Welcome to Innovations. In this edition, we explore how Colgate uses technology to build and maintain connections. Read about student government’s use of video streaming technology to increase engagement and about enhancements to the Peace and Conflict Lab, where scholars from the United States, Canada, and Europe recently held two virtual conferences. You will also find out how digital making technology connects students with objects and artifacts that are thousands of miles away.

IN THIS ISSUE

Data Analytics and Decision Support
Peace and Conflict Lab 2.0
Rise of Cryptomining Malware
Student Government Livestream

On the cover: 3-D building created by Jacob Feldman ’19 for Professor Karen Harpp’s UNST 350A course

Innovations can be found online and in limited print circulation. To share stories with colleagues, visit blogs.colgate.edu/its.
The most useful tech doesn’t change or define the meaning of what we do. Instead, it is aligned with what we do that helps us, frees up time, and improves our lives.

To that end, a strategic plan for information technology at Colgate must be connected to our dreams and desires, and the work we set out to do in these first years of our third century.

MESSAGE FROM THE CIO: Steve Fabiani

The most useful tech doesn’t change or define the meaning of what we do. Instead, it is aligned with what we do that helps us, frees up time, and improves our lives.

In the fall newsletter, I outlined areas where a technology plan might provide focus. In this edition, I expand a bit on those areas and would like to share with you what I’m thinking about and let you know how those plans are connected to the community we serve.

Improving Classroom Technology and Innovative Spaces. Our students, and the majority of our new faculty, are digital natives. Prospective first-year students visit Colgate from schools with fully digital, flexible, and modern learning spaces. Although we have some outstanding special spaces like the Ho Tiung Visualization Lab and the Peace and Conflict Studies War Room, there’s work to be done in providing comprehensive maker technology, and 3-D and virtual reality development facilities for interested faculty and students. Additionally, we have many opportunities to refine further the technology experience and overall fit and finish in our regular classrooms, auditoria, and seminar rooms.

Enhanced Support for Teaching, Learning and Research. Digital technologies offer unique affordances to support teaching, learning, research, and creative work — bounded only by the imagination of our faculty and students. ITS staff collaborate with faculty in the exploration of ways in which technology can be used to amplify the residential liberal arts learning experience. As reflected in the recent Middle States Self-Study Report, faculty satisfaction around collaboration with technology staff has improved in recent years, and interest continues to grow. As the satisfaction and demand increases, our strategic effort in this area includes the growth of instructional design support, evaluation of technology-based instructional innovations, and providing access to top-quality academic technology resources.

Special Support for the Arts. We’re seeing increases in demand for digital media and special event support, and we anticipate that the demand for this suite of services will continue to grow. Film and Media Studies and Art and Art History are both beginning to open dialogue about improving their dedicated learning spaces and are looking to upgrade special event facilities, which support very special programs like the Flaherty Film Seminar. The technology plan must reflect our university’s strong commitment to support the arts.

Connectivity and Infrastructure. During the last two years, we have made substantial investments in wireless infrastructure in our residential spaces. Looking comprehensively at our network, we ensure that the whole campus — its buildings and its outdoor common areas — has fast and reliable internet connections. Planning must include an opportunity to take advantage of high-speed research networks like Internet 2 and other services to fully support an active community of scholars and their ability to collaborate with national and international colleagues.

Information Security and Risk Mitigation. This is a consistent technology priority for higher education. For the second year in a row, it’s been identified as Educause’s #1 area of technology focus for our peers nationwide. Our information security program, especially in areas of community awareness and data governance, needs additional focus. Our technology disaster recovery plans are ready for refreshing, and our community has expressed interest in learning more about how to navigate safely, both personally and professionally, in an increasingly complex digital world.

Enterprise Data Systems and Data Analytics. Major enterprise systems that support admission and advancement are on solid ground with the implementation of Slate and ongoing implementation of Raiser’s Edge NXT. We are making strides in helping our community understand and utilize analytics and data visualization to support decision making. However, many other systems supporting financial functions, human resources, service management, and student records are in need of modernization. Many administrative processes are paper-based and labor intensive. Many of those that are electronic are running on outdated operating systems. As one reviews Educause’s “2018 Top 10 IT Issues,” it is evident that data are front and center. While information security is rightfully #1, three of the other top 10 issues are:

While information security is rightfully #1, three of the other top 10 issues are:

1. Data and information management and governance, implementing effective institutional data governance practices. The maturity levels of analytics data quality and compliance are front and center.

2. Using business intelligence and analytics to inform the broad conversation and answer big questions.

3. Data management and governance, implementing effective institutional data governance practices. The maturity levels of analytics data quality and compliance are front and center.

In spring of 2017, the Data Analytics and Decision Support team was created as one of the important pillars to support faculty, students, and staff.

PROJECT SPOTLIGHT:

Peace and Conflict Lab 2.0

Mark Hine

The Peace and Conflict Lab was purpose-built to explore the history and impact of conflicts and peace across the world with experts far afield. Alan Hall’s one of a kind “war room” includes large TVs, iMac workstations, and high-quality conferencing equipment. The immersive interactive space has hosted numerous international and transcontinental video conferences in addition to traditional lectures. Bridging geographic gaps and bringing people together to share a collective experience has been the overarching goal of the PCJ Lab from its inception.

In the summer of 2017, ITS and faculty partnered to initiate a major technical upgrade and provide a much-needed equipment refresh to improve the ease of use and reliability of the equipment. Sound quality improvements, wireless AV control, and an improved workspace to enhance the existing infrastructure were completed, ensuring the Peace and Conflict Lab will remain a premier space for research and engagement for Colgate students and faculty.

The Peace and Conflict Lab is used by numerous units on campus for a wide variety of reasons. This unique learning space has been a focal point for connecting disparate continents, bringing in noted authors, connecting remote classrooms, and virtually hosting visiting comment-area experts.

Between 2015 and 2016, Professor Andrew Besser, director of the peace and conflict studies program, noted author, and the Charles A. Dora Professor of history, taught a blended online course on the Vietnam War with a colleague and her students at St. Lawrence University. The two professors brought students “face to face” from across the two campuses in real-time using video conferencing technology for conversation and idea exchange. “Functionality was excellent,” Besser noted.

Professor Daniel Monk organized two international virtual conference sessions. “It worked flawlessly . . . and it has now led to a special issue of a journal called ‘Critical Studies on Security,’” Monk said. Monk is a member of the PCJ program and chair of the Peace and Conflict Studies and Islamic Civilization program.

Assistant Professor Ten Ballvé used the space to connect with book and article authors the class was reading. The experience “really helped bringing material to life and allowed students to learn about what was being covered in class that you would never know about by reading the finished book or article,” Ballvé said. Ballvé teaches in the Geography department and Peace and Conflict Studies.

Thanks, and enjoy Innovations!

Steve

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**RESEARCH NOTES:**

Howard Powell, Technical Director, Research and High-Performance Computing

**Space: The Final Frontier**

This winter, Research Computing has been focused on leveraging both physical and digital approaches.

First, we’re happy to announce that Research Computing is now located in room 350 of the Case Library and George Consortium for Information Technology: adjacent to the north entrance.

Our new space features areas for collaboration and project planning with faculty and students.

We plan to have an open house event sometime later in the spring, and expect to use this space when working with researchers. Please stop by and visit us!

Following the space theme, Research Computing has also been thinking about data storage and working on a long-term strategy for research storage.

Last summer, ITS purchased a 16TB IBM Storage System, which was used primarily to provide storage for the research virtual machines mentioned in the last newsletter. This storage is highly reliable and fast, but quite expensive — about $690 per TB. That’s about ten times more expensive than disk storage available at a retail store, because of the speed and redundancy required for such important work. It’s perfect for active storage of data that’s changed and accessed frequently, but too expensive for data that’s used once and then stored long-term.

Over the last few years, we’ve been looking at what different researchers across campus are already doing for long-term storage. What’s become clear is that there’s a need for a simple long-term data storage solution that offers the reliability and redundancy that our researchers need, but without such a high cost barrier.

In the last newsletter, we mentioned a small server that we could help configure that would hold a total of 40TB of disk space at a cost closer to $50 per TB. This system is based on FreeNAS, an open-source operating system designed for storage. The FreeNAS software is free and well supported by a community of users who also desire a reliable, inexpensive storage solution. Using FreeNAS along with a relatively simple server and set of high-quality hard drives, we are able to provide a private server to researchers here at Colgate with enterprise-quality features. These servers are small and energy efficient, so it’s easy for ITS to provide a home for them in our secure, climate-controlled, and power-protected campus data center. Researchers can simply use the storage space as a network drive from any computer on campus. Research Computing has also been working with the libraries to consider data management best practices so we can better assist researchers developing their own data management plans.

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**DIID YOU KNOW?**

All of our auditoriums have microphones and 99 percent of our classrooms have sound systems built in.

Our event support capabilities, in addition to our embedded systems, include large rear projection screens and projectors, webcams kits, HD cameras (for large events), high-quality portable sound systems from Bose, wired and wireless audio, and video cameras (for large events), high-quality portable sound systems, HD cameras (for large rear projection screens and projectors, wired and wireless audio, and video cameras, connected with global media professionals, in addition to our embedded systems, include large rear projection screens and projectors, webcams kits, HD cameras (for large events), high-quality portable sound systems, HD cameras (for large rear projection screens and projectors, wired and wireless audio, and video cameras.

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**NEW SPACE FOR RESEARCH COMPUTING CASE 350**

Most of us are using Crashplan or Dropbox to back up our files, but as with research data, that’s not always the best option. This spring and summer, Research Computing plans to review our backup strategy and supplement it as necessary, which means we will be reaching out to our faculty colleagues to help us better understand research data workflows and help identify any risk that can be mitigated.

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The Good Old Days

The sudden exploitive value of cryptocurrencies such as Bitcoin and Monero has led many companies to recognize it as a legitimate form of currency. Through regulations, several countries have even legitimized and authorized its use on international exchanges. As cryptocurrency becomes increasingly integrated into our digital lives, it has also drawn the ire and attention of cybercriminals looking to make easy and lucrative profits. Cryptocurrency mining or cryptojacking, the digital and open-source equivalent of bankjacking, are generated as a reward for solving a computationally intensive puzzle known as a block.

Together, these blocks form what is known as a blockchain, or the vast digital ledger that records all transactions within a given cryptocurrency system. One can willingly participate by utilizing their computer or handheld device’s resources to “mine” these virtual coins or tokens and reap the monetary reward in turn. Unfortunately, cybercriminals looking to make easy profits can exploit security vulnerabilities on individuals’ computers to steal and mine cryptocurrencies without their knowledge. This malware is known as cryptocurrency mining malware.

In recent months, the information security community has witnessed a surge in malware dedicated to cryptocurrency mining. Although this form of malware was first observed in 2013, the introduction of new attack vectors, coupled with the growing interconnectiveness of systems, has greatly increased the rate of infections. This is evident by the sheer variety of compromised systems, ranging from millions of Android smartphones to digital signage in department stores to government websites serving up malware to the casual internet surfer. Even system updates from a major software vendor were found to be compromised and delivering cryptocurrency mining malware.

This type of malware has proven so profitable to cybercriminals that it has even altered their favored tactic, ransomware, which itself had become pervasive in recent years. While always a tricky proposition, balancing courtesy and professionalism with demanding a ransom be paid to ensure valuable files, cybercriminals have determined that it is far easier to simply hijack the same system in order to steal its resources and mine the very cryptocurrency they are after. Symptoms of a cryptocurrency mining infection include unexpected system slowdowns, nearing the point of a system-wide crash.

The best protection against cryptocurrency malware, and malware in general, is to raise your security savviness in order to spot security risks. Although the recent focus on stealing coins and tokens is by far the most obvious method of delivering malware, the method of delivering malware is one which remains as varied and dynamic as the threat itself. This is evident through the sheer variety of compromised systems, the myriad of infected devices, and the many different methods by which malware is delivered and mined. For now, the only way to avoid this is to be constantly aware of the digital world around you.”

As the attacks continue to evolve, cybersecurity professionals are working to stay ahead of the game. By staying informed and vigilant, we can help protect ourselves and others from these dangerous threats.

Nelson Lee

RAPTORS IN THE SKY

A fly-fishing enthusiast designs and 3-D prints a functioning fishing reel and shares it freely on the web for others to download and make; an art student wants to make samples of sound more tangible and mine the very cryptocurrency they are after; a technology group provides expanded working space for people to realize and share their ideas. Each of these examples highlights new and interesting opportunities to create enhanced learning experiences that are limited only by imagination and creativity. And while this digital making certainly holds promise, it is perhaps less about the affordances of the technology itself and more about the group thinking that it encourages us to consider what is possible in a different light. We welcome you to join us as we explore new ways to get started making your next creation.

William Peak, professor of geology, 3-D printed several models of crystal systems (e.g., trigonal, orthorhombic, tetragonal, trigonal, hexagonal, and cubic) to introduce students to basic concepts of crystallography. The models were downloaded from Pintable, enlarged to twice their original size, and 3-D printed on equipment located in The Hub. The models allowed students to physically interact with each structure to gain a better understanding of their key characteristics.

Karen Harpp, professor of geology and peace and conflict studies, and Peter Tschirhart, former assistant dean for undergraduate programs and the Hub’s first director, in 2015, the兴起的数字生活，它也吸引了黑客的注意和关注。这些黑客正在寻找并利用易受攻击系统中的安全漏洞，包括影响电子邮件和在线文档查看等元素，这些元素可能被黑客利用来获取对系统的控制权。这会导致系统的崩溃。如果被黑客利用，这种类型的恶意软件可能会对系统造成严重的破坏。如果用户在其计算机或手头设备上安装了这样的恶意软件，黑客可能会利用该设备的计算资源来挖掘加密货币，而用户对此却一无所知。这种恶意软件通常被称为加密货币挖矿恶意软件。

在最近几个月中，信息安全社区已经见证了加密货币挖矿恶意软件的激增。尽管这种类型的恶意软件早在2013年就已经被发现，但受到新攻击手段的影响，它们变得越来越多样化和复杂。例如，攻击者利用数百万安卓智能手机中的漏洞，甚至利用政府网站来传播这类恶意软件，这些网站通常用于向公众发布广告。甚至一些主要软件供应商的更新也会被篡改，传播这种类型的恶意软件。

这种类型的恶意软件因其高利润性而被黑客青睐。尽管传统的勒索软件（ransomware）攻击手段仍然有效，但现代勒索软件攻击方式正在变得更加多样。黑客利用各种不同的手段来传播恶意软件，包括通过电子邮件、社交媒体消息或网站等方式。

幸运的是，该行业的专家警告说，这些危害并非没有对策。通过采取一系列措施，例如加强网络安全性、提高用户意识、使用杀毒软件和定期备份数据等，可以有效防止或降低这些威胁。对于企业来说，这些措施是必须的。对于个人用户来说，他们应该定期更新操作系统和软件，同时避免点击来自不可信来源的电子邮件和网站链接。

最终，防范这种类型的恶意软件需要我们共同努力。通过提高意识、采取预防措施和确保系统安全，我们可以保护自己和他人免受这些威胁。
New offerings from the Engagement and Support Team

**TAP**

*Technology Assistant Program (TAP)*

This program is designed to pair ITS student workers with Colgate faculty who need technical assistance with short- or long-term projects. The demands of Colgate faculty are many, and often the use of technology can be a delay and a frustration. It is our hope that with TAP, we can provide dedicated ITS student workers to alleviate the technical stresses faculty may face. More information on TAP can be found here: [http://www.colgate.edu/offices-and-services/information-technology/getting-help/technology-assistant-program/](http://www.colgate.edu/offices-and-services/information-technology/getting-help/technology-assistant-program/).

**FLIPSTER**

The Offices of the President and the Provost and Dean of the Faculty sponsored a campus subscription to Flipster, which will provide all members of the university community with free mobile digital access to several important national magazines and journals. Instructions can be found here: [http://www.colgate.edu/offices-and-services/information-technology/workplace-software/flipster/](http://www.colgate.edu/offices-and-services/information-technology/workplace-software/flipster/).

**Usage statistics from popular services**

**Office 365**

Office 365 was announced as a new service in the fall, and since then, 843 users have activated their accounts. We provided Office 365 to users who did not have access to it previously, and this has increased users’ productivity by enabling them to use the mobile apps while they are on the go.

**Adobe Creative Cloud**

Under our previous Adobe license, we were limited to 300 installations of Creative Cloud across campus. With 311 licenses used already, an unlimited campus license leaves us free to support any member of the faculty who would like to use the Adobe products. This is in addition to all the labs and classrooms that now receive the suite, nearly doubling its availability on campus.

More information on our workplace software can be found here: [http://www.colgate.edu/offices-and-services/information-technology/workplace-software/](http://www.colgate.edu/offices-and-services/information-technology/workplace-software/).

**ITS Event Support**

The ITS Classrooms, Digital Media & Events group provides support to more than 250 spaces across the Colgate campus. As a component of that support, event management is a staple activity. We not only set up and operate equipment, but also coordinate the needs of our guests and hosts. We manage release forms, prep and review laptop presentations, and can help ensure the venue you select is appropriate for your needs.

The events we manage range in complexity from classroom recordings to livestreaming for some of Colgate's most important and seminal events. We support, on average, 130 events a month, so lead times are very important. We encourage and welcome event consultations. These conversations are valuable so that we may help our community choose the best venue, the right personnel, and the necessary equipment for the occasion. A quick call to the ITS Service Desk at 315-228-7111 is all that is required. We can usually address your questions within 24 hours. Before making an EMS reservation, reach out to us — we are happy to help.