

# Information Technologies Activity Report

January – May 2017

## Designing the next community cluster

In response to the recommendation of the University of Delaware Research Computing Task Force, UD built two high-performance computing (HPC) community clusters for University researchers. The [community cluster program](#) allows researchers to have access to HPC resources without the ongoing financial liability of running and maintaining their own clusters. UD Information Technologies (IT) provides the infrastructure, absorbs 50% of the cost of each cluster, and consolidates the purchasing of individual “compute nodes” to reduce the investors’ cost.

The Mills HPC community cluster, deployed to faculty investors in 2012, reached the end of its nominal lifespan earlier this year. With the shutdown of Mills on the horizon and investment interest voiced by new and existing faculty, IT staff have been working with prominent HPC vendors to produce a design specification for the next University of Delaware community cluster.

Over the past year, IT has conducted interviews with faculty about the community cluster program and the direction of our next HPC cluster. The next cluster’s architecture must meet the goals gleaned from these conversations.

Designs submitted for the new cluster are taking advantage of recent hardware advancements, including a decrease in the physical size of each compute node and a decrease in power requirements. Using these smaller compute nodes should decrease the cost of the cluster by packing the smaller nodes into a chassis with consolidated power delivery. A chassis that could be reused in the future, with newer nodes purchased to replace the old, would dramatically increase the operating lifespan of the cluster. Interest in coprocessor technologies like general-purpose GPUs is on the rise at the University, so the designs were required to include nodes with nVidia Pascal GPU coprocessors.

For the infrastructure of the cluster to achieve a life span up to twice that of the current Mills or Farber clusters, the resources critical to performance of the machine must be designed appropriately. Intel's OmniPath high-speed network fabric was required in all designs: at 100 gigabits per second (Gbps), OmniPath is nearly twice as fast as the InfiniBand network in Farber. OmniPath’s technology roadmap includes enhancements in the next few years that should further increase its efficiency.

Storage hardware in each rack added to the cluster was also mandated: As the cluster grows, capacity is added to both the high-speed Lustre storage system and the long-term NFS storage system. This addition also increases the bandwidth (reads and writes per second) of the storage systems. As in previous clusters, the long-term NFS storage will be replicated off-site for resiliency.

Having the ability to grow the machine should increase the lifespan of our next cluster to at least eight years. Adding nodes and storage capacity as faculty invest in a community cluster keeps the investors' workloads moving at the expected pace.

On both Mills and Farber those workloads were managed using job scheduling software created by Sun (now Oracle), called Grid Engine. Another product has moved to the forefront of job scheduling for HPC workloads and is being used on many large-scale supercomputers, including the latest XSEDE systems. On the next community cluster, UD will follow that lead and switch to the Simple Linux Utility for Resource Management (SLURM) and a share-based scheduling algorithm that will allow researchers to make more efficient use of the cluster's resources.

Faculty have asked that more flexible investment options be offered. Competing for and winning grants to cover a large up-front purchase in a cluster is far more difficult than budgeting smaller amounts annually. An option is being explored for the next cluster whereby, after a minimal buy-in (e.g. the cost of one node), faculty could increase their investment in smaller amounts. Each investment would be for a fixed term, and at any time the investor's scheduling priority would be proportional to the total investment. Expired investments would default not to zero but to a minimum value for a period of time, so that the investor has a grace period to continue to access the cluster at the lowest possible priority relative to other users.

The satisfaction and research success of investors and their coworkers is of paramount importance to UD IT. Five months of discussions with HPC vendors have recently concluded, and IT staff are now engaged in presenting the proposed design to faculty and departmental staff. Barring any major issues, fall 2017 should see the third UD community cluster built and deployed.

## Planned Outages

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### Upcoming UDSIS outages

Several updates and patches to UDSIS are scheduled for the summer term. UDSIS will be unavailable on the following Saturdays: June 10, July 15, and August 5. Notices of outages will be posted on the CAS login page closer to the actual dates.

## Information Security

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### Secure UD “Take a BITE out of phish!” campaign

In April, the University launched the [Secure UD “Take a BITE out of phish!” campaign](#). This enhancement to Secure UD Training helps improve our community’s awareness of phishing attacks and the danger they pose to personal information, devices, and accounts.

Each month, as part of the “Take a BITE out of phish!” campaign, a randomly-selected sample of employees will receive a harmless test phish that mimics real phishing attacks. The campaign is intended to raise awareness—not to deceive or trick. Employees will not be punished for falling for test phish. If an employee falls for a test phish, he or she will see a message about the “Take a BITE out of phish!” campaign and resources to help become more successful at recognizing future phishing attacks.

Employees are encouraged to be aware of the threat posed by phishing attacks and report suspicious messages immediately by forwarding them to [reportaphish@udel.edu](mailto:reportaphish@udel.edu). Phishing emails sent to [reportaphish@udel.edu](mailto:reportaphish@udel.edu), including test phish and real ones, are annotated and posted to the [Secure UD Threat Alerts](#) blog.

In April, the University ran the first “Take a BITE out of phish!” test. In this baseline assessment, [test emails](#) were sent to all 7,119 employees enrolled in the campaign. Only 273 employees (approximately 3.83%) clicked on the suspicious link, and 161 employees reported the phish by forwarding it to [reportaphish@udel.edu](mailto:reportaphish@udel.edu).

These results are a tremendous improvement over the University’s two previous phishing tests. In June 2015, 25% of test phish recipients clicked on the suspicious link, and in February 2016, 18% of recipients did so.

April’s phishing test shows that our community has made great progress in security awareness. Most organizations expect to see single-digit click rates only after a year of testing. Continued testing, training, and awareness can help eliminate much of the risk to the University and its community. A well-informed and vigilant community is UD’s greatest defense against ever-evolving cyberattacks. Future test results will be published in [Secure UD News](#).

#### Why “Take a BITE out of phish!” matters

The importance of increased and ongoing phishing awareness was recently highlighted by the massive and very real [Google Drive phishing attack](#) and the recent [ransomware epidemic](#) crippling the United Kingdom’s National Health Service.

During the first week of May, thousands of organizations and millions of accounts received phishing emails that imitated Google Docs invitations. Clicking the link and giving permission to the fake Google Drive app would compromise a victim’s account and files. Clicking would also allow the attacker to send the same phishing email to addresses in that account’s contact list.

On May 12, the news exploded as 40+ National Health Service trusts, the backbone of the UK's healthcare system, were shut down by ransomware. Dubbed "[WannaCry](#)," this strain of malware encrypts files on computers and network drives and demands payment for their return. WannaCry is also designed to spread across networks to attack as many vulnerable devices as possible. As the ransomware raced across the UK and into 150 other countries, patients were denied medical care and businesses crashed.

Incidents like these are highly visible and are good examples of what can happen when cyberattacks are successful; however, they are far from rare occurrences. Hackers are always searching for and trying new ways to exploit people, organizations, and networks.

Even as our community becomes more aware and phishing test scores continue to improve, regular training and continued watchfulness are important to protecting ourselves, each other, and our University from cyberattacks.

### **How you can help**

You can help protect our community against phishing and other cyberattacks simply by being aware of them. If you identify a suspicious email, report it by forwarding it to [reportaphish@udel.edu](mailto:reportaphish@udel.edu). You can also report other kinds of cyberattacks and security risks by emailing [secadmin@udel.edu](mailto:secadmin@udel.edu).

Employees can learn more about the dangers of phishing and how to keep themselves, the community, and the University safe by completing the "Social Engineering" and "Email, Phishing, and Messaging" modules of [Secure UD Training](#).

Phase I of Secure UD Training, which includes these and other modules, will be available until September. Approximately 1,000 employees have started or completed Phase I so far. Join your colleagues in helping Secure UD: [complete your training today!](#)

Unit heads who would like to arrange a phishing test for their unit, or who would like a report of Secure UD Training completion across their unit, may request one by contacting [secadmin@udel.edu](mailto:secadmin@udel.edu).

## **Cylance releases case study on use at UD**

Cylance published a case study describing the University's experience with the advanced anti-malware protection of CylancePROTECT. By participating in the case study, the University demonstrated its commitment to secure practices.

CylancePROTECT uses artificial intelligence and machine learning to prevent zero-day attacks and malware from compromising users' computers. IT has reported that none of the UD systems running CylancePROTECT have been breached.

As a result of UD's participation in the case study, Cylance offered the University a discount on software licenses. Therefore, UD IT has increased the number of CylancePROTECT licenses available for University-owned computers from 1,000 to 2,500. Contact your departmental or college IT professional to learn more about Cylance licenses.

## MacOS desktop security training

Beginning in December and continuing through the spring semester, CS&S offered six training sessions on securing macOS systems. The first overview session set the stage for the remaining events, which focused on topics including whole-disk encryption, security profiles, integration with Active Directory, and software distribution and updating. Each session was offered twice, allowing several dozen departmental IT staff to attend each session relevant to their needs.

## Jamf trial

UD IT and more than a dozen IT professionals from across campus are now evaluating Jamf management software. The month-long trial will feature intensive testing of Jamf Pro, the industry-leading software suite for managing and securing iOS and macOS devices. If testing is favorable, we hope to make Jamf Pro available to interested University units by mid-summer.

## Over 30,000 UD people protecting themselves with 2FA

In May 2015, the University began offering two-factor authentication (2FA) as an additional protection for University accounts. By May 2016, about 3,000 people were using UD's 2FA service. As of this month, over 30,000 people are now taking advantage of UD's 2FA protection.

Over the past 12 months, 2FA protection has become mandatory for students and employees.

- Graduate students and all new students (graduate and undergraduate) have been protecting their accounts with 2FA since November 2016.
- Beginning in January, all new full-time employees enroll in 2FA as part of their onboarding process.
- Since February 13, all full-time employees, including faculty, have been required to use 2FA to protect their accounts.
- English Language Institute students have been using 2FA protection since February 14.
- Current members of the classes of 2017 – 2020 are now protecting their accounts with 2FA. The University phased in enforcement class by class:
  - Seniors – March 6
  - Juniors – April 5
  - Freshmen and Sophomores – May 11.
- Miscellaneous wage employees are currently being invited to use 2FA protection and will be required to do so beginning on June 26.

- UD IT, Payroll, HR, the Registrar's Office, and other University departments are developing plans to offer 2FA protection to alumni, retirees, and other parts of the University community.

In addition, 2FA protection has been added to many University applications in which confidential information could be at risk.

- During 2016, virtual private network (VPN) connections from off campus or unsecured Wi-Fi networks began requiring 2FA.
- On February 6, certain student financial aid forms began using 2FA protection.
- Also on February 6, UDataGlance began requiring VPN (and, therefore, 2FA) for off-campus or unsecured Wi-Fi access.
- On February 20, payroll and HR forms that require an employee or faculty member to transmit confidential information received the added protection of 2FA.

UD IT thanks the University community for embracing the extra protection of UD 2FA, and urges everyone to enroll in 2FA (or other multi-factor authentication systems) offered at financial institutions, email services, shopping sites, government sites (e.g., Social Security), and social media sites.

A strong password is no longer sufficient protection for your accounts. For safety's sake, use the combination of a strong password and 2FA protection wherever it is offered.

## Constituent Groups & Feedback

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### IT Pros quarterly meeting

On March 8, approximately 80 departmental IT staff attended an IT-hosted informational session on current developments in central IT. Joy Lynam began with an overview of the complexities of account creation for new University students, faculty, and staff. Karl Hassler followed with an in-depth look at the security assessment his group is offering as a service to units across campus. A series of short talks on topics including Microsoft Cloud Services, our VMWare infrastructure, and other new developments came next. The event concluded with an open discussion of future services.

### Unconference planned for June 6

UD IT will be hosting a half-day unconference on June 6, open to all campus IT professionals. In an unconference, the participants vote for three to four topics and break into groups to discuss them in three sessions. At the end of each session, each group summarizes their findings to all participants. Members of the IT-Pros Google group received registration information this week.

## Research Support

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### Research Computing spring semester events

The Research Computing team was busy during the spring semester hosting the February HPC Symposium, April UNIX Basics training, and monthly XSEDE workshops.

- The [February HPC Symposium](#) was led by Anderson Janotti, assistant professor in the Department of Materials Science and Engineering, and his research group. Their presentation, “[Materials by Computational Design – A Bottom Up Approach](#),” addressed the role of computer modeling in the discovery and optimization of new materials.
- The April training sessions covered topics such as project structure and build management with make, automated build configuration with autotools and CMake, revision control with git, and VALET.
- The monthly XSEDE workshops covered OpenMP, MPI and Big Data. The Research Computing team is hosting XSEDE’s Summer Boot Camp from June 6 - 9. ([Register](#))

The next HPC Symposium on June 28 will be a new format where researchers can participate in a poster session with other groups that work on the clusters.

### GIS Events

- Olena Smith of IT Client Support & Services (IT-CS&S) presented guest lectures on GIS to increase awareness and use of GIS on campus in multi-disciplinary courses: “Story Mapping for Preservation of Cultural Property II” (ARTC 302) for the Department of Art Conservation, and Introduction to GIS for CAD for Site Design (PLSC 150) for the Department of Plant and Soil Science. If you are interested in a GIS guest speaker in your class, please contact Olena Smith at [gis-info@udel.edu](mailto:gis-info@udel.edu).
- IT-CS&S collaborated with the University Library to host training on the widely-used ArcGIS software: [Getting Started with ArcGIS Online](#) on March 1, and [Getting Started with ArcGIS for Desktop](#) on March 8.
- IT-CS&S continues to host the **UD GIS Coffee Hour** for GIS users from UD and the surrounding community. In February, John Stevenson from the UD Library presented on [PolicyMap](#). In April, Kim Cloud and Miriam Pomelo from the State of Delaware [presented on the FirstMap](#).
- In April, IT-CS&S released the [UD 2017 Commencement map](#) for event locations and parking. It also released a new version of the [UD Campus Map](#).

## Call for research: posters and links

- The June 28 HPC Symposium will be in a new format: Researchers can present poster sessions about their work on the Mills and Farber clusters or on any national supercomputing cluster (for example, XSEDE) and talk with other groups presenting information about their research. [Reserve your easel now](#).
- The Research Computing team encourages Mills and Farber stakeholders to submit their research to the Research Computing website gallery. Contributions to this gallery allow the Research Computing group to highlight the importance of funding future University HPC clusters. These research publications show, in part, how much research has been accomplished by the use of HPC community clusters and their vital importance as a computing resource to the UD research community. You can submit links to your papers, images, or poster sessions via our online [Research Submission Form](#) or submit other file types to Anita Schwartz ([researchcomputing@udel.edu](mailto:researchcomputing@udel.edu)).

## Teaching and Learning

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### Summer Faculty Institute 2017

Faculty from across all colleges and departments will gather to learn from some of the country's leading educators at the University of Delaware's 2017 Summer Faculty Institute (SFI), scheduled May 30 to June 1 in Gore and Mitchell Halls.

This year's organizing principle is "making meaning and creating deep learning through technology," and each day's program supports a special theme.

The keynote speakers for SFI 2017 include James Lang, author of the book *Small Teaching: Everyday Lessons from the Science of Learning* and a popular *Chronicle of Higher Education* column of the same name; Valerie Barr, professor of computer science at Union College; and Mills Kelly, professor of history and art history at George Mason University. The keynote speakers' presentations will introduce the daily themes at the Institute: small teaching, computational reasoning, and digital humanities, respectively.

Registration is now open, and more information is available [online](#).

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## Business Systems

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### Two-factor authentication (2FA) with University-issued fobs

IT-Web Development (IT-WD) and IT-Network and Systems Services (IT-NSS) collaborated to offer two new ways for campus users to obtain a University-issued 2FA fob: Individuals may purchase fobs from the UD Bookstore, or departments may purchase fobs for their employees by using the Request for Service: Fob Purchase for Employee 2FA Web Form.

To activate a fob, log in to [My UD Settings](#) and choose **Activate my 2FA fob** from the menu. Make sure you have the fob in hand. Although Google Authenticator is the recommended method for generating 2FA authentication codes, University-issued fobs can be helpful for specific audiences, such as international students and certain employees. ([More information](#))

### Biological Material Registration Web Form goes live

IT-WD partnered with the Department of Environmental Health & Safety to develop the new Biological Material Registration Web Form. The new Web Form helps units be compliant with University policies: Research with biological materials must be registered, an inventory of biological materials must be maintained, and labs are audited on a periodic basis. The form also documents a Principal Investigator's certification that work is done in accordance with UD policies and the CDC/NIH "Biosafety in Microbiological and Biomedical Laboratories" guidelines.

### Two more Web Forms using CFS component

The Request for Service: Shredding (non-Archives) and Request for Service: Lock Shop (keys only) Web Forms were updated to use UD's Chartfield String (CFS) component. The CFS component centralizes the way accounting information is collected. IT-WD and General Accounting worked with Facilities, the owner for these forms.

### Equipment Activity improvement for sold equipment

The University tracks sales of serviceable equipment to outside entities. The Equipment Activity Sold Web Form now requires entry of a "Cash Transmittal" Web Form ID by Procurement. This change streamlines the process of linking the Equipment Activity Web Form with the Cash Transmittal Web Form. The department selling the equipment therefore has accurate and complete cash transmittal information about the transaction. IT-WD partnered with General Accounting, Procurement, and the Cashier's Office to make this improvement.

## **Business forms and applications are updated for HR Upgrade to v9.2**

The recent upgrade of the HR PeopleSoft system required several changes and enhancements to HR and Payroll Web Forms and Web. Forms and views that IT-WD updated include Direct Deposit, Request to Recruit, Job Data, Employee Demographic Data, and S-Contract. Modifications were made in 2016, tested, and released to production on March 5, 2017, when the upgraded HR system was made available to the campus.

## **Direct Deposit business controls**

To continue with the adoption of the National Institute of Standards and Technology (NIST) guidelines, IT-WD added many security improvements to the Direct Deposit Web Form. Additional layers of validation are now required to make changes, historical information is displayed to help identify possible suspicious activity, and email notifications have been added. On the back-end, data encryption has been enhanced. As of February 20, 2017, 2FA is now required to access the form and mitigate potential fraudulent use. HR and Payroll can answer questions on the Direct Deposit Web Form.

## **Database support**

- PeopleSoft and Oracle Database software upgrade: The Human Resources PeopleSoft software (the Tools software and the primary application software) was successfully upgraded. In conjunction with the upgrade, the Oracle databases associated with HR were also upgraded to Oracle 12c, and relevant security patches were applied.
- Database hardware changes: Selected databases continue to be moved to the new Oracle supercluster hardware and software. The PeopleSoft Human Resource Quality Assurance database has been moved, and the Test and Development databases will follow this month.

After further testing, the first of the Production databases will soon be moved to the supercluster.

Work continues on the transition to the new backup and recovery strategy implemented via Oracle's Zero Data Loss Recovery Appliance (ZDLRA). IT Management Information Services (IT-MIS) database administrators are working with the Oracle technical team to resolve some intermittent technical issues.

## **UDSIS updates**

- BHSC phase two: IT-MIS worked with the Blue Hen Success Collaborative (BHSC) office and the Registrar's office to implement phase two enhancements to the system. BHSC is an initiative that helps University departments track student progress and is

expected to have a positive impact on graduation rates. For more information about BHSC, read this [UDaily article](#) or this [Wilmington News Journal article](#).

- OISS Terra Dotta implementation: The University is in the process of transitioning international student and scholar visa processing to a third-party vendor. Daily interfaces between UDSIS and the Terra Dotta software have been implemented by IT-MIS in order to send the latest student data to the federal Student & Exchange Visitor Information System (SEVIS) to produce visa documentation and track international students.
- SFS Third Party Billing implementation: Student Financial Services, in collaboration with IT-MIS, recently implemented the third-party billing feature in UDSIS. This feature will enable automated billing of third party entities that sponsor students at the University.
- Slate-UDSIS interfaces, phase two: For the past two years, Slate has been used by the Admissions office to process undergraduate applications. Throughout the admissions cycle, interfaces run to update UDSIS with the latest information about applications. Working with the Graduate Office, IT-MIS recently implemented interfaces between Slate and the UDSIS Graduate Application, speeding up the processing of graduate student applications.
- UDOonline Destiny interface implementation: The UDOonline office is in the process of implementing new software to handle online enrollments. New interfaces to the vendor system, Destiny, have been implemented by IT-MIS. For more information, see this [UDaily article](#).
- Curriculog: IT-MIS is working with the Registrar to implement interfaces to Curriculog, a new system that will enable faculty and Registrar staff to work on adding updates and new courses to the Course Catalog.
- Loading Grades: IT-MIS is currently working with the Registrar and faculty to develop a facility to upload mid-term and final exam grades into UDSIS from a variety of sources (e.g., Sakai and Canvas). This project will make it simpler for faculty because they will be able to enter grades in one place instead of re-entering them in UDSIS.
- Concert: IT-MIS is working with the College of Nursing and Health Sciences and the Registrar's office to implement interfaces to Concert, a system that will be used to track the academic progress of Nursing students.

## UD Financials news

- Student Loans Refund Process: IT-MIS improved the Student Loan Title Four refund process so that loans required to be paid by check are separated from student refunds that the University processes via direct deposit.

- Revenue recognition: The Research Office identified several duplicate rows which resulted in erroneous amounts in revenue recognition. IT-MIS developed a process to correct the error.
- GCC/QC Interface with General Ledger: IT-MIS developed a process for Auxiliary Services to automate the loading of Monthly Printing Services (both GCC and QC) charges to General Ledger and provide a validation report.
- Non-Student Billing Interface: The Research Office introduced a bill type for the new National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL) awards. IT-MIS modified the Non-Student billing interface in PeopleSoft to use purpose code NIIMBL, generate invoice numbers beginning with “NMBL,” and assign the new bill type NIIMBL to those invoices.
- Auxiliary Services data error correction: IT-MIS developed a common component to correct any Auxiliary Services data validation errors fed into the General Ledger (GL). This functionality provides the ability to correct invalid speedtypes and accounts for any Auxiliary Services charges before adding them into the GL, which reduces the manual effort needed to correct those charges.
- Spreadsheet upload of GL accounts: IT-MIS developed a utility to mass update GL accounts, helping the Controller's Office update the accounts in volume.

## Event Production and Media Services

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### IT-UMS supported Biden Institute launch and other events

University Media Services (IT-UMS) provided the staging and lighting design and technical support for the launch of the Biden Institute. The Institute, led by former Vice President and UD alumnus Joe Biden, aspires to be “an intellectual center for scholars, policymakers, activists and national leaders” with a mission “to help shape and influence the work on some of the nation’s toughest domestic problems.”

UMS also streamed the event live and provided video and audio feeds for a large overflow crowd of invitees.

IT-UMS also coordinated the staging and lighting and provided the audio, video, and live streaming for the “Biden is Back” event on the Green, which celebrated the former Vice President’s return to the University of Delaware. IT-Network and Systems Services (IT-NSS) also provided support with both direct and wireless network access which supported the live stream and press connections.

IT-UMS also provided the technical operations and live streaming of the first Biden Institute event, “Win-Win: How Taking the Long View Works for Business and the Middle Class.” The event, held in Mitchell Hall, featured a panel of eight corporate leaders and experts and was moderated by former Vice President Joe Biden.

The Biden events were among the 182 campus events that IT-UMS supported in Mitchell Hall, Pearson Hall, the Roselle Center for the Arts, and other campus locations.

## Video production

IT-UMS has also produced 28 documentation recordings, provided full stadium production and streaming of 16 Lacrosse games, and completed five full production programs including “Run, Hide, Fight,” a video for the University Police demonstrating actions and procedures that should be taken by campus community members should they be confronted by a violent intruder.

## Personnel

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**Salvatore Ciro** started working in IT-CS&S in March as an IT Support Consultant I. He provides technology support to faculty and staff. Salvatore comes to IT-CS&S after providing technology support in the private sector and, more recently, working part-time for the IT Support Center.

In February, **David Abrams** started working in IT-NSS as a Network Technician II. David has over 16 years of experience working in telecommunications in the private sector. He will support the telecommunications infrastructure and work primarily on installing, troubleshooting, repairing, and maintaining a wide variety of data communication systems.

**Erik Williams** joined IT-NSS as a Network Technician I in March. Erik brings his experience installing and troubleshooting problems with telecommunications infrastructures in commercial business environments to IT-NSS. His primary responsibilities include installing, troubleshooting, repairing, and maintaining a wide variety of data communication systems.

In March, **Larry Rogers** joined IT-NSS as a Network Technician I. Prior to coming to UD, Larry worked for many years installing and maintaining telecommunications in the commercial business sector. In the Network group he will install, troubleshoot, repair, and maintain a wide variety of data communication systems.

Congratulations and best wishes to **Linda Usher**, a Production Control Analyst III in IT-NSS, who retired in February 2017 after 38 years. We thank her for her many years of service to IT and UD.

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