# RICE

Office of Information Technology Annual Report 2018-2019

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## About Us

The goal of the Office of Information Technology (OIT) is to provide the Rice University community with effective, innovative and client-focused technology solutions. We support research, academic and administrative systems, voice, network, computing infrastructure, identity and access management, security and other core systems. We strive to be an integral part of Rice committed to supporting the university mission through innovative uses of technology and service excellence.

# Research, Teaching, and Learning



#### Support Services for Use of Regulated Data in Research

The regulatory landscape and needs of researchers are constantly shifting. The Controlled Unclassified Information (CUI) program is a federal initiative that governs the handling of certain research data. OIT's Center for Research Computing (CRC) collaborated with researchers and colleagues over the past year to understand their needs and develop services to meet CUI requirements. OIT and the CRC are under the advisement of the Research Computing Subcommittee of the University Committee on Information Technology. The University Committee on Information Technology is a faculty senate committee co-chaired by **Dr. Paul Padley**, Professor of Physics and Astronomy and Director of the T.W. Bonner Nuclear Laboratory and **Dr. Farès el-Dahdah**, Director of the Humanities Research Center and Professor of the Humanities. The Research Computing Subcommittee is chaired by **Dr. Tayfun Tezduyar**, James F. Barbour Professor of Mechanical Engineering and staffed by **Dr. Jan Odegard**, Executive Director of the Ken Kennedy Institute and Associate Vice President, Research Computing.

The key to success of the program is the CRC's early engagement with new projects to facilitate and advise researchers, in partnership with the Office of Research. The CRC's facilitator team collaborate, as needed, with the Office of Sponsored Projects and Research Compliance, the Information Security Office and across OIT to reduce friction. To address rapidly expanding demand for services, the CRC is seeking to hire a Compliance Facilitator.

Some of the partner projects that have been completed by the CRC include:

- Expansion of the Virtual Research Data Environment (VRDE) to supporting the Children's Environmental Health Initiative (CEHI), the Houston Education Research Consortium (HERC), and the Kinder Institute Urban Data Platform
- Consultation with the Texas Policy Lab on infrastructure for data compliance
- Addition of the Research Electronic Data Capture (REDCap) as a service to support Rice 360° Institute for Global Health needs in Malawi

#### Research Computing Expansion

The Center for Research Computing (CRC) shifted from an infrastructure organization to being a services organization with an increased focus on expanding customer support. This year several new services were implemented including:

- Research storage: Scalable Research Data Facility (RDF)
- Research virtual machines: Owl Research Infrastructure Open Nebula (ORION)
- Research backup services: offering AWS cloud-based data backup services
- Support for managing sensitive data in the research context: Research Electronic Data Capture (REDCap)
- Research software development service that can be included in funded research projects

A major accomplishment during this past year was the deployment of an on-campus, scalable Virtual Machine (VM) cloud infrastructure ORION to support a new researcher community. ORION has enabled the CRC to engage with researchers in the Humanities Research Center (i.e. ImagineRio), Economics, History, as well as Spanish, Portuguese, and Latin American Studies. With two CRC staff members certified as Cloud Practitioners and pursuing AWS Certified Solutions Architect training, the CRC can also engage in helping researchers migrate and manage workloads in the cloud (AWS, Google, or Azure). To expand the CRC's support for cloud, the CRC is adding a staff member knowledgeable in this area.

With the support of the Research Computing Subcommittee of the University Committee on Information Technology, the Vice President for Finance, and the Vice Provost for Research Office, the CRC was able to replace DaVinci, a widely-used but aging high-performance computing (HPC) system, and set the path for a sustainable funding model for shared research computational hardware replacement.

Clinton Heider, Research Computing Facilitator, presents a workshop on the background of virtualization and the cloud.



#### Summer Internships for Rice Students

For the second consecutive year, OIT offered a summer program to support Rice's Vision for the Second Century, Second Decade goal to offer internship opportunities to Rice students. The program was designed to provide students with 12 weeks of paid work experience, mentors, and opportunities to showcase and see the impact of their work. This summer, nine students (six graduates and three undergraduates) honed their software development skills while gaining practical and professional IT experience. The program was led by **Zheng Fan**, in collaboration with staff mentors, **John Mulligan**, **Henry Nguyen**, **Chris Brown**, and **Omer Piperdi** from OIT and **Terie McClintock** from Facilities Engineering and Planning (FE&P).

Upon completion, the students praised the program for providing an opportunity to learn complex technical skills and apply them in a workplace setting. "It helps me have a better understanding of the software engineer career," said **Hongrui Wei**, who developed major enhancements for the data visualization portal website. Another intern, **Shengjing Zhang** developed a pipeline for scaling optical character recognition jobs with the Center for Research Computing's supercomputing team and shared, "It feels great to put my knowledge into practice." The program places a heavy emphasis on building and maintaining the mentor relationships. As a result, a student from last summer's cohort provided the following update, "I got the offer of a full-time engineer from Google and I will accept it. Google is my dream company. I sincerely thank you for offering me the opportunity of an internship last summer. I learned a lot and won the confidence to start my career in the United States." OIT looks forward to continuing the internship program and creating a space for students to apply their classroom knowledge in preparation for their professional careers.





#### Support for Online Master of Computer Science Degree

Upon approval of the online Master of Computer Science degree program, OIT's Learning Environments team immediately collaborated with Rice Online Learning, Graduate and Postdoctoral Studies, the Computer Science department, and two outside vendors that were hired to launch the program. The Learning Environment team supported the program's launch by:

- Creating a website for the marketing firm that links to Slate, the admissions application system
- Collecting and transmitting prospect and application data to a vendor that assists prospective students with their applications
- Configuring Mulesoft, an integration platform that enables the exchange of data between Rice and outsourced vendors
- Reconfiguring the Student Information System (Ellucian Banner) to accept additional data from the admissions system
- Hiring an Online Program Support Specialist dedicated to supporting online students with any technical issues



# **Enabling Business Partners**



#### E-signatures Streamline Campus Processes

The ability to sign documents electronically increases efficiency, improves document routing, and reduces the use of paper. OIT began the transition from paper to electronic signatures last year with the selection of Adobe Sign as the tool. Adobe Sign enables faculty and staff to share existing documents or design custom forms to collect data and e-signatures. It also allows for the creation of customized workflows, in which documents can be electronically routed and signed by one person or multiple people in a designated sequence.

Since the launch, OIT has implemented Adobe Sign in all schools and 20 administrative departments. There are currently 300 faculty and staff in Adobe Sign who have completed approximately 5,000 digital agreements containing over 14,000 e-signatures. Engineering and Natural Sciences, members of the pilot group, led the way early on by completing over 1,200 agreements. Since then, OIT partnered with Human Resources (HR) to redesign one of the most widely used forms to date, the Personnel Action Form (PAF). Since the introduction of the electronic PAF form, HR has noticed a significant decrease in errors due to the use of validation fields in the form. Likewise, departments have expressed an appreciation for the ability to monitor the status of their PAF forms and receive a notification once they have been processed. OIT looks forward to onboarding additional administrative departments and developing new digital forms and processes.



#### Banner 9 Upgrade

Many of the central administrative offices such as the Controller's Office, Office of the Registrar, Student Financial Services, Human Resources, and Payroll use a system called Ellucian Banner 9 to store information and process transactions. OIT supported the Banner 9 upgrade that went into production this past fall. This version introduced a modern technology stack and enhanced security system, as well as an improved user interface and online forms. Because these features did not exist in previous versions of Banner, many faculty and staff at Rice use a customized interface known as Edgar. In the future, OIT hopes to implement the modern web-based interfaces that are available in the new system.

Ellucian also continues to develop and release updated applications and user interfaces to the self-service portal of Banner, also known as Esther at Rice. The first self-service application to be deployed in Banner 9 was the course registration system during O-week in August 2019. Additional self-service features are being scheduled for release in coordination with the respective offices.



#### PMO Enables IT Project Success

The Project Management Office (PMO) was established in 2016 to support the execution of major university-wide initiatives whether or not these projects are delivered by OIT. By partnering with organizations across campus, experienced project managers within the PMO enable project success by applying standard methodologies, engaging OIT technical resources when needed and coordinating with external technology vendors, leading process design, communicating effectively, and coordinating organizational change management activities.

To date, the PMO has played a key role in the deployment of several major organizational initiatives, including the OwlConnect advancement system, Glasscock's implementation of Destiny Solutions for course registration, HR process improvement and automation (digital signatures using Adobe Sign), and the rollout of the new Slate graduate admissions system. Additionally, the PMO worked with representatives across campus to ensure the selected Enterprise Resource Planning (ERP) software met institutional and departmental requirements.

Currently, the PMO is partnering with Facilities Engineering and Planning (FE&P) in the implementation of Tririga for space management, capital projects, and work order management, as well as with Environmental Health and Safety (EHS) in a project to develop a lab safety platform.



*PMO Project Managers, Eric Withaar and Sheila Luttrell* 

# Infrastructure and Support



#### Student Digital Experience

In spring 2019, an OIT service team was formed to look at the student's digital experience while at Rice. Students were invited to participate in two focus groups to discuss how OIT could improve their experience including registration, communication, learning management systems, classrooms, wireless, and other technology interactions. Some suggestions have already been implemented and many are in progress. Two examples are:

- Integrating the course schedule tool with Esther to have multiple resources in one place and prevent students from having to switch systems. The new system was piloted in August 2019.
- Improving explanation of password complexity rules when creating accounts.

The team plans to work with the Student Association and Graduate Student Association to host a focus group each semester to gather additional input from students.



OIT staff listen to the ideas and suggestions of students during a focus group lunch.

#### Multi Factor Authentication

Rice continues to see increased attacks from criminals, through phishing, attempts to install malware on systems, and exploiting system vulnerabilities. One of the main targets of these attacks continues to be the usernames and passwords used to access private information or university data that criminals can monetize. As the attacks become more advanced, complex and harder to recognize, these attacks become more effective against protective measures. Attackers do their homework using information provided on webpages or LinkedIn and Facebook. They are able to determine who to attack in order to access different kinds of information. While most attacks are thwarted, occasionally a password is stolen, and the attacker can use that stolen password to access private information or even reroute paychecks and cause other monetary damage.

In order to better protect the university community, the Identity and Access Management (IAM) team in collaboration with the Information Security Office (ISO) have been rolling out a system that adds a second layer of protection, in addition to a password, called Duo. Duo requires an additional logon step (second factor) - either an app on a smartphone, a phone call, a text, or one-time generated code. While an attacker may steal someone's password, the password alone will not give them access to sensitive resources.

Duo was initially added to the virtual private network (VPN) service in October of 2018. Since then, it has been added to other services, including native Banner 9 (not Esther or Edgar), the NetID portal, and some instances of Slate, the admissions system. Duo will continue to be added to other services that provide access to protected systems, networks, and private information in order to secure Rice's information and assets.



#### Voice over IP (VoIP) Communications System

The Rice Board of Trustees approved replacement of the aging campus telephone system with a Cisco Voice over Internet Protocol (VoIP) Unified Communications telephone system in December 2016. VoIP technology provides an improvement to the existing telephony architecture, redundancy, and resiliency and significantly enhances the client's telephony experience. The Cisco VoIP system was purchased in early July 2017. The migration of all campus telephones to the new Cisco VoIP system was completed in December 2018 and included approximately 4,100 extensions.

With the installation of the new system completed, OIT has shifted its focus to rolling out advanced features via controlled release. These new features include:

- WebEx: a video conference, collaboration and mobility application, allowing individuals to set up meeting/collaboration spaces
- SpeechView: a service that transcribes voicemail to email
- ConferenceNow: an audio conference bridge feature, which in time will help eliminate third-party conference bridge services



# A Look to the Future



#### Enterprise Resource Planning (ERP) Implementation

Over the past year, university leadership has been engaged in an assessment of the current human resource, payroll, and financial systems. The current Ellucian Banner solution was originally implemented in 1993, and although it has received many upgrades, the technology is outdated and has reached end of life.

In the spring of 2019, the Board of Trustees approved a new project to replace the Banner ERP with a modern cloud-based solution. By implementing a new enterprise resource planning system, Oracle Cloud, Rice will have a modern platform that will allow for business process transformation and increase productivity overall. In addition to replacing Banner, this unified system will replace 11 other applications as it integrates all business applications into a single cloud solution. The project will implement new functionality by delivering eight new modules that will expand business capabilities in the human resource and financial areas.

OIT, in partnership with the Offices of Human Resources and Finance, will be leading this campus-wide transformation. This project is expected to go live in the summer of 2021.



### Digital Accessibility

Digital accessibility is the practice of ensuring that Rice websites, web applications, and digital content can be used by everyone at the university. While accessibility is necessary for some groups to use the web or other technologies, it is beneficial for everyone.

Rice University has developed a Strategic Plan for Accessibility that has been presented in the Faculty Senate and the Administrator's Forum. OIT's Learning Environments team is working to transform its goals into action. Examples of the work completed to date are:

- Installation of assistive listening systems in over 80 of the Registrar-managed rooms
- Facilitation of flexible classroom updates, including assistive listening systems
- Full deployment of Canvas, the university learning management system with robust support for assistive technologies including the JAWS screen reader
- Inclusion of more assistive technologies such as NonVisual Desktop Access (NVDA) and Google Color Enhancer in the 2019-2020 campus-wide computer image
- Migration of thousands of video assets from Ensemble platform to Kaltura, which features automatic machine-generated closed captions

In February 2019, a Digital Information Accessibility Coordinator was hired to lead a campaign of awareness and education about the Web Content Accessibility Guidelines and Universal Design for Learning. The coordinator works with the Office of Compliance and Office of Disability Services on technology accessibility improvements and to engage with Rice stakeholders and technology vendors to improve digital accessibility.



For more information, contact Digital Information Accessibility Coordinator John Williams (a11y@rice.edu, 713-348-6116).

#### Campus Wireless Project

A wireless connection occurs when any device connects and communicates without wires to connect to the internet. Devices use two types of technologies to accomplish this: Cellular (3G, LTE, 5G, etc.), Wi-Fi (802.11x), or both. The Wi-Fi service on campus is operated by OIT. Laptops typically utilize Wi-Fi to connect to Rice network resources and applications as well as the internet. The major telecommunications carriers (AT&T, Verizon, etc.) provide the cellular services on campus. Mobile devices (smartphones and tablets) usually rely on cellular connectivity to access network resources but can also utilize Wi-Fi. OIT has initiatives in progress that will improve service in both of these categories.



OIT has initiated a project to improve campus Wi-Fi network services, as the aging legacy Wi-Fi infrastructure can no longer adequately support demand for bandwidth and coverage. A primary cause of failure in Wi-Fi network deployments is lack of proper

radio frequency (RF) engineering and planning. The buildings' age and construction material can have a significant impact on propagation of RF signal. In order to ensure proper coverage, capacity, seamless roaming and more, OIT hired a third-party engineering firm to conduct a comprehensive RF survey of all campus buildings. The resulting reports provide a detailed design, indicating where Wi-Fi access points should be installed and how they should be mounted for optimal performance. OIT created a detailed building-by-building deployment schedule. Throughout the current fall and spring semester, teams will focus on deployments in academic buildings across campus followed by administrative locations. Residential buildings are scheduled to start summer 2020.

A comprehensive cellular RF survey was performed across campus, and OIT is in the early stages of developing a plan to improve the service in collaboration with the carriers.

#### Awards

#### **Rice Mile Award**

This year seven OIT staff members received the honor of being nominated by their customers and colleagues for their exceptional service:

John Croft Sarah Gonzales Diane Yee Ray Jones Jackie Blyden Hector Piñeda Juan Rodriguez



From left: Sarah Gonzales, Diane Yee, and John Croft

The RICE MILE award was established to recognize staff who demonstrate a commitment to making their departments and Rice better through their work and through their embodiment of two or more of the RICE MILE values:

Responsibility Integrity Community Excellence Mission-driven Impact Leadership Entrepreneurial

#### IDG's One to Watch Award

**Diane Butler**, Associate Vice President for Teaching, Learning and Scholarly Technologies, was given a One to Watch Award by IDG, a technology media, data, and marketing services company at IDG's AGENDA19 business leadership conference. The honor indicates that the "recipients have demonstrated a keen understanding of business goals, possessing the capabilities and character to be future leaders in the industry." The purpose of the award according to Tim Scannell of the CIO Executive Council is "to acknowledge the success of those individuals who have the right mix of technology and management skills to maintain continuity, drive innovation, and lead solutions teams."





From left: Kevin Morooney, Internet2 Vice President of Trust and Identity, Howard Pfeffer, President and CEO of Internet2, and Klara Jelinkova.

#### Internet2's President's Leadership Award

**Klara Jelinkova**, Vice President for International Operations and Information Technology and Chief Information Officer, was recognized with the President's Leadership Award by Internet2 on March 6. "Klara's time, energy, and leadership have helped make the Internet2 community's trust and identity capabilities what they are today," said Howard Pfeffer, president and CEO of Internet2. "Particularly noteworthy during Klara's leadership was the successful completion of a revised InCommon Federation charter and bylaws, establishing community processes to help mature and grow the InCommon Federation's operations and capabilities, and increased global connectivity with the community of research and education trust federations through GÉANT's eduGAIN infrastructure in Europe."

#### CIO100 Award

Last fall, Rice launched an online undergraduate course in COMP 140, Computational Thinking, thanks to the efforts of Rice Online Learning, the Computer Science department, and OIT. This project was selected for a CIO 100 award for establishing excellence in technology innovation and business value. CIO (owned by IDG, the world's leading technology media, data and marketing services company) selects 100 organizations for recognition at their annual CIO 100 Symposium.

As demand increased for Computer Science classes, Rice faced a decision to either to turn away students that wanted to enroll in an introductory course or hire more faculty to meet the growing demand. Both of these options reflected an older business model. Instead, Rice opted for a new approach where specialized software and methods were developed to allow for a personalized digital delivery in a parallel on-line session. This blended approach gave students the same level of in-person interaction with faculty, achieved the same learning outcomes, and kept personnel expenses at the same level.



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*Photos are from Rice University's Public Affairs' Photo Gallery or taken by OIT employees with the exception of the two photos on page 23, which were taken during the award ceremonies.*