

Fisher College of Science and Mathematics Technology Plan 2015
Information and Instructional Technology Committee
Towson University *(December 18, 2015 update)*

1. Introduction

This document is prepared to articulate the present technology needs and vision of future technology goals for the Fisher College of Science and Mathematics (FCSM).

Purpose of the Plan:

The FCSM Technology Plan serves two purposes. The first is to assist the college in setting technology priorities and objectives. The second is for use by the Division of Academic Affairs and the Office of Technology Service to assist in recommending University-wide technology priorities and unified solutions.

1.1. Fisher College of Science and Mathematics Mission

Through rigorous and high quality undergraduate programs in a wide variety of scientific, computing and mathematical disciplines and graduate programs in research-based, practice based, applied and interdisciplinary fields, it is the mission of FCSM to prepare its students to live and work productively in a scientific and technological world and to pursue learning throughout their lives. Faculty members engage both their undergraduate and graduate students through interactive teaching, advising, basic and applied research, and collaborative activities internally and externally. They form partnerships both to serve the metropolitan community as well as to meet regional, national and international needs. The result is dedicated, innovative, flexible, and highly prepared individuals who excel in graduate school, professional school, and careers in industry, government and teaching.

1.2. FCSM Relevant Policies or Standards

1.3. FCSM Technology Committee Members and Document History

This document was drafted by Sam Houston with input from the FCSM IITC Committee members:

David Hearn, Biological Sciences

George Kram, Chemistry

Sam Houston, Computer and Information Sciences (CIS)

Alexei Kolesnikov, Mathematics

Phuoc Ha, Physics, Astronomy, and Geosciences (PAGS)

This plan includes some of the advancements since the Fall of 2012, when the last FCSM plan was submitted.

1.4. FCSM Technology Committee Mission

The FCSM Information Technology Committee (ITC) purpose is to:

- 1) Develop and recommend a College wide technology plan.
- 2) Develop technology priorities and objectives for the College.
- 3) Advise the College on the operation of computer labs, classrooms, and technology centers.
- 4) Interface with the University ITC and the Office of Technology Services (OTS) concerning college-wide issues and priorities.

1.5. Distribution and Control of Technology Funds

Technology funds are provided through department operating budgets, student technology fees (STF), research grants, and individual course fees for field trips, printer consumables, systems, and software. Each department applies these funds to meet the requirements to equip classroom, teaching and research labs in coordination with OTS best practices and policy for platform support. Additional resources are sometimes available from the Office of the Dean of the Fisher College or from grants from the Fisher Foundation.

1.6. FCSM reflection on last technology plan submitted.

PAGS has added external DAC systems, iPads for Physical Science and Science Ed classes, and 90 new computers. Lab software funding is still an issue for PAGS. This may be partly addressed in the future through the restructuring of STF fund distribution.

Use of mobile devices is increasing in Smith Hall and will require greater wireless coverage. Wireless access for CIS and Mathematics has been improved with a fourfold increase in the number of access points in YR 7800.

Classroom and lab projection systems have been upgraded and are working overall. Technical problems do occur and can be disruptive for classes that meet only once per week or that involve time sensitive student presentations or external speakers.

Mathematics has redesigned the Math 119 course, where part of the course provides lab time for students to work on problems with the help of instructors. The Linux-based WeBWorK server has been updated by OTS and continues to be used. TI Smartview software is now installed in all classrooms. Matlab licenses are now available for limited concurrent users.

CIS is migrating their central Unix server to a more distributed project server environment, and continues to experience dynamic changes in services required. OTS has responded to special networking requests, upgraded the virtual host system for CIS and is planning to implement a small-scale web publishing service for student and campus organization Wordpress sites. VDI and desktop-based virtualization technology is being used for CIS Security, IT courses, courses on alternative platforms, and complex development environments.

OTS has implemented many technology services and support improvements. Office 365 provides for increased e-mail quotas and the OneDrive cloud storage service. The JAMF Casper Suite has improved Mac OSX image deployment and software distribution. Support improvements also include the Panopto lecture capture system, an Adobe site license for labs, classrooms, and faculty, unlimited access for Webex, and system upgrades through the EduCycle program.

OTS engineering and user services are more often including FCSM technology staff in the project planning process, e.g., the TowsonU active directory (AD) redesign and Casper implementation.

2. Areas of Focus

The following areas of focus articulate a number of specific needs in FCSM departments.

2.1. Lab Software and Hardware Maintenance and Acquisition

Upgrade cycles for student hardware computing resources are sustained with Student Technology fees. Hardware acquisition for research labs has become easier with the EduCycle program. Lab systems will continue to require upgrades as long as desktop systems are the predominant mode for scientific, development, and computing applications, or until alternative equivalent platforms become viable. See the new technology trends section below.

Lab software for scientific applications in teaching and research labs has been an issue, though that may be changing now that STF requests for software may be considered through the Provost office. PAGS is currently waiting on an STF request for Origin, a standard use plotting package for the physical sciences. STF funding may also be considered for other applications such as LabVIEW, Matlab, and SigmaPLOT.

The range of and support requirements for scientific, IDE, application, and local server and cloud based resources is increasing for course instruction and research labs. There is an increase in wireless applications and mobile devices used in courses, field work, and research.

In Mathematics, software in redesigned courses use the most up-to-date versions for online publisher content, so applications such as Adobe Flash player or Mathematica require a more proactive maintenance schedule.

The recently established UTeach program requires maintenance for the following education related technology: 18 laptops, 60 iPad minis, 2 Mondopads; 5 computer desktops and printers; and various PASCO probes used mainly with iPad minis. This list is likely to grow.

In Chemistry, maintenance (upgrades) are rarely done unless Operating System changes require it. Since the last report Chemistry has made investments in a substantial number of new scientific instruments and equipment, all of which require computing resources and provide for hands-on experiences for student course work and research projects.

The AIT labs have been rebuilt, including upgraded lab systems, network configurations, applications, build processes for FRED systems, Forensics software, and development of documentation for the ongoing maintenance of lab imaging, applications, and software license services.

2.2. Classroom Technology

Classroom digital presentation systems with Crestron control panels have been added and maintained in the Smith, Linthicum, and York Road locations. Mathematics uses SmartBoards for interactive displays. There will be an ongoing requirement for maintenance and refresh cycles for this equipment. Stable operation of current classroom technology is an important support issue.

In Chemistry, SmartBoards have been installed in several classrooms and the tutoring center, and have been well received by Faculty and students. STF funds have been used to install close to 90 computers in Summer 2015, and all Lab PCs, classroom PCs, and mobile Laptops have been updated. Multiple computers have been upgraded/replaced through the EduCycle program. Chemistry has also adopted Turning Technologies new “clickers” Audience Response System that students purchase on their own and use for multiple courses.

2.3. Faculty and Staff Computer Systems

Faculty and staff computer systems are upgraded via the OTS “trade-up” program. Many Faculty require a shorter cycle for computer upgrades for overall performance, hardware resources, or interfaces such as USB3 or multi-monitor support. There is an increased need for software, systems, and technical assistance.

There is increased usage of MACs and Linux-based systems and the accompanying need for technical support.

There is an increased need for specialized open-source and commercially available software such as SAGE (an open-source mathematics system) or Matlab (a computer algebra system more suitable for numeric calculations), and computing resources for data science (large data sets and algorithms). Mathematica (a computer algebra system used in Calculus courses), R-stats/R-studio, SPSS, and Minitab statistical software are currently used for course instruction and research.

2.4. Student Access to Specialized Software and Hardware

Students and Faculty require increased levels and modes of remote access, especially wireless and student VPN access. Wireless access has been increased in the York Road building. PAGS is looking for a better solution for management of remote printing from teaching lab laptops.

Chemistry has specialized course specific software available for the students to use on dedicated computers in several dispersed areas in the department. There is no dedicated computer lab for this purpose.

Biology specialized software needs include Sequencher (<http://genecodes.com/>), CLCbio (<http://www.clcbio.com/>), Geneious (<http://www.geneious.com/>), and various open-source packages.

The list of open-source and commercial software required is long for all departments within FCSM. Required applications for Mathematics include Matlab and EndNote.

2.5. Unique or Specific Support Needs of the College/Division

Linux and open-source software installation, application, and troubleshooting support is needed similar to services provided for PCs and MACs. In CIS local support is provided. It is also likely that there will be continued growth in the number of smaller computing devices used by students and faculty for education purposes, and the respective need for maintenance policies.

Chemistry supports a Linux-based HPC server and Biology has expressed interest in a College wide grid server. The HPC server is at end-of-life and funding is being sought to upgrade this system.

Storage areas remotely accessible are required with the flexibility to modify permissions, to provide access to local external agencies, and to establish a more permanent presence. An example need is the Science Education equipment lending library database for local teachers. A similar service is the anonymous FTP server supported by the Space Telescope Institute.

CS/IS/IT program requirements include technical support for an increasing range of IDEs, applications, platforms, mobile devices, Cloud services, IT program labs, capstone projects, MACs, and graduate thesis and research projects. Course and lab projects have greater complexity with network (VPN, proxy, and firewall), server, and security components. This support requires proactive planning and flexibility in computing policies.

2.6. College/Division and department interest in specific new technology trends

Science Education will require tablets and smart phones, Promethean Smart Boards, and collaborative systems to work with local teachers.

There will be growth in the need for online collaborative and lecture capture systems:

Videoconferencing, shared storage, and access to local Web 2.0 technologies for external agencies.

Physics has a need for new and updated software, course homework programs (WebAssign, WebWork, Lon-capa), computer interfacing and remote control for scientific applications, and mobile laptops and tablets.

Desktop and server virtualization is used extensively in CIS courses and programs. This need will grow to include specific CS/IS/IT program requirements, instruction in the technology itself, contracted Cloud services, local infrastructure requirements, student access components, and persistent system instances with associated network and storage requirements.

Requirements in all areas of FCSM identified in the CTC IT Needs assessment survey are still valid, specifically the interests in trends for software packaging and distribution, discipline specific technology support, application hosting, course redesign, mobile technologies, cloud services, varied instructional models and learning spaces, open educational resources, and the migration of skill sets required for technology support staff.

FCSM Technology Committee chairperson

Date

FCSM Dean

Date