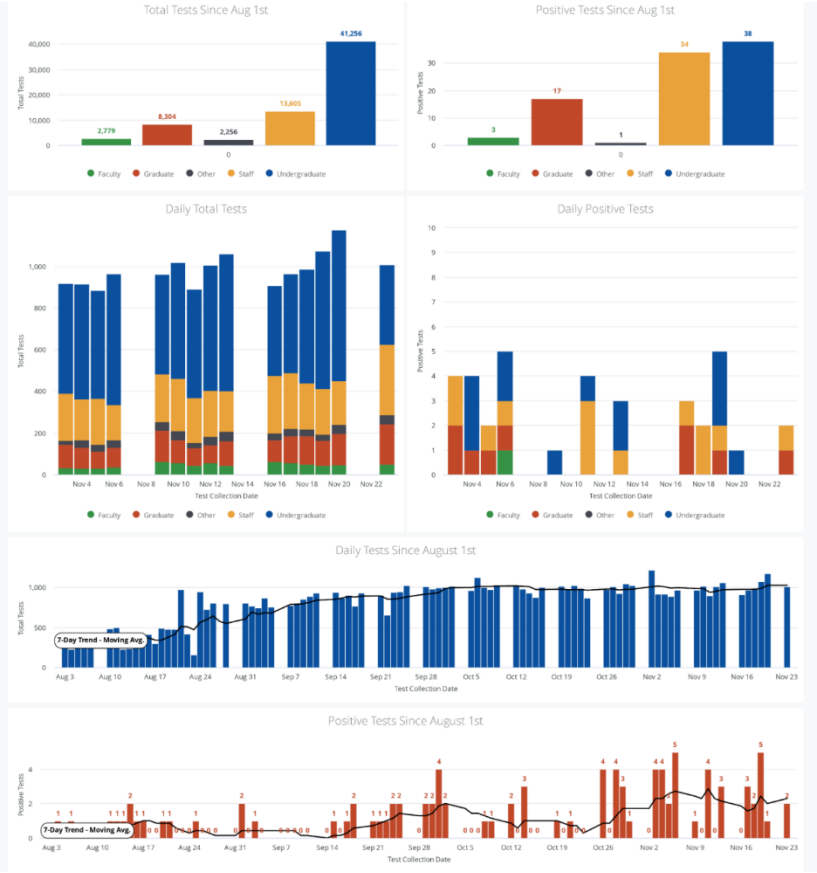
University Administration and Operations

COVID-19 Campus Dashboards

As students, faculty and staff returned to campus this fall, transparency regarding COVID-19 containment effectives was vital. To support Rice's goals, OIT deployed the initial COVID-19 dashboard within three weeks.

The Web, Emerging Technology and Innovation team partnered with the Rice Crisis Management and medical colleagues to define, map and streamline contact tracing processes and data capture. The team then worked with Google services for rapid deployment of the cloud-based data platform. The dashboard is hosted on the Google Cloud Platform, leveraging an elastic data warehouse, Big Query, and Google's recently acquired visualization and analytics platform, Looker. Support and improvements for the dashboard are supported by the Enterprise Data and Business Intelligence team.

The dashboard updates daily with aggregated testing results and is the prominent feature of the Return to Rice web site (https://coronavirus.rice.edu). This site also serves as the centralized location for scheduling tests, reporting symptoms, minimizing risk and is a repository of information about Rice's COVID-19 policies and communications.



Enterprise Resource Planning Implementation

In January, Rice kicked off the project to implement the new ERP/HCM integrated application, Oracle Cloud. This project will consolidate several applications into one, optimize hundreds of business processes, add several areas of new functionality, deliver role-based security across the platform and provide modern analytics. The project is aptly named imagineOne – one system, one process, one access, one Rice.

Over 200 people from across campus are part of the implementation team and have been actively working to design process maps, perform system configuration, convert data, build integrations and execute several rounds of testing. Using an agile methodology, the project team including campus partners are able to experience the system, gain a sense of the ease of use and begin imagining how their work will transform. imagineOne is expected to go live summer of 2021.

Some of the immediate benefits include:

- Collapse and consolidation of 19 disparate systems into a single application that will not only have a single login, but will also provide a new level of transactional transparency that will allow users to drill into details.
- Streamlining of workflows and approvals. Many processes are going from double digit number of steps down to less than five.
- Automated organizational charts based on HR data.
- Simplification and improvement of three current visitor systems into a single streamlined system.

one system, one process, one access, one Rice

transforming the way we work

Infrastructure and Support

Support Enhancements for the Remote Environment

The OIT Campus Services teams were critical to the success of the Rice community shifting to remote operations by adjusting support structure, producing technical guidelines and instructions and providing loaner equipment.

As many departments transitioned to remote operations, the OIT Campus Services teams made substantial changes to the support model. While some staff remained on campus to ensure essential support, the Service Desk extended hours of operations and onsite teams transitioned to contactless support. These changes ensured effective support of all stakeholders and led to OIT receiving perfect scores on 100% of the 70 customer feedback surveys in September.

To provide the Rice community with technical recommendations and guidelines for functioning remotely, staff developed remote working, teaching and learning documents in the OIT KnowledgeBase (KB). During the months of March and April, 98,824 KB articles were viewed as the university transitioned to fully remote operations.

In collaboration with the Vice President of Finance and the Office of the Dean of Undergraduates, the OIT Campus Services and Network Services teams developed a program to distribute loaner laptops as well as temporary internet access devices to students. This program continued into the summer and fall semester to ensure that all students had the essential technical resources to participate in the online and dual delivery course delivery modes.

Keeping Everyone Connected

The campus wireless team played an important role in Rice's response to COVID-19. In support of the shift to remote work in the spring, OIT assembled and fabricated a work-from-home kit that provided staff members with Rice Owls Wi-Fi and enabled the use of VoIP phones from home. These changes allowed staff to operate remotely with access to all of the Rice resources they would typically have on campus. Additionally, to prepare for students returning to campus in the fall, OIT deployed an outdoor Wi-Fi solution for the residential college quads, provisional campus facilities (PCFs), open tent structures and other high traffic areas to maximize the use of outdoor spaces for learning and recreational activities while promoting social distancing efforts. Feedback from the campus community on these improvements has been overwhelmingly positive.

The Campus Wireless Refresh Project, which began in 2018 to replace the aging Wi-Fi infrastructure, is also on schedule with the remaining academic and administrative building upgrades scheduled through the spring and early summer of 2021.

To complement the wireless implementation, Rice is engaging with a major cellular carrier to design and install a state-of-the-art 4G/5G LTE cellular network that will cover the entire Rice campus. This project will enable additional carriers to use the design as a template to provide enhanced coverage and carrier options on campus in the future. As the team concludes the network designs stage with campus architect, George Ristow, implementation is expected to begin in early 2021.

Photo by Brandon Martin

Security

Protecting the University's Electronic Resources and Data

This year the Information Security Office (ISO) and the Identity and Access Management (IAM) teams continued initiatives around vulnerability management enhancements, bringing on third party support for risk detection and response and preparing authentication and authorization system upgrades for the spring and fall semesters.

To mitigate account password compromises, which are one of the most common ways attackers can enter a network to access protected environments and steal private information, the ISO developed a process to identify passwords that were potentially exposed and worked with the account owners to update them. In addition, ISO worked with OIT and other campus IT teams to more effectively address compromised accounts and suspicious activity identified through security tools, developed a monthly remediation process and added more automation to streamline security investigations.

ISO also acquired third party assistance to help detect and respond to advanced threats against the university from well-funded adversaries. This third party provides full time, round-the-clock monitoring support, looking for evidence that attackers are on or trying to enter the Rice network.

Photo by Jeff Fitlow

Promoting Secure and Efficient Remote Operations

As university employees transitioned to working from home in the spring, the Information Security Office (ISO) provided safety guidance, which included the use of Rice-owned, OIT-configured systems connected to the Rice VPN network and reminders to be vigilant for phishing attacks and other anomalous activity. ISO also worked with OIT to evaluate the tools and services designed to help the campus to quickly pivot to dual delivery for education and remote work for staff and faculty, including Zoom and other collaboration software and services.

The Identity and Access Management (IAM) team ensured authentication systems were ready for increased remote access, including the multifactor authentication system. The team also worked with departments around campus who were preparing students for remote access. For example, they created a portal for new students to upload their photos for their Rice IDs for the Rice University Police Department (RUPD). They worked closely with OIT to make sure that instructors had the appropriate access and entitlements for both on campus and remote classroom technologies as well as worked with RUPD to update building access as needed.

Photo by Jeff Fitlow

Awards

Rice Mile Award

The RICE MILE award recognizes staff who exhibit the qualities in the RICE MILE (responsibility, integrity, community, excellence, mission driven, impact, leadership, and entrepreneurial). This year six OIT staff members received the honor of being nominated by their customers and colleagues for their exceptional service:

"**Karl Burkett** [Linux System Administrator for Education] enabled students to have a work environment independent of the quality of their personal computers. He worked closely with the faculty to configure the systems in a way that was both secure and accessible; provided the necessary system power and minimized cost to Rice."

"**Paul Engle** [Identity and Access Management Architect] continually demonstrates excellence in collaborating and thinking about how his work is impactful to other groups. Paul's integrity is exemplary of Rice and the trust he builds through his integrity makes him a valued and trusted resource. Without his excellent work Research at Rice would not be as well supported as it is."

Fernando Gonzalez [Systems Administrator] was nominated for his "outstanding personality, talent, skills, motivation, professionalism, and dedication to Rice. Fernando is not only always kind and polite, but also always positive about his job, his duties, and what can be done. When you ask for help from him, you feel welcome, and what you would like him to do is not seen as a burden by him but as something he enjoys doing."

"**Qiyou Jiang** [Senior HPC Application Developer] has consistently worked with researchers providing exemplary support and building community amongst the graduate students doing computational work. A large number of graduate students come to him for computational support and trust his efforts. He is highly thought of in the Center for Research Computing. He is modest and hard working. Collegial and supportive."

Jay Lee [Support Specialist, Technical Lead] was praised for his speedy work setting up a new computer for his nominator. "He valued my questions during the whole setup process, he was respectful with my ignorance on the new device. He took the time to ensure I had all programs loaded on laptop and they were working properly before leaving."

"**Marc Scarborough** [Campus Chief Information Security Officer] has consistently provided exemplary leadership and community building. His impact in improving Rice's security and thoughtfulness towards improving processes related to security displays the responsible behavior and consideration towards enabling his constituents."

IT by the Numbers

July 1, 2019 - June 30, 2020

RESEARCH COMPUTING

567

shared research computing users

395 TB

research data

2.6

PFLOPS available

CLIENT SERVICES

5,730

centrally managed endpoint devices

48,985

support requests

4,946

remote support sessions

333,898

knowledgebase inquiries

NETWORK

87

buildings connected

3,310

wireless access points

2,108 / 3,359

pre-remote / remote
VPN users each month

SERVERS AND STORAGE

1,179

servers supported

1.2 PB

data stored and backed up

SECURITY

187,353

fraudulent emails blocked

4,408

userids assigned

1,082,711

single sign on logins
(1/15/20 to 6/30/20)

502,200

multi factor authentications
(3/1/20 to 7/1/20)

COMMUNICATIONS

141,000,000

email messages

4,160

campus phone lines

165,849

web conferencing meetings

606

official Rice websites (Drupal)

STUDENT REGISTRATION

89,795

registration transactions

FINANCIAL SYSTEMS

1,384,244

financial transactions processed