CAMPUS IT PLAN

A CAMPUS-WIDE VIEW OF TECHNOLOGY EFFORTS
APRIL 2018

Stanford University

"The Campus IT plan is a wonderful initial effort to capture and communicate the incredible breadth of IT projects across the university in support of our research and education mission. By providing visibility into campus-wide IT activities, the plan unlocks opportunities to better collaborate and deliver technology services that align with the university's emerging Long Range Plan."

—Randy Livingston,
Vice President for Business Affairs
and Chief Financial Officer

TABLE OF CONTENTS

Preface

IN THE FALL OF 2017, IT ORGANIZATIONS ACROSS CAMPUS
launched a planning process to better align with one another and serve our common community. With the IT plans included here — from all seven schools, SLAC and the major academic and administrative support organizations — we have a foundation from which we can more efficiently execute our planned IT efforts and, as we move forward, plan more effectively.

Parallel to the development of this first Campus IT Plan, we conducted a user research study — gathering input from staff, students, faculty, and postdocs from across the university — to provide insights that will inform future planning efforts.

In the coming year, we hope to build on our planning work. Though details have not yet been finalized, we're excited to leverage the research we've completed, facilitate collaborative planning efforts across multiple campus units, and, as we did this past year, collect and publish updated plans from the IT community.

More than 300 staff, students and faculty contributed to developing this plan. These include:

- A steering committee made of up of IT leaders from 10 campus organizations
- A core project team comprised of 12 University IT staff members
- A campus working group, consisting of representatives from each participating unit, who were responsible for working with their teams to gather, write and submit plans for their respective organizations

- Approximately 80 IT and administrative leaders who participated in workshops to help define the 10 IT strategic areas
- Approximately 130 staff, students, and faculty who participated in user research to gather information about campus needs and to inform future IT planning efforts

Feedback please

This is a pilot year for IT planning at Stanford, and we are interested in your feedback and ideas on how we can improve and build on this Campus IT Plan. Please submit your feedback, ideas and questions on our website (campusitplan.stanford.edu/contact), and a member of the team will get back to you as quickly as we can.

Introduction

THIS CAMPUS IT PLAN PROVIDES A COLLECTIVE VIEW OF THE technology improvement efforts currently in progress to support the Stanford community. It includes individual technology plans of Stanford's seven schools, SLAC, and the major academic and administrative support organizations. The individual plans align to a set of common strategic areas identified by key Stanford stakeholders as critical to technology support at Stanford.

Completed in April 2018, this plan marks the first time Stanford has published a comprehensive view of IT plans from across campus. The collective effort of professionals from 19 organizations is a testament to the collaborative spirit of the IT community to increase transparency and improve the ways we work together.

The plan captures hundreds of improvement efforts. They are informed by many trends and external forces that shape how we deliver technology. These include:

- The accelerating pace of technological change
- The blending of personal and business use of technology
- Rapidly changing research and learning paradigms
- The explosion of "big data"
- The expanding availability of cloud computing
- A complex regulatory environment
- The frightening growth of cyber threats and cyber crime

Above all, these trends require our IT community to be agile and innovative; we must continually change many aspects of how technology-related work is done. And most importantly, we must work together, consistently sharing ideas, best practices and solutions. Publishing this collection of efforts will make it easier to communicate, partner and share resources across the university.

Importantly, as well, this Campus IT Plan creates a strong foundation for future planning that will enable the IT community to continue to respond and deliver ever more relevant technology services and support.

Summary

THE INDIVIDUAL IT PLANS INCLUDED HERE ALIGN TO A SET of 10 strategic areas identified by key Stanford stakeholders as critical to technology support at Stanford. In this summary, we highlight Stanford's IT efforts organized into these 10 strategic areas:

412 Total IT Efforts
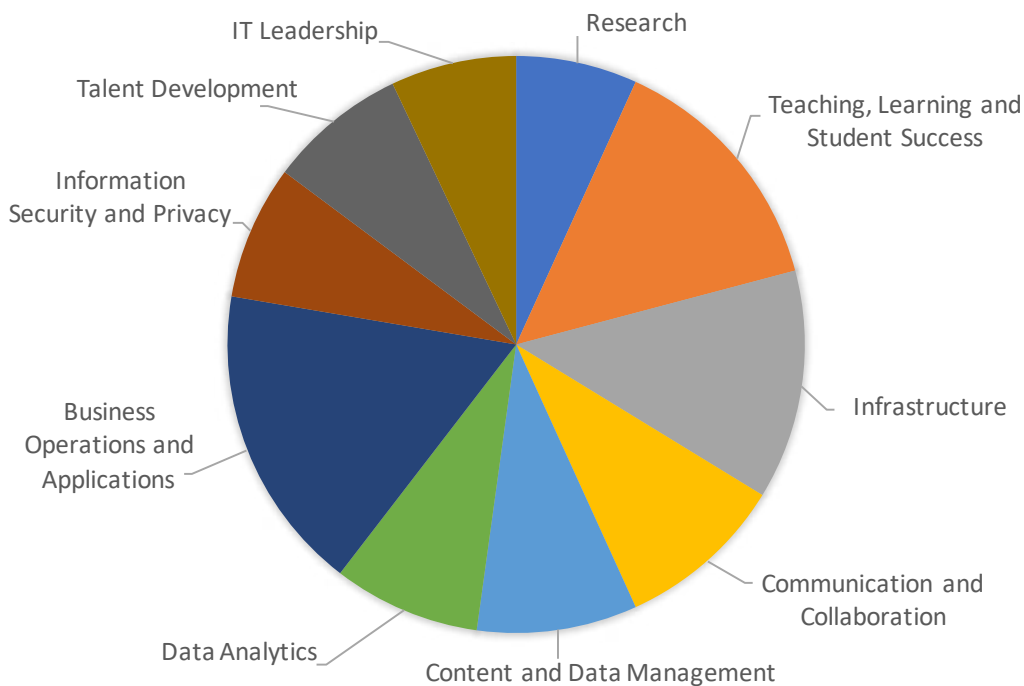
See IT efforts by Strategic Area:

campusitplan.stanford.edu/
strategic-areas

Research

Stanford's culture of collaboration drives discoveries in areas vital to our world, our health and our intellectual life. This year, 28 unique IT efforts are under way at 11 organizations that directly support the research mission of the university.

Greater collaboration

The Stanford Research Computing Center (SRCC) is a joint effort between University IT and the Dean of Research to build and support a comprehensive program to advance computational research at Stanford. Many of the current research efforts represent additional cross-unit collaboration, such as the one between School of Medicine and the SRCC to build Nero, a high-performance research computing platform for clinical and High Risk Data.

IT at Stanford is making it easier for researchers to make connections across diverse data sets. SoM is engaged in several efforts that will bring together disparate datasets from diverse sources with STARR (a petabyte-scale data repository) and DASHER (a large-scale data commons). STARR-Odyssey and STARR-Miner are data mining projects that will allow researchers and data scientists to securely run powerful analytical processes leveraging AI and machine learning.

The Research Information Ecosystem (RIE) is a collaboration across many Stanford units, led by the DoR, with the vision of creating a more connected set of systems. Stanford Libraries is developing RIALTO, an RIE application that will provide a holistic picture of the university's research activity and impact, while eliminating duplicate data entry and opportunity costs stemming from lack of information. The API gateway is another foundational RIE effort being implemented by University IT, with the DoR leading the community organization, and many collaborators across Stanford IT.

More computing power

IT at Stanford is also working hard to make sure researchers have access to more computing power and support than ever before. Stanford Earth is engaging with their research communities and lining up consulting and coding support for researchers; H&S is also reaching out to their community and expanding their research computing footprint; SLAC is working on a state-of-the-art storage model; GSB is enhancing and scaling their research computing capabilities; and SoE is embarking on an experimental, innovative open research network for electrical engineering and computer science.

Teaching, Learning and Student Success

IT at Stanford is dedicated to supporting teaching and learning in and out of the classroom, and helping students succeed in pursuing their degrees and careers. This year alone, 11 organizations are advancing 58 IT efforts aimed at doing just that.

Learning platforms

Canvas, Stanford's principal Learning Management System, maintained by VPTL, is foundational for teaching and learning. VPTL is extending the Canvas ecosystem through integrating third party tools that significantly expand the feature set of this robust platform. They're also connecting it to other university systems to automatically create

courses and sync student enrollment. SoM is working to connect Canvas with Ilios, a medical curriculum management system.

Another notable development in this area addresses the multiple public-facing learning platforms currently in use. VPTL will consolidate the platform and the course content to Open edX, an open source Massive Open Online Course platform. Courses from the Stanford Center for Professional Development and the Stanford Center for Health Education will be migrated over to the new Open edX platform.

Emerging technologies
IT at Stanford is ramping up the use of emerging technology to support face-to-face, online and blended learning. Stanford Libraries is creating 3D models for the classroom. GSB, GSE, School of Earth, and VPTL are all exploring augmented and virtual reality for teaching and learning.

Lecture capture
Lecture capture is being upgraded and streamlined, and more options are becoming available to support capturing content from anywhere. Automating the capture and delivery process, new tools for self-capture, live streaming/live-viewing and screencasting support are just a few of the exciting developments we're working on in this area. Panopto, software that's integrated with Canvas and manages capture and streaming, is being piloted in a joint effort between VPTL and UIT to take lecture capture to the next level. Stanford Law is also automating their lecture capture and delivery process.

Degree tracking and career pathways
We are diligently working to support students in course planning, degree tracking and in managing their career pathways. SAS is working on a number of university-wide initiatives in this area, including a feature-rich upgrade to the curriculum planning system (CPS), along with enhancements to the Stanford Bulletin — the university's official statement of courses and degrees — which leverages the data in the CPS. SAS is also working on a degree audit system for students, faculty and staff in a major collaborative effort with UIT and many Stanford stakeholders. Additionally, SAS has partnered with UIT and a SaaS vendor to create authenticated Certified Electronic Certificates and student-curatable ePortfolios, to enable students to represent the outcomes of their education for prospective employers.

GSE is working on a personalized program proposal with built-in routing and approval workflow, and a course mapping visualization tool that helps students make informed decisions about which courses are best suited for their needs.

GSB is creating a job platform for students and alumni, as well as a career pathways tool that integrates multiple data sources to allow students to explore career options.

Infrastructure

A top priority for IT organizations across Stanford is supporting and enhancing Stanford's IT infrastructure to maintain and continually improve bandwidth, availability, performance, security and scalability. This year, 15 organizations are focused on a total of 60 efforts related to IT infrastructure.

Cloud

There is increasing momentum in the exploration and adoption of cloud-based technologies. UIT is leading a Cloud Transformation Program to adopt scalable, cost-effective and resilient cloud-based solutions, and the majority of Stanford's IT organizations have already begun to transition many of their applications to cloud-based solutions.

Virtualization and containerization

Virtualization and containerization are also a priority in our collective quest for productivity and security. There's momentum in moving to virtual servers to reduce maintenance and increase security, and in moving to virtual storage to improve performance and increase resiliency (when moving to cloud storage). Other solutions being implemented include virtual endpoint management and desktop virtualization, which enables users to maintain the same desktop experience in different locations. Still other efforts focus on containerizing websites to ease deployment and configuration.

Identity and access management (IAM)

IAM is another area of convergence, with UIT leading a centralized effort and many other units leveraging the central infrastructure being implemented. Efforts include completing the migration from legacy WebAuth to SAML (Security Assertion Markup Language) authentication and creating an IAM roadmap for legacy applications and identity stores.

Business continuity and disaster recovery

Business continuity and disaster recovery is an important activity gaining momentum across campus, with these efforts significantly overlapping cloud and virtualization initiatives. UIT, for example, is managing a business continuity and disaster recovery program that initially focuses on Business Affairs but ultimately can be used as a template for all Stanford campus partners. Other activities across campus include creating or revamping business continuity plans, re-evaluating backup strategies, and moving websites, services and storage to the cloud, with more than half of Stanford's IT organizations working in this area.

Communications and Collaboration

Across campus, IT at Stanford is responding to the availability of new tools to support our communication and collaboration needs, which include the continuing globalization of our faculty's research collaborations, as well as the surge in our remote and mobile workforce. This year, 39 efforts are under way in 14 organizations that will introduce, enhance or streamline communication and collaboration tools and technologies.

Remote collaboration

A common focus is improving the remote collaboration experience. In partnership with colleagues from across campus, UIT has prepared guidance for standardizing the audiovisual conferencing capability across campus as part of its efforts to support robust solutions between main campus and the new Stanford Redwood City campus. In the coming year, several new and existing conference rooms across campus will be outfitted with this standard configuration. In addition, IT professionals in School of Medicine, H&S, Stanford Earth, EH&S and GSB will be adding or enhancing video conferencing technologies in their meeting spaces.

Websites

Websites are an essential form of communication, so it's not surprising that web development is a constant priority at Stanford. A particular area of momentum right now is scaling and standardizing websites. Many sites are being moved to the cloud to become more scalable. H&S and Stanford Web Services, which is part of UIT, are partnering to pilot and prepare for the heavy lift of moving many Stanford Sites to Drupal 8. Both H&S and DoR are consolidating many of their sites onto the university's central web platform (Jumpstart in Stanford Sites). Since some units prefer to use WordPress for their websites, UComm is creating a new front-end framework that will enable developers to leverage the Stanford-branded web themes for either Drupal or WordPress.

Other efforts

Still more communication and collaboration efforts are underway, including work in GSB and SAA/OOD to leverage marketing platforms for more robust and cohesive external engagement, digital signage and wayfinding work at Stanford Law and enhanced communication services for Stanford Health Care. UIT, in partnership with the Department of Public Safety, is implementing a new emergency mass notification system (Everbridge), which LBRE is also adopting. Additionally, SAS is working to streamline student and faculty email communications from the central office.

Content and Data Management

Content and data management is an integral part of our work in IT at Stanford, with 15 organizations focused on 37 efforts in this area.

People data

A current area of focus across Stanford relates to our vast quantity of "people" data, such as profiles and contact information, that exist in a variety of separate systems. Many units, including School of Medicine, SAA/OOD, DoR, SAS and UIT, are exploring ways to get these systems to work together. Further, many units, such as Stanford Law, GSB and H&S, are leveraging their "people" data by exploring or advancing their use of customer relationship management software, including Salesforce.

Document and content management

Document and content management is another area of active exploration and improvement across IT at Stanford. Multiple organizations are embarking on a new document or content management strategy or evaluating new content management systems (CMS). Other highlights include UIT evaluating replacement options for Nolij, a document imaging and management system; and, VPTL migrating Stanford's online course catalog to a new CMS called Destiny One.

Stanford is also innovating in this area. Some examples: GSB is implementing an intelligent and unified search capability across all content and data; and, LBRE is initiating a discovery project for Smart Buildings including 3D and augmented and virtual reality.

Digitization and preservation

No mention of content and data management could be complete without acknowledging the numerous ongoing efforts at Stanford Libraries to digitize, archive and preserve content. That enormous task and ever-growing body of data creates

the need for infrastructure improvements, such as expanding and improving storage, exploring cloud solutions, re-architecting systems (LOCKSS), supporting and expanding features for publication (both research and student works), and ensuring our ability to deliver all of that media — much of it video — as needed.

Data Analytics

Many IT units are actively engaged in efforts to better support data-driven decision-making. These efforts include data aggregation and modeling, ETL (Extract, Transform and Load), data warehousing, visual dashboarding and robust programs to drive engagement, provide training and eventually enable self-service analytics. This year, 15 organizations are focused on a total of 34 efforts related to data analytics.

Business intelligence (BI)

Many organizations are now embarking on BI strategies or programs, including SAS, who is developing a decision support model using Tableau to provide student data for approved academic services. Others are extending existing programs, such as H&S working to add faculty-related data from HandSON to support faculty financial decision-making processes, and also utilizing a BI connector to connect Tableau and OBIEE.

While many of the current data analytics efforts are focused on administrative decision support, VPTL, GSE and GSB are engaged in learning analytics projects. Also, EH&S and GSB are both exploring semantic data modeling in order to leverage additional data sources, including unstructured text, in their analytics platforms.

Collaborations

Robust data analytics platforms are complex and often benefit from collaboration, as shown in the example of the Student Integrated Reporting and Information System (SIRIS), which University IT is currently enhancing in partnership with Institutional Research & Decision Support (IR&DS). H&S is also collaborating with IR&DS to evaluate the upcoming SIRIS release to determine where there may be a business need to visualize this data in their student dashboards.

Another major collaborative effort underway is one between School of Medicine and the Clinical Science Departments, the Dean's Office of Strategy and Analytics, SoM Controller's Office, Stanford Health Care and Lucile Packard Children's Hospital. Together, these groups aim to enhance existing clinical FTE and Clinical Productivity applications and dashboards, and build new solutions to support the growth of the clinical practice.

Business Operations and Applications

Maintaining, securing and improving the systems and applications that enable Stanford's business operations to run efficiently and effectively is a top priority for IT units across the board. This year, 18 organizations are focused on a total of 71 efforts related to business operations and applications.

Process improvement

Roughly half of Stanford's IT organizations are actively involved in process improvement efforts that precede systems or applications development. Work ranges from the School

of Engineering evaluating business process management as a whole, to optimizing specific business processes at Stanford Earth, SLAC and School of Medicine. Other organizations, including Hoover and UIT, are working to digitize stored paper. Additionally, SAS is developing a number of improvements to key registrar business processes, the most notable of which is the creation of electronic student forms with workflow and tracking.

Strategic process improvement efforts include EH&S conducting a high-level review of the value, costs and constraints of all their current IT implementations, and UIT assessing their funding models.

Customer relationship management (CRM)

CRM is another area of focus across campus, including an SAA and OOD project to replace their existing PostGrads system with a more modern Salesforce-based one. In addition, GSB and H&S are diving deep into Salesforce to enable more meaningful engagement and more easily manage relationships.

Other efforts

Many IT efforts are aimed at improving unique functions at Stanford. Some examples are R&DE maintaining and enhancing their "Big Six" applications that are critical to supporting residential and dining operations; and LBRE implementing drones, a new 3D Building Implementation Modeling platform, digital workflow for plan review, and emerging technology options including augmented reality and even Alexa.

Information Security and Privacy

Information security is a responsibility shared by all members of the Stanford community, and of top priority to the IT community. That priority is demonstrated by the number of units with efforts in this area, and by the continued leadership and orchestration of security activities across campus by Stanford's Information Security Office (ISO).

Security standards

Ensuring the Stanford community adheres to the Stanford Minimum Security Standards (MinSec) is a high priority across campus. All IT organizations are fully committed to employing, maintaining and auditing their system's compliance with the standards, and increasing awareness across our communities.

Strengthening security

ISO is working on additional ways to orchestrate stronger information security at Stanford, most notably in the areas of user authentication and intrusion detection and response. And both ISO and School of Medicine are thinking about cloud security — ISO is evaluating cloud security tools, and SoM is working to create consistent procedures to ensure their data in the cloud is secure.

File storage and file sharing

Mitigating risks associated with file storage and file shares is a priority for IT at Stanford. ISO is working on a broad plan to protect data stored across the university's many file sharing services, including introducing a data loss prevention and

management solution, archiving or purging unneeded data, and ushering the campus toward modern and consolidated file storage solutions. All units are active in this area, with just some of the examples being: H&S implementing auditing processes; SAA/OOD migrating to Secure File Storage and auditing workgroup membership; and, VPTL and ISO collaborating on identifying and securing misconfigured shares.

Leveraging automation

IT at Stanford is continuing to make information more secure through use of automation. We scan, monitor and analyze with such tools as Qualys (security scanning for all parts of the infrastructure), Carbon Black (endpoint security software), Splunk or Sentinel (software for managing machine data), or homegrown solutions.

Other noteworthy activities include SLAC's automated health check app to ensure security compliance for externally-owned devices connecting to SLAC systems. Stanford Libraries is working to fully automate patching their server fleet of over 500 virtual machines and 100 codebases. And School of Medicine's SUSI (Stanford University Systems Inventory) automates compliance verification against MinSec for a variety of servers and applications.

Talent Development

Across the board, IT at Stanford is investing in talent through extensive training, mentoring, and a number of development programs. Most notably, nearly every Stanford information technology organization sends staff to the Information Technology Leadership Program (ITLP) and/or the Stanford Technical Leadership Program (STLP).

Additionally, we're training our IT staff in specific technologies, tools and disciplines including Cloud, Salesforce, OBIEE, Drupal 8, user interface, user experience, Tableau, and more.

And, in many cases, we're formalizing our talent development plans. SLAC is creating formalized development plans for all Computing Division staff. School of Medicine is formalizing career development plans and goal setting. Business Affairs runs a talent development program to grow internal talent through exposure, experience and education activities.

Succession planning is another area of focus, with targeted efforts underway at SLAC, UIT and School of Earth.

IT Leadership

Stanford's IT community looks forward to continuing our momentum toward becoming a more coordinated, efficient and effective community. This progress will be bolstered by the leadership of Stanford's new chief information officer, Steve Gallagher.

Our collaboration is currently embodied in our strategic advisory councils, like the CIO Council, Campus IT Leaders and the Desktop Advisory Group, which are made up of IT leaders across campus. H&S is also notable for encouraging cross-pollination among Stanford's IT leadership, with an active program of collaboration. Additionally, EH&S is taking a leadership role in working with numerous administrative units to improve how we can collectively support research at Stanford.

University IT (UIT)

PART OF BUSINESS AFFAIRS, UNIVERSITY IT IS DEDICATED TO delivering world-class service and technological solutions in support of research, teaching and learning, administration, and healthcare. Our strategic goals include:

- Provide systems and applications that are secure, reliable, integrated, and easy to use, and that enable the work of our faculty, students and staff.
- Provide consistent, responsive, best-in-class services and support.
- Deliver accurate, timely and useful information to support decision-making.
- Continuously improve our clients' satisfaction with UIT applications, systems and services.
- Create an organization that attracts, develops and retains outstanding staff, and is widely recognized as a great place to work.

We provide a range of services that extend across the academic campus, and will soon serve Stanford Redwood City as well. Included in our service portfolio are:

- Business applications
- Email and calendar service
- Authentication, directory, registry and data integration services
- Networking and communications
- Data center facilities and services
- Research computing services
- Web hosting and development
- Central desktop support
- Help desk support

In addition to providing these services across campus, UIT provides a range of telecommunication services to Stanford Health Care.

Also part of UIT is the Information Security Office (ISO), which orchestrates Stanford's efforts to protect its information assets and comply with information-related laws, regulations and policies. ISO provides a broad array of tools and services to prevent, detect and recover from cybersecurity incidents.

This is an exciting time of change and evolution in UIT. In March 2018, Stephen Gallagher became the leader of UIT and the new CIO of Stanford University. Steve will work with UIT senior staff to identify new opportunities to improve the efficiency of IT operations, enhance user experience and satisfaction, and improve compliance and reduce risk.

Highlights

Upcoming move to Redwood City: In 2019, most UIT staff members will join more than 2,000 other employees in the move to Stanford Redwood City. We are deeply involved in partnership with Land, Buildings & Real Estate and the Stanford Redwood City Executive Committee to build out the technical infrastructure at this new, modern administrative campus.

New identity and access management (IAM) solutions: We are in the process of implementing a new, modern and scalable set of IAM solutions.

Communication and collaboration improvements: We continue to evolve the communication and collaboration tools available to the Stanford community so they can do their best work regardless of location. Our goal is to support efficient communication and improved collaboration from various locations including Stanford Redwood City.

Enhanced information security: Our focus areas this year include intrusion detection and response, file storage security, cloud security, phishing awareness and improved usability through client certificate-based authentication. Our continuing goal is to have no incidents attributable to a lack of best practices. As a foundation, we accomplish this through the comprehensive and sustained adoption of the Minimum Security Standards (MinSec).

Migration to the cloud through Cloud Transformation Program: Over the next few years, we will migrate significant parts of our service portfolio to cloud-based products and cloud-hosted deployments. We will select scalable, cost-efficient, innovative and resilient solutions to minimize risk in a disaster, increase geo-diversity, free up campus space, provision computer resources faster, improve scalability and leverage services provided by cloud vendors.

Research computing enhancements: We plan to add interactive graphical analysis capabilities to the primary shared compute cluster, Sherlock, and to selected projects in the Google Cloud Platform. We will also architect a shared environment through a partnership with the School of Medicine's Research Technologies group. The new environment, called Nero, will enable computing and analyzing High Risk Data at scale.

New communication services for Stanford Health Care: Our efforts here include designing and deploying unified communication and paging infrastructure at the new Lucile Packard Children's Hospital and the new Stanford Hospital, extending the suite of communications and collaboration services provided to Stanford Health Care to its ValleyCare locations in the East Bay, and modernizing contact centers through workforce optimization software.
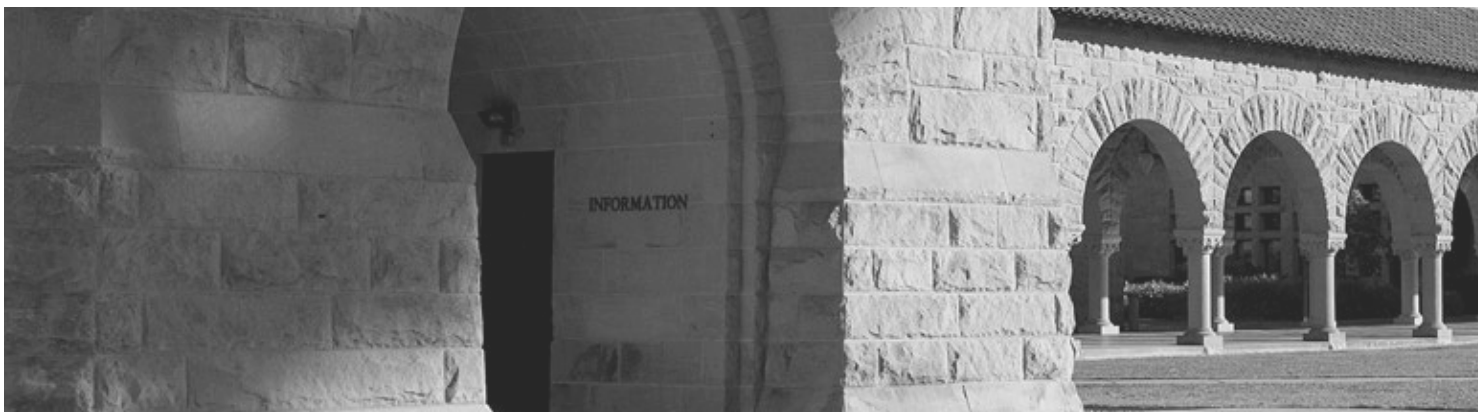
Implementation of centralized managed print services: We are partnering with Financial Management Services to evaluate and select a vendor to implement centralized managed print services for the main campus, Stanford Redwood City and Stanford Health Care. Managed print services have the potential to reduce costs, improve sustainability and improve user experiences with printing.

Direction of the Service Management Portal Program: The new Service Management Portal, powered by ServiceNow, helps campus organizations support their communities. In the coming year, we'll unify service management for IT and non-IT organizations across campus.

Improved business continuity and disaster recovery: We are working to improve the resiliency of Business Affairs applications and services — including response plans — in the event of major incidents or disasters. We're also improving the capability of staff to maintain continuity of operations for critical functions. This program will eventually serve as a template for campus partners in their own business continuity and disaster recovery efforts.

IT Efforts

Strategic Area	IT Effort
Research	- Enhance Research Computing
Teaching, Learning and Student Success	- Pilot video asset management platform - Enhance the Graduate Financial Planning System - Investigate managed print services solution - Implement new Alumni Volunteer Portal for Undergraduate Admissions - Implement a campus-wide degree audit solution
Infrastructure	- Lead the Cloud Transformation Program - Implement an identity and access management solution - Facilitate completion of technical infrastructure for Stanford Redwood City - Migrate department networks to new SUNet backbone - Upgrade communications infrastructure - Develop centralized API infrastructure and catalog
Communication and Collaboration	- Enhance Stanford Health Care communication services - Standardize campus-wide conference room audiovisual capabilities - Launch Slack Enterprise Grid - Roll out enterprise softphone services - Implement new emergency mass notification system - Move websites to cloud with Drupal/Acquia Platform-as-a-Service solution
Content and Data Management	- Identify a replacement for Nolij, a document imaging and management system
Data Analytics	- Transition Evolve Financial Reporting software from launch to ongoing program - Launch second phase of the Student Integrated Reporting Information System (SIRIS)
Business Operations and Applications	- Manage, evolve and expand the Stanford Service Management System - Support the development of the Alumni and Development Application Platform Transition (ADAPT) Initiative - Manage business continuity and disaster recovery program

Strategic Area	IT Effort
Business Operations and Applications, *continued*	- Assess and rationalize IT funding models - Roll out procure-to-pay purchasing marketplace - Integrate FICO anti-fraud system into business processes - Implement a financial system and platform to support global financial management - Replace Associated Students of Stanford University (ASSU) MyGroups and accounting system - Implement PTA Manager to automate requests and approvals - Implement a Software-as-a-Service recreation management solution for Stanford Recreation & Wellness - Implement a Risk Management Information System - Upgrade PeopleSoft Campus Solution
Information Security and Privacy	- Introduce client certificate-based authentication - Expand intrusion detection and response capabilities - Evaluate cloud security tools - Expand Phishing Awareness Program - Strengthen third party service user authentication - Overhaul file storage security - Strengthen two-step authentication options - Revise Administrative Guide Chapter 6
Talent Development	- Sponsor and participate in ITLP and STLP - Facilitate third annual UIT Mentoring Program - Assess and develop cloud computing skills - Participate in Business Affairs Talent Development Program - Conduct succession planning
IT Leadership	- Design, launch and facilitate the Campus IT Plan Program - Facilitate strategic advisory councils including CIO Council, Campus IT Leaders and Desktop Advisory Group

Stanford Libraries (SUL)

STANFORD LIBRARIES CONSISTS OF 24 LIBRARIES WITH OVER 9 million books, 1.5 million audiovisual recordings and more than 2.2 million e-holdings including digital books, journals, image sets and data sets.

Digital Library Systems & Services (DLSS) was created in 2004 and is the information technology production arm of SUL. DLSS serves as the digitization, digital preservation and access systems provider for SUL, and is the research and development unit for new technologies, standards and methodologies related to library systems.

DLSS builds upon purchased systems, locally developed tools and increasingly, public domain software. For each of these, DLSS provides significant local integration and enhancement, plus ongoing support of these applications and their technical environments. DLSS also actively participates in and contributes to the library, higher education and open source communities around technologies, methods and standards.

Read the full plan online:

campusitplan.stanford.edu/units/sul

Highlights

Enable interoperable access to digital images for research with Mirador: Stanford researchers make extensive use of digital images in their research, teaching and publication efforts. To support these needs, SUL leads a global effort to create infrastructure and tools to enable interoperable access to the repositories of academic research institutions. Known as the International Image Interoperability Framework, this effort resulted in the development and broad adoption of open standards and APIs to support interoperable access to image data.

SUL implemented this as a core service and built a software platform called Mirador that enables Stanford faculty to access, analyze, compare and annotate images for research and teaching.

Implement the Research Intelligence System for Stanford University (RIALTO): RIALTO will be a web-based research data aggregation application that will store data using linked data principles, allowing for complex inference-based queries. RIALTO is part of the larger Stanford Research Information Ecosystem (RIE), which seeks to produce a more connected set of systems for Stanford University.

With RIALTO, we will integrate information from existing on-campus systems such as Stanford Profiles, the Stanford Digital Repository (SDR), Stanford Electronic Research Administration System (SeRA) and Stanford You. RIALTO will provide information on the relationships between research activities, outputs and grants for Stanford's faculty, administrators and students. The effort is planned for spring 2018.

Expand features for research outputs in the Stanford Digital Repository (SDR):
The SDR is an enterprise system that was designed, built and operated by Stanford Libraries for the long-term management of content of enduring value to the university community.

One of the primary use cases for the SDR is to support the deposit of research outputs generated by faculty and other Stanford researchers. Research outputs includes datasets, software, articles, working papers and technical reports among others. Long-term management of this content is critical to maintaining the scholarly record and stimulating new research.

A new Digital Object Identifier service is now in the planning stage, as well as new mechanisms for transferring large data sets to and from the SDR.

Improve and enhance the Stanford Spatial Data Infrastructure (SSDI): SUL built and continues to improve robust and innovative systems to support the use of geospatial data across campus. The SSDI is a set of interoperable infrastructure components that provide open standard web services, web service monitoring, and real-time index updating services for licensed and open geospatial data.

These services are accessible for web applications, Geographic Information Systems (GIS), visualizations and other software. Data served through the SSDI can be found through our GIS discovery portal, EarthWorks.

Highlights, *continued*

Enable 3D models in the classroom: SUL is building a new service to support the innovative use of 3D technologies in the classroom. As part of our digitization services, we offer 3D scanning for objects and artifacts and create 3D models that can be used in the classroom.

Instructors can present the 3D models on large displays, and students can view them on their devices inside and out of the classroom to reinforce their learning. The models can be used to complement the original artifact or can be used as surrogate if the original is rare or fragile.

Re-architect the LOCKSS software: Lots of Copies Keep Stuff Safe (LOCKSS) is open-source software developed by the LOCKSS Program Auxiliary Unit in Stanford Libraries to help hundreds of libraries throughout the world reliably preserve the digital information that matters to them. LOCKSS was built to help mitigate the risks that threaten the long-term persistence of digital information.

We are currently in the midst of a two-year effort to re-architect the LOCKSS software as a set of modular, interoperating web services. This will afford the opportunity to integrate unique LOCKSS software capabilities into non-LOCKSS systems, with the potential for broad-based improvements to the efficacy of digital preservation solutions.

IT Efforts

Strategic Area	IT Effort
Research	- Enable interoperable access to images for research with Mirador - Expand SearchWorks, SUL's information discovery platform - Improve and enhance the Stanford Spatial Data Infrastructure
Teaching, Learning and Student Success	- Enable 3D models in the classroom
Infrastructure	- Upgrade and virtualize backup environment - Upgrade and migrate to new VMware infrastructure - Migrate DLSS sites and services to Amazon Web Services - Migrate all applications from WebAuth to Shibboleth
Content and Data Management	- Provide digitization and preservation services - Implement S3-compatible object store - Leverage cloud for SDR catalog - Provide ongoing archiving services - Re-architect LOCKSS software - Expand features for research outputs in the SDR - Provide ongoing support for student works in the SDR - Provide ongoing support for media delivery and archiving with SDR - Add collections to the Born-Digital/ Forensics Lab
Data Analytics	- Implement the Research Intelligence System (RIALTO)
Information Security and Privacy	- Automate virtual machine patching and maintenance
Talent Development	- Participate in ITLP and STLP

Vice Provost for Teaching and Learning (VPTL)

THE OFFICE OF THE VICE PROVOST FOR TEACHING AND Learning broadly supports learning across all of Stanford's schools and beyond the campus, advancing faculty-led programs and initiatives. VPTL's mission reflects campus priorities; it is intended to help Stanford invent the future research university through faculty-initiated teaching and learning innovation for undergraduate, graduate, professional and lifelong learning. VPTL's activities and services draw upon core competencies in pedagogy, educational technology, learning environments, academic business development and strategic collaboration throughout the university.

Read the full plan online:

campusitplan.stanford.edu/
units/vptl

Highlights

Consolidate and streamline public-facing learning platforms: Part of VPTL's mission is to facilitate the dissemination of Stanford's research knowledge and specialized expertise broadly, through new models of learning and engagement. To this end, VPTL has historically had multiple platforms that provide access to Stanford for different audiences. In the coming year, we will streamline our platform ecosystem and consolidate course content to Open edX, an open source Massive Open Online Course (MOOC) platform. This will allow us to focus resources on managing and maintaining a single platform, cross-utilizing new features and upgrades for various audiences.

Develop a Digital MEdIC mobile app: The Digital Medical Education International Collaborative (Digital MEdIC) is an initiative from Stanford Medicine, in collaboration with partners worldwide, to provide online access to high-quality, customizable healthcare education content available to anyone, anywhere, anytime.

In collaboration with the Stanford Center for Health Education, VPTL is developing an Android and iOS mobile app to provide Digital MEdIC course content. The app will have an offline feature to support education in rural areas with poor connectivity.

Improve web presence for all VPTL entities and standardize cloud website hosting with Drupal and Amazon Web Services (AWS): Having merged several units, VPTL acquired hundreds of web pages, teaching and learning resources, more than 10 web entities with various hosting platforms (on campus and cloud) and varying content management systems. These assets are valuable but lack cohesion. This project has two components:

1) Integrate, re-develop and create VPTL website and web toolkits to increase faculty and student engagement.

2) Port all new web entities to a combination of AWS and Drupal, which provides all the benefits that cloud delivers.

We launched seven websites on the new standard stack and plan to utilize the strategy for all sites and toolkits as they are updated/launched.

Maintain and expand the Canvas ecosystem: VPTL manages Canvas, the university's Learning Management System, which houses courses and data for enrolled students. While Canvas itself is Software-as-a-Service (SaaS), VPTL maintains a whole ecosystem around it to ensure that the needs of teaching and learning at Stanford are met.

Our planned and completed enhancements to Canvas include customizing and connecting Canvas with other university systems, building and integrating features and third party tools.

Re-architect Stanford's Online Catalog: The Stanford Online Catalog is the main portal for users to discover the wide variety of learning content that Stanford offers. VPTL will migrate its online course catalog to use Destiny One, a SaaS content management platform. This redesign will provide new functionality and a better user experience, while enhancing scalability and security for over three million learners on Stanford Online.

Respond to emerging technology needs for instructors and students: More and more, instructors are incorporating the use of emerging technologies, such as virtual reality experiences and 3D printed objects in their courses. We anticipate that students will also begin to incorporate such technologies into their work products. VPTL monitors the emerging technology landscape and collaborates with campus leaders and partners to anticipate support needs related to the use of emerging technology in teaching and learning.

Highlights, *continued*

Update public cluster computing technology: VPTL manages the public machines available in the libraries, residences and clusters across campus. We continue to investigate and update the technology used to manage these machines.

Our efforts for this year include:

- Software delivery: Investigate desktop/application virtualization infrastructure or other ways to deliver instructional software on users' own computers.

- Imaging/Endpoint Management Software: Investigate alternative Imaging/Endpoint Management Software for public computers, including Mobile Device Management (MDM), Jamf mobile endpoint management, BigFix, etc.

Upgrade classroom capture and self-service video infrastructure: VPTL's efforts in this space include upgrading and streamlining existing classroom capture, and developing a flexible framework for content capture from anywhere. Panopto, a platform we are piloting in collaboration with UIT, is part of the solution in both efforts.

Panopto can be integrated into the classroom capture process, to manage video capture and streaming (both live and on demand), replacing the existing, more expensive encoding infrastructure. Panopto is also integrated with Canvas and enables content creation, video sharing, and search and editing. This will provide faculty and teaching staff with self-service options for video capture and delivery.

We are also evaluating various hardware devices (Epiphan Pearl, Teradek, etc.) for live streaming, quality control monitoring and live viewing of seminars and talks by attendees.

IT Efforts

Strategic Area	IT Effort
Teaching, Learning and Student Success	- Maintain and expand the Canvas ecosystem
	- Consolidate and streamline public- facing learning platforms
	- Upgrade classroom capture and self- service video infrastructure
	- Develop a Digital MEdIC mobile app
	- Evaluate managed print services
	- Respond to emerging technology needs for instructors and students
	- Add lecture self-capture functionality to the Academic Technology Lab
Infrastructure	- Continue virtualization and containerization efforts
	- Upgrade and consolidate back end infrastructure
	- Support Internet of Things devices in classrooms and residences
	- Update public cluster computing technology
Communication and Collaboration	- Improve web presence for all VPTL entities and standardize cloud hosting
Content and Data Management	- Re-architect Stanford's Online Catalog
	- Continue to build out video asset storage and archive solution
Data Analytics	- Launch learning analytics dashboard
	- Expand reach of business intelligence
Information Security and Privacy	- Work closely with UIT and ISO to maintain security standards
Talent Development	- Participate in ITLP and STLP

Student and Academic Services and University Registrar (SAS)

STUDENT AND ACADEMIC SERVICES AND UNIVERSITY REGISTRAR is a division of Student Affairs. It is made up of several units including:

- The Office of the University Registrar
- Student Information Services
- Student Services Center
- Student Financial Services
- Graduate Admissions

Student Affairs advances student development and learning; fosters community engagement; promotes diversity, inclusion and respect; and empowers students to thrive.

The Office of the University Registrar supports teaching and learning by maintaining the integrity of academic policies and the student information system. The office is the steward of Stanford's student records from application to degree conferral in perpetuity. Units include Degree Progress, which tracks student achievement to degree completion; Student Records, which manages records from matriculation through graduation; and Course and Event Scheduling, which manages curriculum planning and class enrollment. The office also publishes relevant university policies including the Stanford Bulletin, the official university statement of degree requirements and classes.

The Student Information Services team provides business system analysis and application development for Student Affairs. They are the business owners of many applications that rely on the secure and appropriate use of student data. They work in close partnership with various UIT teams who maintain the enterprise systems. Applications include Axess (Stanford's Student Information System), student data web services and more.

The Student Services Center, Student Financial Services and Graduate Admissions units manage and implement technology that supports innovative approaches to their business practices and interfaces with student needs.

IT Efforts

Teaching, Learning and Student Success

- Upgrade Curriculum Planning System and enhance the Stanford Bulletin
- Implement a degree audit system
- Cash advance program for graduate students
- Pilot Certificates and ePortfolios
- Implement eDissertation project
- Conduct discovery effort for students to self-identify gender identity in Axess
- Integrate student grades with Canvas
- Conduct proof of concept for Student-in-the-Cloud using current certificate programs
- Improve electronic Ways certification system

Communication and Collaboration

- Upgrade Stanford Bulletin, including ExploreDegrees and ExploreCourses
- Streamline student and faculty emails

Content and Data Management

- Develop new approach to APIs

Data Analytics

- Develop a decision support model with Tableau

Business Operations and Applications

- Create electronic student forms with workflow
- Implement a tool to upload placement tests
- Add mandatory checking to event check-in
- Enhance functionality in lookup.stanford.edu
- Explore real-time billing for student accounts
- Prepare for 1098T changes
- Implement Flywire as an additional online payment option for international students

Information Security and Privacy

- Implement ability to load certificates for blockchain verification

IT Leadership

- Participate in ITLP and STLP

Highlights

Upgrade Curriculum Planning System (CPS) and enhance the Stanford Bulletin: Academic administrators use the CPS to manage course offerings and class scheduling. In collaboration with UIT, it will be upgraded to include live feeds to Axess, enhanced course management abilities and workflows to replace paper- and email-based internal academic department processes.

Additionally, discovery is underway for graphical user interface and functionality enhancements for the Stanford Bulletin, which leverages the CPS. The Stanford Bulletin is the university's official statement of courses and degrees. We are working with the existing Software-as-a-Service (SaaS) in both of these cloud-based efforts.

Implement a degree audit system for faculty, students and staff: Stanford lags behind our peers in not providing a comprehensive degree audit system for students to track their degree progress. The discovery project was a collaboration among stakeholders in SAS and other university central offices including UIT, as well as other academic departments and programs. A robust SaaS-powered solution has been selected and implementation has begun. The system will help students optimize degree completion and will be used by administrative staff for degree clearance and data analysis.

Implement an online cash advance program for graduate students: Student Financial Services is developing an internal, online mechanism for graduate students who are expecting aid to receive a cash advance of their funding prior to the start of the term. This solves a longstanding issue for students without the means to cover a period of study while funding is pending. This implementation involved collaboration with numerous teams including UIT and Business Affairs.

Pilot and implement authenticated Certified Electronic Certificates (CeCertificates) and ePortfolios: Students need to represent the outcomes and capacities from their Stanford education to prospective employers and other downstream opportunity providers. The CeCertificate uses XML to publish data from Stanford-maintained databases of programs and courses. We collaborated with UIT and a SaaS vendor in creating this product, which we are continuing to pilot with interested Stanford units. SaaS-powered ePortfolios enable students to curate their work, multimedia artifacts from the Stanford Digital Repository and official records in order to create a rich electronic representation of their education.

Create electronic student forms (eForms) with workflow: Currently, student-initiated requests to the Registrar's Office are handled using printed PDF forms. The eForms initiative will move all Registrar student forms, petitions and requests into a fully electronic environment with workflow for seeking approvals and routing to interested stakeholders in central offices and in the academic departments.

Graduate School of Business (GSB)

ONE OF THE SEVEN SCHOOLS AT STANFORD UNIVERSITY, the Graduate School of Business is one of the top business schools in the world. The school's mission is to create ideas that deepen and advance our understanding of management, and use those ideas to develop innovative, principled and insightful leaders who will change the world.

The GSB IT group, known as the Digital Solutions team, focuses on supporting the GSB application and service environment, and creating digital solutions to transform higher education.

The Digital Solutions team seeks to transform higher education through an innovative application of information technology with instructional design, online educational assets, design thinking for process redesign, and an increasing focus on improving the user experience and making data-driven business decisions that are guided by a business and technology architectural mindset.

Digital Solutions nurtures select competency "Practice Areas" and cascades those sensibilities broadly through user experience, software development, adverse event prevention and response, and design thinking.

Highlights

Migrate to Salesforce Communities platform: We will migrate our legacy portals to the Salesforce Communities platform. This platform will enable more meaningful engagement between GSB staff, students, faculty, prospects, alumni and others.

Create a personalized job platform for GSB students and alumni: We will create a solution for students and alumni to present personalized employment and internship opportunities for their unique career paths. The platform will include activities such as resume review, career fit and job identification/tagging.

Enhance and scale research computing capabilities for faculty: GSB faculty and PhD students have a number of options to fulfill their research computing needs. In addition to personal research servers and campus-wide offerings like Farmshare and Sherlock, the GSB provides a small pool of on-premise shared servers known as the Yens.

Also available is our on-demand extensible cloud service, known as Cloud Forest. This effort will continue to enhance these and other compute capabilities for faculty, including disaster recovery and cloud computing, so that we can keep up with — and get ahead of — the demand for processing large datasets with even more computational power.

Test experiential augmented reality (AR) for research: As part of our general efforts into the use of AR and virtual reality (VR), we partnered with faculty to evaluate whether using AR to visualize health information affects consumer choices. In the course of this effort we tested various platforms such as Augment, zSpace and ARKit.
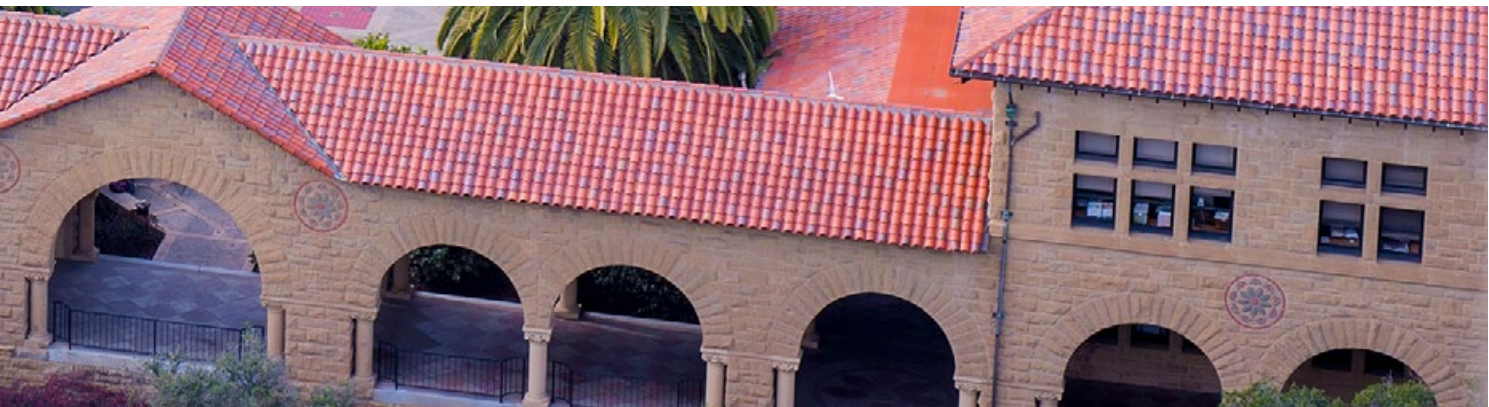
IT Efforts

Strategic Area	IT Effort
Research	- Create standards and a service for research datasets - Enhance and scale research computing capabilities for faculty - Test experiential augmented reality for research
Teaching, Learning and Student Success	- Research a career pathways tool for GSB students - Create lifelong identity for GSB certificate alums to foster sustained engagement - Enhance course evaluation application - Design and produce instructional media content - Enhance students' ability to research courses - Implement a degree progress tracking application - Create a personalized job platform for GSB students and alumni - Support and enhance Learning Management System ecosystem - Redesign and enhance MBA courses - Evaluate and use best of breed tools in GSB's educational technology lifecycle - Ongoing development of simulations and interactives
Infrastructure	- Refresh audiovisual infrastructure - Implement disaster recovery for faculty research storage - Add organizational efficiencies to shared storage structure and process - Re-architect on-premise application servers - Re-imagine GSB print services - Re-architect overall GSB storage strategy

Strategic Area	IT Effort
Communication and Collaboration	– Develop Library microsite – Enhance marketing capabilities to create meaningful connections and drive program expansion – Create a new GSB student directory
Content and Data Management	– Spread and encourage usage of Inkling – Establish enterprise data warehouse – Replace sunsetting product line with COVEO (a unified intelligent search tool)
Data Analytics	– Establish processes and technology components for analytics self-service – Build faculty administrative analytics framework – Implement a learning analytics platform – Build semantic analytics capability
Business Operations and Applications	– Migrate to Salesforce Communities platform – Automate account lifecycle – Migrate and enhance the Course Planning System – Implement an IAM service for unaffiliated users – Retire WebAuth and migrate GSB systems to Shibboleth – Roll out project development process tool – Develop and integrate an application review module
Information Security and Privacy	– Create a cybersecurity program – Meet General Data Protection Regulation compliance
Talent Development	– Participate in ITLP and STLP

School of Earth, Energy & Environmental Sciences (Stanford Earth)

WE CREATE KNOWLEDGE TO UNDERSTAND EARTH AND sustain its inhabitants.

IT Mission

Our mission is to align and deliver effective and innovative technology solutions and support services that enhance teaching, learning, research, and administration while enabling our faculty, staff and students to execute on the Stanford Earth and university mission.

Guiding Principles

- Anticipate future technology needs to maintain Stanford Earth's role as worldwide leader in research and learning.
- Focus on providing timely, accurate and secure solutions to Stanford Earth.
- Adopt and promote good computing practices; ensure compliance with internal and external standards. Ensure system processes and procedures are adequately documented and up to date.
- Emphasize transparency of budget, priorities and resource alignment.
- Continually seek out opportunities for automation and integration.
- Partner with other Stanford schools, institutes and administrative organizations to leverage resources towards common goals.
- Foster an inclusive and respectful culture.

Read the full plan online:

campusitplan.stanford.edu/units/earth

IT Efforts

Research

- Survey our research community
- Review and assess the high-performance computing model for the Center for Computational Earth & Environmental Science
- Identify consulting resources for high-performance computing

Teaching, Learning and Student Success

- Explore use of augmented reality and virtual reality technologies to benefit teaching and learning in the school

Infrastructure

- Evaluate opportunities to further leverage cloud platforms

Communication and Collaboration

- Enhance audiovisual technology in conference rooms and meeting rooms
- Create Stanford Earth intranet
- Explore digital signage solutions
- Expand faculty and student outreach
- Expand technology awareness within the Stanford Earth community
- Establish common collaboration tools

Business Operations and Applications

- Onboard additional labs to iLab
- Introduce business intelligence and decision support
- Further leverage University IT's Technology Consulting Group (TCG) and Computer Resource Consulting (CRC) services
- Evaluate ways to manage software licenses and collections

Talent Development

- Succession planning and staff development
- Enhance cloud development skills
- Sponsor leadership development via STLP

Highlights

Review and assess the high-performance computing model for the Center for Computational Earth & Environmental Science (CEES): CEES was formed about 10 years ago with the goal of establishing a strong computational science community though research, education and high-performance computing.

Over time, research requirements change, and we are receiving feedback that the current model may need to be modified in terms of flexibility, and ability to provide sustained access to resources. Therefore, this effort will review the current architecture and financial model for the CEES and more broadly, for research computing across the school.

The goal is to propose a new finance model and reference architecture that more closely aligns with the current and future needs of our research community.

Explore use of augmented reality (AR) and virtual reality (VR) technologies and how they may benefit teaching and learning in the school: Perform an exploratory pilot project to evaluate current AR and VR technology in the newly-renovated student lounge. This pilot project will allow students to experiment with ways in which these emerging technologies may be used, for example, to support deeper visualizations as well as the possibility of virtual field trips in advance of actual field trips.

Create Stanford Earth intranet: Develop a new Stanford Earth intranet to promote internal communication, cross-departmental community awareness and serve as a central hub for information and resources for the school.

This effort will increase access to useful information for faculty, staff and students, and provide greater visibility on the variety of activities that take place at any given time across the school.

Evaluate opportunities to further leverage cloud platforms as viable alternatives to on-premise hosted and managed solutions: Evaluate alternative technology platforms and solutions including cloud platforms such as Google Cloud Platform and Amazon Web Services to determine level of viability as alternatives to locally hosted solutions. This includes in scope a broad spectrum of platforms, infrastructure and software application services.

The results of this effort will help identify which systems and services may be migrated to the cloud, versus those that may need to remain on premise, and those that may transition to a hybrid of the two.

Graduate School of Education (GSE)

GRADUATE SCHOOL OF EDUCATION IS A LEADER IN pioneering new and better ways to achieve high-quality education for all. Faculty and students engage in groundbreaking and creative interdisciplinary scholarship that informs how people learn and shape the practice and understanding of education. Through state-of-the-art research and innovative partnerships with educators worldwide, the school develops knowledge, wisdom and imagination in its diverse and talented students so they can lead efforts to improve education around the globe.

The GSE Office of Innovation and Technology, referred to as GSE IT, is a unit under the GSE Dean's Office dedicated to collaborating with our academic community to design and deliver hands-on support that aligns with the school's vision for inter-disciplinary and innovative technology solutions. GSE IT is committed to providing leadership and support in the following areas:

- Academic support resources
- Application development
- IT support
- Software, equipment and facilities
- Visual design and digital media
- Web design and development services

IT Efforts

Teaching, Learning and Student Success

- Develop models to evaluate student questions with natural language processing
- Build a digital playground for rapid, personalized experiential learning
- Build an interactive media case-based learning database
- Improve student learning outcomes through enhanced learning analytics
- Support, maintain and add functionality to the student degree program proposal and degree tracking system
- Build a course mapping visualization tool for students and advisors
- Develop and enhance educational mobile applications

Infrastructure

- Standardized conference room technology to support remote and distributed collaboration
- Create more flexible and collaborative workspaces
- Transition on-premise servers and applications to the cloud

Information Security and Privacy

- Raise information security awareness with staff, faculty and students

Talent Development

- Design and offer certificate programs to develop staff technical skills
- Participate in STLP

IT Leadership

- Provide IT consultation to faculty, staff and researchers
- Support the new Entrepreneur-in- Residence program

Highlights

Develop models to evaluate student questions using natural language processing tools: Cloud-based natural language processing tools by Amazon Alexa, IBM Watson and Google Assistant provide plentiful opportunities for innovation. They allow us to build text-based classifiers that can help teachers decrease the amount of time spent grading responses, giving teachers more time to facilitate meaningful interactions in the classroom.

We are currently testing Bloom's taxonomy as a new question classification model for the SMILE Cloud platform. SMILE, or the Stanford Mobile Inquiry-based Learning Environment, is an assessment-making application that allows students to quickly create their own inquiries or homework items.

Build a digital playground for rapid, personalized experiential learning: As interactive media and digital learning experiences become more integrated, instructional design has come to the forefront. GSE IT is developing a blended learning curriculum and accompanying app developed alongside GSE faculty to provide a "digital playground" for rapid, personalized experimentation with new concepts. Student interaction with this online learning environment is book-ended by face-to-face instruction, providing a rich data set with which to inform future pilots around blended learning.

Improve student learning outcomes through enhanced learning analytics: GSE IT aims to serve as conduit for meaningful data insights by collaborating with the leading online course platforms such as Udemy and edX, and learning analytics companies to research and provide insights on students' learning experience, progress and outcomes.

Develop and enhance educational mobile applications: GSE IT provides a mobile and web application design and development service to support our faculty. Some of the apps in active development are:

- Playful Science: Resources for families to engage in playful science exploration
- SPELL: Helps young children accelerate literacy development
- Achieve: Individualized health interventions
- Child Emotion and Performance Assessment: Assesses inhibitory control, cognitive flexibility, frustration tolerance and more
- Science in the City: Professional development for teaching science
- Child Learning Assessment: Assesses second and third graders' math and reading ability

Support the new Entrepreneur-in-Residence program: The program, launched in January 2018, brings one accomplished entrepreneurial leader to campus for a year at a time to provide mentorship and help connect investors and other executives with researchers. GSE IT assisted in developing and facilitating the online web content, digital media and digital learning curriculum.

School of Engineering (SOE)

THE SCHOOL OF ENGINEERING HAS NINE DEPARTMENTS AND 150 programs, institutes, centers, affiliates and labs. It is home to roughly 4,700 faculty, staff and students.

The Engineering IT group is massively decentralized, consisting of 42 professional IT staff members spread across 10 different units, with little overlap between units.

The SoE Dean's Office IT Provide the Following Services:

- Desktop support
- Datacenter hosting
- Virtual machines for researchers
- Storage for researchers
- Audiovisual and conference room support
- Print services
- Security services
- Research IT consultation services
- Project management
- Business workflow management (Pega)
- License server service

Within the SoE, the Computer Science (CS) and Electrical Engineering (EE) departments both have dedicated IT staff who provide a wide range of services to their faculty and staff, which are focused primarily on research.

The primary areas of focus for CS and EE IT groups include research infrastructure development and support, service desk support, data center services, Electronic Design Automation and Computer-Aided Design, research software support and licensing, network monitoring, network security and teaching support.

Read the full plan online:

campusitplan.stanford.edu/
units/soe

IT Efforts

Research

- Create an Electrical Engineering and Computer Science research network

Teaching, Learning and Student Success

- Develop an Electrical Engineering simulation space for short-term software and computation access to students

Infrastructure

- Develop a cloud and virtualization strategy

Data Analytics

- Develop a business intelligence strategy and governance model

Business Operations and Applications

- Implement a business process management system
- Develop a strategic roadmap for implementation of ServiceNow

Talent Development

- Provide leadership training to technical leaders to maintain a sustainable, high performing culture

Highlights

Implement a business process management system: Build applications to reduce manual data entry and calculations, and centralize information. We will leverage integration points and web services to send and retrieve data from core campus systems, such as PTA validation, Person Service Look-up and Oracle Labor Distribution.

Applications currently deployed include Faculty Salary Offset Approval workflow and Research Assistantship Approval workflow. Applications under consideration include Student Fellowship Approvals, Onboarding and Offboarding of Staff, and Staff Performance Appraisals.

Develop a strategic roadmap for implementation of ServiceNow: Develop a strategic roadmap for the implementation and adoption of ServiceNow as informed by UIT's strategy. The roadmap will include integration of the Service Desk and other non-IT groups within the SoE.

Develop a cloud and virtualization strategy: Develop a strategy and roadmap for the use of cloud and the virtualization of server infrastructure supporting the administrative and research workloads.

Create an Electrical Engineering (EE) and Computer Science (CS) research network: Create an unfettered, open research network space, using locally-developed innovations and involvement from many research groups and companies across the world.

Over the past decade, research from Stanford has transformed how we build and manage computer networks. Many modern network devices are programmable. This is an active area of research, with new ideas emerging about programming languages, system architectures and hardware designs.

EE and CS aim to create an open research network space upon which new paradigms, protocols, services and implementations can be experimented. This can be a single service tied to one system, or hundreds of small Internet of Things devices meshing for some purpose. Many of these will be developed in a trial and error approach, or with multiple approaches, and we will attempt to log scientifically the performance and fitness of different designs. Simply put, this effort is an attempt to create laboratory settings to apply the scientific method to networks and systems. This research network space will be available for most ongoing activities in the departments, helping to maintain the open nature of non-administrative computing research.

Develop a business intelligence (BI) strategy and governance model: The SoE Dean's Office IT group will develop a BI strategy and governance model that provides self-service access to information.

School of Humanities and Sciences (H&S)

H&S IT IS PART OF THE DEAN'S OFFICE OF THE SCHOOL OF Humanities and Sciences. The H&S IT Team works with UIT, our peer IT organizations and external partners to support stakeholders in the Dean's Office, and in our departments and programs.

The H&S IT group's services fall into five broad categories:

- Applications: Services that allow for efficient management of resources, including the Graduate Financial Planning System, Budget Planning System and HandSOn (faculty administration).
- Business intelligence: Services and dashboards that expand the ways our stakeholders make use of data from university sources and H&S systems, to support operations and strategy.
- Web consulting: Create innovative, best-practice website solutions by leveraging a common platform.
- Operations: Services that keep our school's everyday IT running smoothly, including the move to cloud, computer replacements, information security consulting and more.
- Academic support: Shared solutions for teaching, learning and research. Current focuses include high-performance computing and seminar room audiovisual.

Stanford will appoint a new dean for H&S in 2018, and in addition to the initiatives listed here, we will work with our new dean to define an IT strategy in line with the overall goals for the school.

Read the full plan online:

campusitplan.stanford.edu/units/humsci

IT Efforts

Research

- Expand H&S research computing footprint
- Outreach program for research computing

Communication and Collaboration

- Support video conferencing in H&S
- Pilot collaboration tools
- Prepare H&S Web Consulting for Drupal 8
- Migrate sites to Sites 2.0

Data Analytics

- Data warehouse for faculty financial information
- Evolve financial reporting and dashboards
- Enhance H&S business intelligence dashboards
- Extend Tableau to pull data from bi.stanford.edu

Business Operations and Applications

- Roll out Salesforce
- Roll out automatic workgroup population
- Implement flexible room scheduling interface
- New funds management system
- Cloud-based solutions for HandSOn
- Retrofit HandSOn for access to faculty records
- Expand Graduate Financial Planning System

Information Security and Privacy

- Inventory servers and adopt MinSec standards
- Audit and employ standards around file storage
- Access control review process, audit schedule

Talent Development

- Prioritize user-facing technologies
- Participate in ITLP and STLP

IT Leadership

- Collaborate with other Stanford IT organizations
- End-user outreach
- Improve application team internal processes

Highlights

Expand H&S research computing footprint: Expand the H&S footprint on the Sherlock high-performance: computing cluster for H&S researchers based on patterns of usage over the past year. Make these resources available to all H&S research groups on a fair-use basis.

Prepare H&S Web Consulting for the transition to Drupal 8: The school's web consulting team is partnering closely with Stanford Web Services to help build and prepare for a Stanford Drupal 8 web hosting platform. There are three parts to H&S IT's plan:

1) Pilot Drupal 8 websites

2) Train H&S staff

3) Consolidate existing sites

Enhance H&S business intelligence (HSBI) Tableau dashboards: We will enhance our suite of Tableau dashboards (hosted at hsbi.stanford.edu) as follows:

- Student data: Evaluate the Institutional Research & Decision Support Student Integrated Reporting and Information System 2a/2b release and determine where there may be a business need to visualize this data in HSBI.

- Training: Develop an online HSBI user training course.

- Cross functional: Develop a "Competitive Department Metrics" dashboard(s).

- Other dashboards or reports as prioritized by IT Steering Committee.

Expand Graduate Financial Planning System (GFPS): Phase one of transition to enterprise system: Working with school stakeholders, UIT and our vendor partners, we will expand the H&S-developed GFPS to the School of Medicine and the Graduate School of Education. This represents the first phase of the GFPS's transition to an "enterprise-wide" system. Then we will transition future support and development to UIT, and expand it to the School of Engineering and Stanford Earth.

Audit and employ standards around file storage: It is imperative that we communicate the need for our departments and programs to identify and secure their data while the university determines more programmatic and automated solutions. We will provide guidelines for file storage with a few recommended options. H&S IT intends to work with UIT to establish best practices around data storage options.

Stanford Law School (SLS)

FOUNDED IN 1893, STANFORD LAW SCHOOL ORIGINALLY drew students primarily from California. Today, students come from every region of the United States and every corner of the world. Stanford Law receives an average of 3,800 applicants for 180 seats, and students can choose from nearly 280 courses through the Law School alone.

The Stanford Law IT department is a group of 10 IT professionals supporting the school's computing and audiovisual needs. We provide end-to-end support from foundational IT requests to developing custom solutions for more complex challenges.

For faculty and staff, we procure, set up, back up, administer, troubleshoot and facilitate security compliance for Stanford-owned IT equipment including desktops, laptops, mobile devices, printers and servers.

We help students connect with Law School IT resources — including network printers servers — and UIT services. We provide audiovisual assistance to all Law affiliates and their guests for classes, presentations and events.
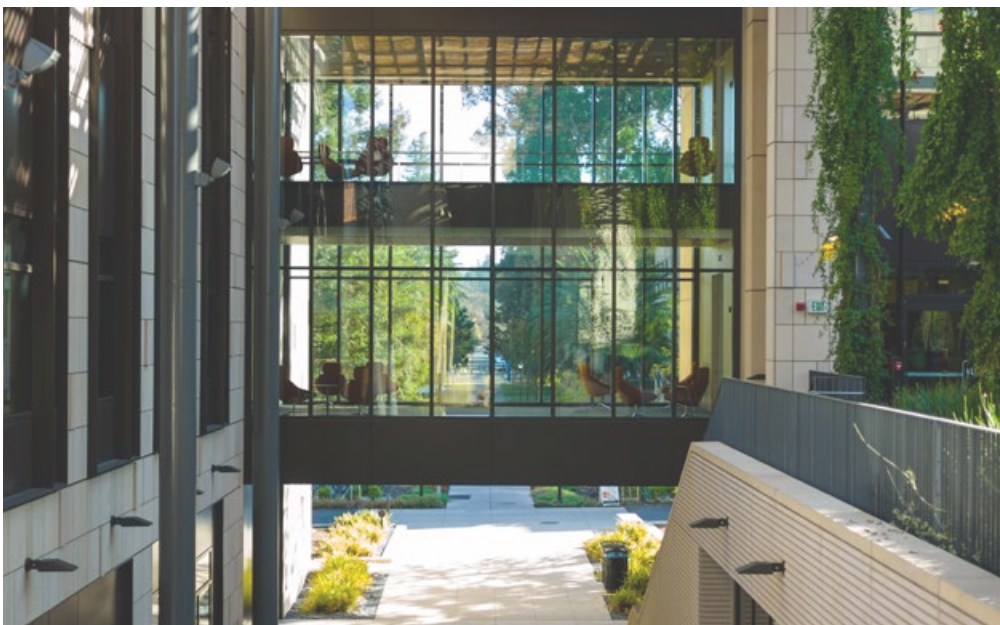
Photo Credit: Ian Terpin/University Communications

IT Efforts

Communication and Collaboration

- Launch wayfinding in Law School buildings
- Upgrade digital signage hardware and platform

Content and Data Management

- Automate lecture capture
- Implement a Customer Relationship Management tool and relevant modules

Business Operations and Applications

- Implement a smart room scheduling system

Talent Development

- Participate in STLP

Highlights

Launch wayfinding in Law School buildings: In order to address the issue of wayfinding within and between buildings, we researched technology that could leverage the proliferation of mobile devices in use across campus.

Bluetooth Low Energy (BLE) beacons were selected as the technology of choice, and a Software-as-a-Service solution with Mist Systems was selected as the vendor.

The first phase is complete with 66 BLE beacons deployed. The second phase includes customizing the Android and iOS app and making it available for the community. This phase is currently in progress and is expected to be complete by the fall of 2018.

Upgrade digital signage hardware and platform: Digital signage at SLS is used regularly, with the heaviest usage occuring during Alumni and Admit Weekends.

The current infrastructure is in need of updates. This project will replace all the existing kiosks with new touchscreen-enabled displays. The new displays will integrate the Law School's instance of Mist using ChromeCast devices.

Displays will offer wayfinding using maps from Micello and will display selected content from the Stanford Law Wordpress site (the user will not have full access to a web browser).

Automate lecture capture: Today, we use a scheduling integration with Google Calendar and NCast devices to capture, edit and distribute classroom lectures for student consumption to a defined distribution channel like Canvas or YouTube.

However, with the platform for Google Calendar changing, we are evaluating scalable options to capture future lectures both in the classroom and meeting rooms.

Without a technology solution, every hour of recording will equate to four hours of work for IT staff. Ideally, the new solution will take care of the capture setup, takedown, post production and delivery for all lectures and meetings, regardless of the meeting venue. This project is currently in the investigation phase.

Implement a smart room scheduling system: SLS doesn't have a centralized method for faculty, students and staff to easily see room availability and complete the reservation process.

Using the newly installed Bluetooth Low Energy beacons, we are integrating the Mist application into the Event Management System to confirm that the requester both has authority to reserve the room, and can reserve it if available.

The first phase will include all conference rooms in the Crown building with an expected completion in the fall of 2018. The second phase will include classrooms in the Crown and Neukom buildings.

School of Medicine (SoM)

THE SCHOOL OF MEDICINE'S INFORMATION RESOURCES AND Technology group (IRT) provides technology and services to support the overall vision of Stanford Medicine to heal humanity through science and compassion by leading the biomedical revolution in Precision Health.

We work in close collaboration with UIT and the IT organizations in Stanford Healthcare and Stanford Children's Health. In general, the SoM receives many core services and enterprise systems from UIT, and IRT's goal is to provide augmented capabilities focused specifically on the objectives of Stanford Medicine. This year, that includes a particular emphasis on several areas:

- Support for data science and data-intensive biomedical research activities, including the translation of insights, algorithms, artificial intelligence and other new technology into the clinical care environment.
- Increased collaboration and interoperability with the IT environments within Stanford Healthcare and Stanford Children's Health.
- Intense efforts to ensure our data and technology ecosystem are as secure as possible.
- Application of innovation cloud-based technologies including new approaches to IT infrastructure as well as novel cloud-native capabilities such as artificial intelligence, large-scale computing, data analytics, etc.

IRT comprises the following functional areas: IT support, data security, research IT, application services, business analytics, educational technology, audiovisual technology, web and digital services, data center, finance and administration.

Highlights

Create DASHER, a large-scale data commons: DASHER will link electronic health record data with genomics, medical imaging, mobile health and sensor data, population scale datasets, patient reported outcomes, biospecimen banks and other non-EHR data sources. It will incorporate tools to access, analyze and use data in a research context and at the point of care in Stanford's health system.

Build Nero, a secure research computing platform: Nero is a secure, Protected Health Information-compliant research computing environment being developed in collaboration with the Stanford Research Computing Center. The new centralized infrastructure will enable new types of research that are currently not possible.

Enhance STARR (STAnford medicine Research data Repository): STARR links clinical data, research data, and data from national and state sources. The current priority is incorporating medical imaging. Stanford has over a billion radiology images that can be linked with clinical data.

Enhance OnCore Clinical Research Management System (CRMS) financials: The Stanford Cancer Institute and the SoM use OnCore CRMS for clinical trial protocol and participant tracking. This project begins the integration of OnCore's financial modules with the hospital's EPIC systems, with the goal of improving accuracy and timeliness of budgeting, billing and invoicing.

Deliver Collaborate Anywhere (standardized audiovisual-enabled meeting spaces): The Collaborate Anywhere initiative aims to build a new service across the SoM for universal video conferencing to support remote collaboration and work-anywhere efforts. It aims to provide an optimal user experience, standardized across all SoM buildings, with an enterprise support model.

Transition data center to cloud-based services: Develop and execute a strategy to move from on-premise to cloud-based infrastructure. Goals include elimination of most on-premise facilities, improved data security and protection, business continuity and disaster recovery capabilities, and reduced long-term total cost.

Release and enhance Connected, a web portal focused on SoM operations: Connected is a staff-oriented communication portal that aggregates news, events and links to resources at the school and university. Enhancements include improvements to usability and content, a newsletter push mechanism and a fully-featured event calendar.

Launch Population Health Science Data Core for marquee data sets: The Data Center at Stanford's Center for Population Health Sciences hosts data sets from sources around the world. This centralized library will provide Stanford researchers access to high-value data and the means to explore and manage the data in an unprecedented manner.

Launch STARR-Odyssey, a Common Data Model (CDM) for power analytics: STARR-Odyssey is an institutional Observational Medical Outcomes Partnership CDM being implemented for Stanford clinical data. It provides the means to bring together disparate observational datasets with Stanford clinical data for co-analysis, facilitating cross-institutional studies.

Highlights, *continued*

Conduct a discovery project to rationalize and simplify the process of creating departmental profit and loss (P&L) statements: The goal is to simplify the process of creating departmental P&L statements, which is currently a manual effort. This project will gather requirements from seven participating departments, develop a sample data set, and deliver a solution roadmap.

Enhance Graduate Student Tracking (GST) and the Medical Education Platform (MEP): The GST and MEP provide faculty, staff and students with a website to track, guide and monitor students' careers at Stanford. These systems will be enhanced with new functionality to support Biosciences graduate students, MD students, and a select set of departments in the School of Engineering.

Centralize computer procurement, inventory, billing and deployment processes: We will expand the computer procurement program to enterprise scale by entering into a campus-wide partnership with other IT organizations to implement Oracle eAM (Enterprise Asset Management) and ServiceNow to enable centralized computer procurement, inventory, billing and deployment processes.

Expand SUSI (Stanford University Systems Inventory) to include servers with Moderate and Low Risk Data, and applications at all risk classifications: SUSI provides the ability to verify server compliance with Minimum Security Standards (MinSec). Rollout to servers with Moderate and Low Risk Data, and applications at all levels of risk classification, will enhance security and provide a more accurate and complete inventory of servers.

IT Efforts

Strategic Area	IT Effort
Research	- Create DASHER, a large-scale data commons - Enhance STARR (STAnford medicine Research data Repository) - Build Nero, a secure research computing platform - Enhance OnCore Clinical Research Management System financials - Enhance CHOIR, a learning healthcare system - Improve Stanford's REDCap (Research Electronic Data Capture) platform
Teaching, Learning and Student Success	- Build an integrated learning and curriculum management system - Launch course assessment improvement initiative - Improve capabilities to support classroom overflow - Upgrade MediaFlow, a platform that captures and delivers classroom lectures
Infrastructure	- Transition data center and applications to cloud-based services
Communication and Collaboration	- Deliver Collaborate Anywhere, standardized audiovisual-enabled meeting spaces - Release and enhance Connected, a web portal for SoM operations - Improve web continuity
Content and Data Management	- Automate data for One Directory, an enterprise person directory - Improve experience between Stanford Medicine Box and Stanford University Box
Data Analytics	- Launch Population Health Science Data Core for marquee data sets - Launch STARR-Odyssey, a Common Data Model for power analytics - Launch STARR-Miner, a Big Data mining framework - Enhance Clinical FTE and Clinical Productivity Analytics - Conduct a discovery project to rationalize and simplify creating profit and loss statements - Replace data for lab and office space allocation data with data from new space management system
Business Operations and Applications	- Enhance Service Desk Console (SCOUT) - Centralize computer procurement, inventory, billing and deployment processes - Launch customer-funded IT support for out-of-scope activities - Enhance Graduate Student Tracking and the Medical Education Platform - Enhance Stanford Profiles
Information Security and Privacy	- Expand SUSI (Stanford University Systems Inventory) to include servers with Moderate and Low Risk Data, and applications at all risk classifications - Incorporate Data Loss Prevention into infrastructure - Integrate AMIE and My Devices to ensure compliance - Migrate special devices to networks configured to ensure access is managed appropriately - Identify, develop and implement security standards for cloud-based services
Talent Development	- Improve goal setting program - Enhance career development - Participate in ITLP and STLP
IT Leadership	- Deploy foundational elements of Process Excellence program based on Lean management principles - Establish integrated IT Governance across the three entities of Stanford Medicine

Vice Provost and Dean of Research (DoR)

THE OFFICE OF THE VICE PROVOST AND DEAN OF RESEARCH recommends and disseminates new research policy across campus and oversees implementation and exceptions. As a university officer, the dean acts as a senior advisor to the president and provost in a broad array of academic issues beyond research.

The office also oversees the program scope, direction, administration and resources for the 18 independent laboratories, centers and institutes, that provide a physical and intellectual intersection between schools and disciplines.

DoR's principal technology initiative is the Research Information Ecosystem (RIE), which will benefit faculty and staff by reducing repetitive processes in research administration. Seed Funding, RIALTO (sponsored by SUL) and the API Gateway (sponsored by UIT) are our primary relevant projects under this initiative.

Key technology partners on campus who are needed to realize our vision for the future of research support services include the Stanford Profiles team, the Office of Sponsored Research (OSR) SeRA (Stanford Electronic Research Administration) team, SUL and UIT. By establishing a common foundation for data exchange across systems, we can unlock creative opportunities for all of the teams involved in this initiative, for research and beyond.

IT Efforts

Research

- Implement Stanford Seed Funding system

Infrastructure

- Design partner and community organizer for API Gateway, Developer Portal and Community of Practice

Communication and Collaboration

- Establish a common web architecture for DoR institutes
- Redesign the DoResearch website

Content and Data Management

- Sponsor the maintenance and upgrade of CAPx Drupal Module for Drupal 8

Talent Development

- Participate in ITLP and STLP

Highlights

DoR's principal technology initiative is the Research Information Ecosystem (RIE), which aims to establish a common foundation for data exchange across systems in order to reduce repetitive research administrative tasks for faculty and staff. The first two efforts in the following list are part of the RIE initiative.

Design partner and community organizer for API Gateway, Developer Portal and Community of Practice: Partner with Administrative Systems in UIT to design the new AS-owned API Gateway and OAuth Service to serve research outcomes. In addition to developing the new Gateway itself, the following related initiatives are planned:

- In close connection with the API Developers Community of Practice (CoP), roll out an API Catalog and Developer Portal to provide discovery for all available tools.

- Move APIs into the Gateway, including Stanford Electronic Research Administration (SeRA), eProtocol, ChemTracker and Stanford Training and Registration System (STARS).

We will play a community organizer role to bring together API developers across campus and sponsor the API Developers CoP, as we develop best practices around API design and development.

The API Gateway has broader implications for Stanford beyond the research enterprise.

Implement Stanford Seed Funding system: Stanford Seed Funding is an online platform that integrates the Stanford Profiles API to make it simple for faculty to apply internal funding opportunities. The platform also reduces research administration burdens regarding classification of internal funding types, with the aim to eventually alleviate compliance burdens.

Redesign the DoResearch website: Our flagship site covers the research policy handbook and training and communication on subjects related to research administration, funding, etc. This phase of work includes user experience, content strategy, information architecture and design.

Establish a common web architecture for DoR institutes: Create a developer community that spans multiple DoR Institutes, to align practices and create a common Drupal 8 codebase. This developer community will be made up of individuals from various Stanford units, external development shops and Stanford Web Services.

This project will enable units with limited web resources to quickly spin up high-quality institute websites using Jumpstart in Stanford Sites, while others that have their own developers can deploy to environments of their choice.

The Hoover Institution (Hoover)

THE HOOVER INSTITUTION ON WAR, REVOLUTION AND PEACE is a non-partisan public policy research center dedicated to generating policy ideas that promote prosperity, peace and liberty. The Hoover Institution Library & Archives has expanded into one of the largest collections in the world. The Hoover Institution is housed in four buildings on the Stanford Campus and has an additional expansion office in Washington, D.C.

The departmental IT staff consists of two people reporting to the finance director. Our IT efforts focus on coordinating and integrating with Stanford services, adhering to Stanford policies and security protocols, and maintaining a high level of personal service. This concierge-level service model allows for Hoover scholars and staff to complete tasks efficiently and without service interruptions.

Current IT focus areas include managing security issues and mitigating costs directed by a diligence towards strong financial stewardship. The recent security breaches and increased utilization of cloud and shared services mean that security efforts are a constant challenge. Digitization projects in the Library & Archives have significantly increased the need for data storage.

We are investigating Salesforce (customer relationship management software), Nolij (content management) and Canvas (learning management software).

IT Efforts

Research

- Implement virtualized desktop infrastructure in Library Reading Room

Teaching, Learning and Student Success

- Develop procedures and policies for storage and processing of video and data from Hoover events

Infrastructure

- Explore data storage options to reduce cost and provide a disaster recovery (DR) solution
- Investigate Stanford's virtual desktop infrastructure for users who change locations during the day

Content and Data Management

- Investigate enterprise content management system

Business Operations and Applications

- Digitize stored paper

Information Security and Privacy

- Create IT security policy

Talent Development

- Engage in emerging technologies training, cross-training and on- campus leadership programs

IT Leadership

- Create IT policies and procedures

Highlights

Implement virtualized desktop infrastructure (VDI) in Library Reading Room: Implement VDI to allow read-only access to contractually-restricted digitized documents, exclusively in the Library Reading Room. VDI will allow for growth with less management than the replaced individual workstations. The VDI infrastructure is in place and currently in the testing phase.

Develop procedures and policies regarding storage and processing of video and data collected at Hoover events: Hoover events are becoming higher profile and are increasing in scope. Some events are recorded with multiple cameras, necessitating increased storage and processing to create a final product and archive the raw source.

As such, we will develop new procedures and policies regarding the data from these events and use this information to inform future events.

Investigate Stanford's VDI for users who change locations during the day: With the ongoing growth of buildings and personnel, we are examining using Stanford's virtual desktop infrastructure for administrative staff and other users who have desktop computer workstations in multiple locations. VDI would enable those users to maintain the same desktop experience in different locations.

Photo Credit: Linda A Cicero/Stanford News Service

SLAC National Accelerator Laboratory (SLAC)

SLAC COMPUTING DIVISION IS LED BY THE CHIEF INFORMATION officer and is part of the Business and Technology Services Directorate at SLAC.

The division is based on the following strategic, functional anchors:

- Integrated service management
- Integrated information security management
- Integrated IT operations
- Scientific computing services
- IT project and strategic initiatives management
- Enterprise and solutions architecture

The division serves the roughly 1,700 SLAC staff and users with a one-stop-shop model for services such as:

- Endpoint devices management
- Cybersecurity
- Archives, records, library and publications
- Software engineering (custom, commercial off-the-shelf, cloud)
- ERP (PeopleSoft)
- Content management systems (web, Confluence, SharePoint)
- Storage
- Network engineering and operations
- Telecommunications
- Data center
- Help desk support
- Database administration
- Scientific computing

Read the full plan online:

campusitplan.stanford.edu/units/slac

IT Efforts

Research

- Establish an infrastructure lifecycle for science computing hardware
- Improve our storage service model

Teaching, Learning and Student Success

- Explore ways to make SLAC lectures and colloquia more widely available

Infrastructure

- Review IAM architecture and roadmap
- Optimize utilization, management of data center
- Establish an infrastructure lifecycle management program
- Upgrade network border infrastructure

Communication and Collaboration

- Plan for transitioning content management systems to cloud

Content and Data Management

- Revamp web strategy and service
- Migrate content management and storage to cloud

Data Analytics

- Design and implement a data analytics program
- Explore machine learning to assess infrastructure risk

Business Operations and Applications

- Establish lifecycle management for applications portfolio
- Manage PeopleSoft operations
- Enhance software asset management processes

Information Security and Privacy

- Ensure compliance with Stanford MinSec
- Create automated health check system to ensure security for external devices

Talent Development

- Devise development plans for all Computing Division staff
- Expanded participation in ITLP and STLP
- Explore expansion of the IT internship program

Highlights

Evaluate and optimize utilization and management of SLAC's data center: The SLAC Computation Center is a 17,000 square foot data center facility built in 1977 that hosts over 3,000 physical servers. Although the data center has available white space to host scientific and business systems, the facility's cooling is at capacity.

SLAC's Computing Division will implement updated processes to better maintain and manage the laboratory's valuable and constrained data center space.

SLAC's Computing Division will support the Linac Coherent Light Source-II by hosting the initial phase of the experiment's data analysis infrastructure at the SLAC Computation Center, and the subsequent phase in the laboratory's allocation at Stanford Research Computing Center.

Explore ways to make SLAC lectures and colloquia more widely available to the Stanford community: In any given month, there are many colloquia and presentations taking place onsite at SLAC. Unfortunately, not all of them are broadcast, requiring Stanford staff to join the lecture live in one of SLAC's conference rooms.

In this effort, we will explore options to make lectures available to any Stanford University account holder (not just SLAC), via the web.

Design and implement a data analytics program: The objectives of this effort are to:

- Establish processes for data management (security, ownership and governance) and enterprise data quality (uniformity, accuracy and consistency).
- Determine which data sets to draw from and develop an enterprise data model to support the organization's goals.
- Determine the data presentation requirements and define and enforce design standards and best practices.

Ultimately, develop dashboards and reports to support SLAC's Computing Division.

Explore machine learning to assess infrastructure risk: The current approach to mitigating risk associated with hardware failures is mainly driven by age and monitoring of devices.

In an effort to further reduce these risks and associated replacement and operational costs to fix device issues, SLAC's Computing Division implemented exploratory projects to utilize machine learning to develop predictive models for assessing probability of hardware and device failure (e.g., analyzing the thousands of process variables used to run the particle accelerator to minimize downtime).

Stanford Alumni Association and the Office of Development (SAA/OOD)

THE STANFORD ALUMNI ASSOCIATION (SAA) AND STANFORD'S
Office of Development (OOD), both headquartered in the Frances C. Arrillaga Alumni Center, share some administrative and facilities-related services. Among these are their technology development and support activities.

Founded in 1892, the SAA builds community across alumni, encouraging university participation, volunteerism and personal growth. The OOD is among the more successful higher education fundraising organizations in the world. SAA and OOD staff work in concert with academic leadership and volunteers to enhance long-term connections to and support for Stanford.

The Alumni and Development Information Services is responsible for maintaining, supporting and developing many services that support both SAA and OOD. These include Giftwizard, the PostGrads Database, email campaign services and extensive infrastructure services. These systems support digital solutions for 700 internal Stanford employees and 225,000 external alumni.

Read the full plan online:

campusitplan.stanford.edu/
units/alumni

IT Efforts

Infrastructure

- Improve Splunk tuning and alerting
- Deploy Puppet Orchestration version 4
- Expand cloud usage with AWS
- Complete migration from WebAuth to SAML
- Improve VM infrastructure and monitoring
- Roll out secure file system to OOD/SAA
- Replace existing SAN hardware
- implement an IAM solution for ADAPT

Communication and Collaboration

- Replace older marketing automation tools
- Re-platform external-facing sites with new CMS

Content and Data Management

- Build data architecture for ADAPT and refine data governance
- Build services to connect best-of-breed systems
- Centralized, secure document storage system
- Replatform PostGrads CRM to Salesforce
- Replatform Gift Processing system to Oracle

Data Analytics

- Develop business intelligence strategy

Information Security and Privacy

- Patch server hardware and server applications
- Implement MinSec Standards
- Create new networking, VLAN cleanup and outbound access control list deployments
- Salesforce Security monitoring and strategy

Talent Development

- Participate in STLP
- Learn new tools and technologies for ADAPT

IT Leadership

- Adopt Agile training and coaching

Highlights

Alumni and Development Applications Platform Transition (ADAPT) program: Our key focus through 2020 is the ADAPT program. This multiyear initiative will migrate the PostGrads system and all associated systems and processes (e.g., gift processing, web presence, constituent management) to new, robust, flexible and scalable technology platforms.

This program paves the way for OOD, SAA and our campus partners to better serve, steward and digitally engage prospects, donors, alumni and Stanford Health Care constituents.

The specific objectives of ADAPT are to:

- Increase business effectiveness by providing real time collaboration, data sharing and access and streamlining processes.
- Enable self-service reporting, web administration and content management.
- Be more agile and iterative in delivering solutions.
- Improve donor and alumni user experience.
- Increase throughput and agility of the technology.
- Attract highly qualified resources by leveraging state-of-the-art technology and processes.

University Communications (UComm)

THE OFFICE OF UNIVERSITY COMMUNICATIONS IS STANFORD'S primary trusted source of information about the university, its expert resource for professional communications strategy; advice and support; and its leader for communications innovation, standards and training.

UComm coordinates the university's public and media relations efforts and produces the university's main web pages, social media channels and central publications.

UComm recently developed a Campus Strategic Communication Framework in order to:

- Leverage campus-wide communications to help the entire university have a greater impact than the sum of its parts.
- Amplify the work of our faculty and promise of our graduates in service to society.
- Help secure the resources needed for Stanford accomplish its teaching, research, service and patient care missions.

UComm focuses on IT efforts in support of these communication goals:

- Creating effective, well-designed and consistently-branded Stanford websites.
- Facilitating university-wide communications efforts with tools such as the Stanford Event Calendar and SALLIE (Stanford ALL-Image Exchange) digital asset management system.
- Collaboration with Stanford Web Services on web templates and style guidelines.

Read the full plan online:

campusitplan.stanford.edu/units/ucomm

IT Efforts

Communication and Collaboration

- Upgrade SALLIE, Stanford's digital asset management system
- Improve Stanford Event Calendar
- Roll out Web Accessibility Management Platform to campus units
- Update WordPress themes in a shared front end framework for WordPress and Drupal

Talent Development

- Participate in STLP

Highlights

Upgrade SALLIE, Stanford's digital asset management system: SALLIE is available to all campus units to store, organize and share photos, videos and other digital assets. There is also a large searchable collection of high-resolution Stanford images available for use in campus publications and websites. The system is powered by a commercial product called Cumulus, with a custom-built web front end.

In collaboration with UIT, plans are underway to upgrade Cumulus and replace the custom front end with Cumulus' front end. Searching and retrieving images via SALLIE will be easier with enhanced visual search, facial recognition and the use of artificial intelligence auto-tagging.

Update Stanford-branded WordPress themes, utilizing a shared front end framework for both WordPress and Drupal themes: UComm supports the campus WordPress user community with Stanford-branded WordPress themes, plugins and a Community of Practice. UComm will develop a new Stanford-branded WordPress theme as an upgrade to the existing "Cardinal" and "Lagunita" themes, using a new front end framework called Decanter.

We are working closely with Stanford Web Services, who are similarly building new Stanford-branded Drupal 8 themes on top of the same framework. Our goal is to develop a shared design system (design patterns and visual identity) for Stanford websites leveraging centrally-supported themes.

Improve Stanford Event Calendar: The Stanford Event Calendar is the university's central source for event information. It offers a comprehensive listing of campus events, including lectures, conferences, performing arts, exhibitions and activities.

In the coming year, UComm aims to deliver improved integration with Drupal and WordPress. We will also explore the addition of a RESTful API to the system to enable event sharing across systems.

Roll out Web Accessibility Management Platform (AMP) to campus units: The Stanford Online Accessibility Program (SOAP) has established an enterprise license for AMP, an automated tool offered by Level Access to scan websites for accessibility issues. Any campus unit will be able to use this tool, take online accessibility training provided by Level Access and receive a limited amount of 1:1 support from the Level Access help desk. SOAP will be rolling out the tool, training and support services to campus units over the coming months.

Environmental Health and Safety (EH&S)

STANFORD ENVIRONMENTAL HEALTH AND SAFETY SUPPORTS the campus community in making decisions and taking actions consistent with an uncompromising commitment to safety and environmental stewardship.

Our primary function is to manage health, safety and environmental risks across campus in support of the academic progress and operational needs of the institution. EH&S strives to help individuals and units address potential risks and minimize impacts to human health and the environment.

We also help to reduce uncertainty related to compliance, public relations and financial liability. Our role is to work collaboratively with faculty, students and staff to balance competing priorities while promoting excellence in safety and environmental stewardship.

The primary goal of the EH&S IT program is to provide highly personal and competent IT services to support EH&S business units and individuals. These services are aligned and integrated with the EH&S strategic vision and the business unit Objectives-Key-Results (OKRs).

Read the full plan online:

campusitplan.stanford.edu/ units/ehs

IT Efforts

Research

- Promote and implement new BioRAFT features
- Transition ChemTracker technology and operations to BioRAFT

Infrastructure

- Evaluate systems integration strategies and platforms
- Install IT infrastructure in new EH&S building

Content and Data Management

- Evaluate document management strategies and solutions

Data Analytics

- Explore semantic data modeling to surface opportunities for operational insight, decision making and communication with customers

Business Operations and Applications

- Assess value, costs, constraints and opportunities for current IT implementations

Talent Development

- Build expertise and knowledge about Service Design
- Participate in the ITLP

IT Leadership

- Collaborate to improve how administrative units support research at Stanford

Highlights

Promote and implement new BioRAFT features: Over the past year, EH&S introduced the BioRAFT platform to a number of campus laboratories. BioRAFT is an enterprise safety and compliance platform for scientific research organizations that also provides a means to collaborate and communicate with EH&S on tasks such as inspections.

EH&S will implement the following additions to BioRAFT:

- Transition the approval and management of lasers to BioRAFT, which will enable labs to manage their lasers themselves. EH&S and the Laser Safety Committee will serve as partners to review and approve laser operations.
- Provide health and safety training requirements and records by lab group from STARS.
- Continue developing a campus-wide governance and communication model.
- Enable labs to manage equipment inventories and the dependencies on training requirements and job activities.
- Enable tracking of on-the-job training in the labs.
- Add chemical inventory and reporting.
- Replace the legacy Stanford Health Physics system for lasers and machines.

Explore semantic data modeling to surface opportunities for operational insight, decision making and communication with customers: EH&S utilizes many specialized systems that support the operational needs of various EH&S program areas. These systems range from being hosted by the software vendor to being hosted by EH&S or other Stanford organizations.

Over the next year, EH&S will explore semantic data modeling across these systems to surface opportunities for operational insight, decision making and communication with customers. This effort comprises:

- Staffing operational and organizational analyst, data visualization, and information architecture roles.
- Developing technical infrastructure to support the data provided for business intelligence tools and practices.
- Exploring opportunities for storytelling, communication and decision making.
- Developing a proof-of-concept solution.

Assess current IT implementations: EH&S will initiate an effort to assess the value, costs, constraints and opportunities for current systems, particularly Oracle Enterprise Asset Management. The assessments will focus on the customer experience and the internal operational and strategic effectiveness of the systems.

Land, Buildings & Real Estate (LBRE)

LAND, BUILDINGS & REAL ESTATE IS THE OPERATIONAL CORE of Stanford University's physical campus. LBRE plans, constructs and maintains the Stanford's 8,180 acres.

The LBRE IT department serves as the technology partner for these business needs and consists of multiple teams:

- A dedicated Technical Services team addresses the growing needs for efficient and secure digital endpoints for the 500-plus users.
- The Infrastructure team builds and operates dedicated virtualization clusters for these specialized business needs with a presence in Livermore for Disaster Recovery.
- The Applications Solutions group interfaces with the business units, building custom solutions or partnering with third party vendors or central IT when needed, to implement and manage the application solutions.
- The Maps and Records team supports the geospatial and location-related needs of the campus community, both inside and outside the buildings.

These diverse business functions require a host of technology solutions and present a variety of technology opportunities. Because they are different from each other, LBRE IT is called on to navigate and deliver unique challenges for applications, technology solutions, infrastructure, network and user support.

While several initiatives are behind the scenes in our "intranet" world, we continue to look for collaboration opportunities with the Stanford IT family, and seek to be aware of trends and directions around campus.

Read the full plan online:

campusitplan.stanford.edu/units/lbre

Highlights

Replace legacy space management system and upgrade Stanford's Facility Information Management Portal (FIMS): LBRE administers Stanford's space management system, which is used by all departments on campus to record space utilization. We will replace a 13-year-old space management/facilities management system, which is now dated and fails to meet current needs.

The replacement product is an industry leader called Archibus. A vendor, RSC, will work under the direction of the LBRE IT teams during the implementation of the solution. The project is currently in the design and development phase, and we are working on a pilot.

Additionally, FIMS will also undergo an upgrade. FIMS, Stanford's Facility Information Management Portal, provides reports of multiple attributes about buildings for staff, operational staff and facility managers.

Investigate Amazon Web Services (AWS) cloud hosting for systems supporting backend processing: Being aware of the trends across the university to leverage cloud hosting, LBRE IT Applications group is investigating hosting services in the cloud.

We are looking into resource-intensive servers, such as map servers, that could benefit from the scalability and flexibility that the cloud can provide. The first prototype will migrate the LBRE content distribution network to AWS cloud storage.

LBRE is also considering using S3, Amazon Web Services' cloud storage solution, for backup and archival storage.

Initiate a discovery effort for 3D and smart buildings, including augmented and virtual reality (AR/VR): With the industry trends rapidly moving towards a smart campus, LBRE recognizes the need to embrace these developments. The focus for the LBRE IT Maps and Records team this year is to discover the offerings and industry adoptions around 3D buildings, AR and VR, as well as artificial intelligence as it relates to smart building and outdoor elements, like utilities and roads.

The deliverable for the first year is a defined set of use cases and business requirements along with a proposed technology direction to pilot at LBRE.

Introduce a data visualization dashboard, powered by Tableau, to help users make data-driven decisions: As the footprint of various business applications within LBRE increases, so does the amount of data. The LBRE IT Applications Solutions group is gradually introducing a Tableau dashboard to help users analyze information and make data driven decisions. A gradual and ongoing initiative, the focus this year is around processes, adoption, governance, skill set and resource development.

Implement drone solution for collecting location data: Implement a complete enterprise drone solution that will assist the LBRE IT Maps and Records team in the collection of data from current construction sites, proposed construction sites, roof inspections, earthquake inspections and exterior building assessment. The first phase is focused on data collection at construction sites.

Highlights, *continued*

Define a document management initiative: The LBRE IT department has initiated a multiyear effort to define a shared document management system for LBRE, as well as shared processes across the organization for managing electronic documents. This effort includes the onboarding of business users, raising awareness of the possibilities with various tools and reducing paper copies.

The project is currently in the contract and pilot kickoff phase. The pilot phase is to transition from current file servers to Microsoft Sharepoint, which is a more robust, scalable, secure and accessible system. The pilot evaluation is planned for March to May 2018.

Implement digital workflows for plans with Bluebeam software: The LBRE IT Maps and Records team will implement a new electronic plans review process using Bluebeam software. The technology will allow operational staff to review proposed construction drawing and provide feedback electronically to project managers on the interactive drawings.

The effort will also aim to reduce hard-copy construction document storage.

IT Efforts

Strategic Area	IT Effort
Infrastructure	- Investigate Amazon Web Services cloud hosting for systems supporting backend processing - Implement building controls infrastructure in Redwood City - Evaluate new backup solution for business continuity - Improve monitoring of network traffic for improved security and performance
Communication and Collaboration	- Establish process for departmental websites leveraging Stanford Sites, UIT's central Drupal platform
Content and Data Management	- Define a document management initiative - Initiate a discovery effort for 3D and smart buildings, including augmented and virtual reality - Improve systems development life cycle workflow process and documentation
Data Analytics	- Introduce a data visualization dashboard, powered by Tableau, to help users make data-driven decisions - Evaluate location-based analytics using geographic information systems - Create and fill new data architect role for LBRE
Business Operations and Applications	- Replace legacy space management system and upgrade Stanford's facility information management portal - Develop and support applications for LBRE business units - Develop and support operations management with maps and geographical information systems - Implement drone solution for collecting location data - Implement a building implementation modeling platform - Implement digital workflows for plans with Bluebeam software - Evaluate emerging hardware trends - Implement the Everbridge critical communications platform
Information Security and Privacy	- Evaluate computer imaging solutions
Talent Development	- Participate in ITLP and STLP

Stanford Management Company (SMC)

STANFORD MANAGEMENT COMPANY WAS ESTABLISHED IN 1991 to manage the investment of the university's endowment and other financial assets. Our goals are to:

- Preserve the purchasing power of the endowment for future students and scholars.
- Enable a robust annual disbursement to the operating budget.

SMC is overseen by a board of directors appointed by the university's trustees. Led by Robert Wallace, the organization's 50-person staff consists of 19 investment professionals and 31 operation and support roles, including information technology.

Our five-person IT team is responsible for implementing technologies and providing services that enable SMC to make the best investment decisions and operate efficiently. In addition to providing systems and services, the team is responsible for safeguarding SMC's data and IT assets.

With such a small IT team, SMC relies on the domain knowledge and analytical capabilities of SMC investment analysts, external partners and consultants to successfully implement systems.

Read the full plan online:

campusitplan.stanford.edu/
units/smc

IT Efforts

Business Operations and Applications

- Implement a portfolio management and analytics system
- Enhance Business Continuity Plan and procedure

Highlights

Implement a portfolio management and analytics system:

Investment data has been maintained in various systems since SMC's inception. The lack of a central, comprehensive repository of investment data makes managing and analyzing a complex, multi-asset class portfolio very difficult. Therefore, SMC will implement the Solovis investment management platform to consolidate investment data into one central system for portfolio analysis and reporting.

The new system will benefit SMC's investment and operations teams by ensuring they have easy and timely access to performance, benchmarks, exposure and other information via standard or ad hoc reports, dashboards and Excel downloads, across multiple data sources and systems.

Additionally, Solovis's workflows, controls and reconciliation functionality will increase data integrity. Reconciling Solovis records to the custodian bank will not only improve data quality, but will also provide increased transparency and oversight of the custodian bank's transaction processing and accounting activities.

With the support of Solovis's workflow, automation and reconciliation tools, operations and reporting functions will be streamlined, resulting in productivity and efficiency gains.

This multiyear initiative will be implemented in multiple phases:

- Phase I: Convert historical data, implement workflow, establish controls and reconciliation processes, develop performance and benchmark reports.

- Phase II: Implement liquidity modeling, exposure and holdings analysis, and what-if projections.

- Phase III: Integrate with investment research system and third- partymarket and research data providers.

Enhance Business Continuity Plan and procedure: Over the past year, SMC has engaged with a consultant and other Stanford departments to review its Business Continuity Plan. We've received valuable input and recommendations for improving our processes and systems to meet our recovery time objectives and ensure continued operations during an extended disruption or major disaster.

This effort will incorporate the recommendations into a new version of the Business Continuity Plan. The scope of work may also include the migration from the Livermore disaster recovery site to a new one.

Residential & Dining Enterprises (R&DE)

RESIDENTIAL & DINING ENTERPRISES, THE LARGEST AUXILIARY organization at Stanford University, supports the mission of the university by providing the highest quality services to students and other members of the university community in a sustainable and fiscally responsible manner. R&DE houses more than 13,000 students and their dependents while serving over 6.5 million meals annually to students, conference, catering, retail and concession guests.

R&DE IT consists of 26 staff positions and supports over 65 applications and integrations, 2,200 technology assets and more than 1,100 users. Key applications include:

- Student Housing Operations: StarRez, SAM, Draw and Lottery Program, In-House Draw Application, Lucid
- Stanford Dining: Eatec, LeanPath
- Stanford Conferences: FastTrack, Kinetic KX
- Stanford Hospitality & Auxiliaries: ReServe, Opera
- Revel for credit card management, Visix for digital signage and Kronos for workforce management

Under the direction of Chief Information Officer Paul Robles, R&DE will reimagine the role of technology throughout the enterprise; discover and implement new and emerging technologies; empower R&DE leaders, stakeholders and champions to drive innovation and continuous process improvements; and introduce new methods and processes for taking a student and client centric approach to developing solutions that build a sustainable future.

Read the full plan online:

campusitplan.stanford.edu/
units/rde

IT Efforts

Communication and Collaboration

- Review and improve the technology onboarding program for R&DE staff

Data Analytics

- Create and advance a self-service business intelligence strategy

Business Operations and Applications

- Improve the user experience for technology assets and pilot emerging technology solutions
- Implement "The Big Six" Projects

Information Security and Privacy

- Strengthen our information security posture and increase cybersecurity awareness

Talent Development

- Participate in ITLP and STLP

Highlights

Implement "The Big Six" Projects: R&DE will continue to see through "The Big Six" major project implementations:

- Kinetic Conference Management System
- Lucid Utility Management System
- Revel Point of Sale System
- Tririga Facilities Management System
- Kronos Labor Management System
- Visix Digital Signage

These systems are being refreshed, redesigned and implemented to help enhance business operations, strategic communications, data analytics and the customer experience.

Strengthen our information security posture and increase cybersecurity awareness: Our information security team provides guidance and oversight, and learning opportunities with valuable preventative strategies to keep our data assets safe. We support R&DE initiatives that include compliance with Stanford's Minimum Security Standards (MinSec), credit card PCI compliance, vulnerability and penetration testing on information systems, risk assessment and management, and disaster recovery and business continuity.

Additionally, R&DE IT hosts an annual Cybersecurity Fair. R&DE invites campus partners and leading subject matter experts such as the Stanford Information Security Office and the Stanford Privacy Office to present new information and provide learning opportunities to R&DE staff.

Review and improve the technology onboarding program for R&DE staff: R&DE IT is evaluating and improving its technology onboarding program for R&DE staff. This program will inform and train users of commonly used technology tools and equipment, empower users to be more effective with the technology, improve the end-user experience, and increase productivity.

Improve the user experience for technology assets and pilot emerging technology solutions: R&DE IT is responsible for deploying and maintaining technology assets to all R&DE staff, such as laptops, desktops, mobile devices, cell phones, Internet of Things devices and more.

R&DE IT will re-evaluate its technology standards to ensure that it is aligned with the emerging trends and continues to support current and future business needs. This effort will look at how technology is used and will aid R&DE in improving the overall end-user experience in support of a mobile workforce. R&DE IT will also prototype emerging technologies by conducting pilots within the enterprise.

Contributors

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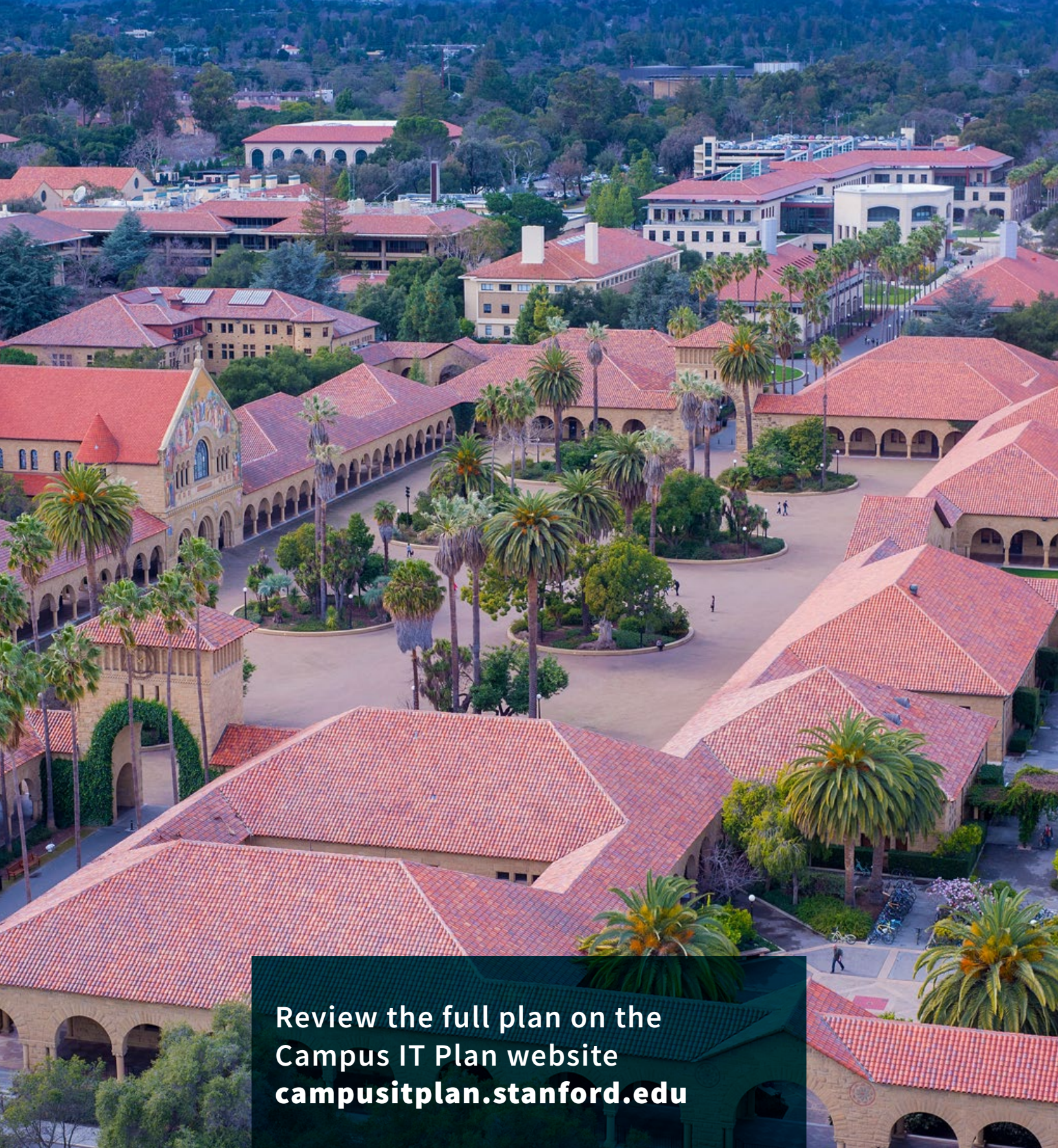
Review the full plan on the
Campus IT Plan website
campusitplan.stanford.edu

Join the conversation
it-at-stanford.slack.com