

Annual Report for Glenn Hennessee

In the past year I have continued to support the faculty, staff, and students by assisting with computer support issues. Mostly this involves software but sometimes I find myself doing some hardware replacement when the shop is busy. I also make sure that the B&W printer and color printer in Dabney 718 and the B&W printer in Swann Library have paper and toner. The past year has been relatively quiet with respect to viruses, worms, etc. this year with only a couple of outbreaks. In general people are much better about keeping their computers up to date with both operating system updates and their anti-virus software updates and exercising caution with email attachments. One noted problem was a Windows NT4 computer of Stefan Franzen that got infected with a particularly difficult to remove virus. Since Microsoft stopped providing any update to NT4 in December 2004 this operating system is particularly vulnerable to any discovered hole in the OS. It was through such a hole that this computer was infected this time. Windows NT systems should be considered highly vulnerable and removed from the network.

In the past year I have spent between 65 and 85 hours assisting Vesna Serrano, a postdoc for Stefan Franzen, in installing Linux and protein crystallography on two computers, one of which is her own personal laptop. This is the most time consuming project I had for any faculty member this past year and is still ongoing.

In the past year I acquired 24 computers from Terry Byron in Statistics that were going to be surplus. Nine of them were put into 718 Dabney to replace the computers that were six to eight years old. Two went to Swann Library on the 4th floor. These eleven computers were slightly less than three years old. The other computers, while not quite as new as the eleven but still very good, have been used to replace staff and lecturer computers. One went into Dabney 124 to replace the 6 year computer there. The most dramatic upgrade was for Maria Gallardo-Williams who was using a 450 MHz Pentium III computer of close to 10 years old and she now has a 2.4 GHz Pentium 4 system. I still have four of these systems to hand out to lecturers, etc. I feel that I have a very good working relationship with Terry and he has been of great assistance to the department with donations of old computer equipment they no longer needed. The year before this we got ~30 computers that went to various purposes, with half of them going to the general chemistry laboratory program in Fox. I also got 3 Macintosh computers from MEAS, one of which went to Dave Shultz to replace his old desktop Mac.

I became head of the department's IT committee and we have been very active this year. We inherited a project started by Chris Gorman to redesign the department's web site and I am now working to convert our existing information to the new design. I also designed and am implementing an "intranet" for the department to house information that only people in the department need access to instead of housing on the public web site. Both of these web sites will be ongoing in terms of content updates and additions.

An area of concern is the age of some of the equipment in research groups and the outdated computers and software needed to keep it going. Brent Gunnoe has a spectrometer with a computer running Windows 3.11 that either isn't upgradable or would be extremely expensive to upgrade. Franzen has a diode array spectrometer with Windows NT as the operating system. Mass spec has an instrument running Windows NT that was taken off the network as the result of a virus/worm that NT is vulnerable to. Recently I spent over half a day assisting Elon and Ana Ison in finding a computer that we could install Windows 98 on and in finding a 10Base2 network card to connect to a GC and then reformatting the hard drive and installing Windows 98. It is a used GC and software isn't compatible with anything more modern for the operating system. As time

progresses we are going to see more and more of these problems as equipment lasts longer than the computers and the operating systems that came with them. Windows 95, 98, Me, and NT4 are no longer supported by Microsoft. Windows 2000 will reach end of life in 2010; Windows XP will reach end of life in 2012. Already Windows 2000 is only receiving critical updates and nothing for non-critical updates, such as the change in the beginning and end of daylight savings time this year. Windows Vista is new and so far is not being very well received by the public at large. Its hardware requirements are such that it is unsuitable for a computer more than a year or so old. It has much larger requirements for disk space and memory than does Windows XP. Vista requires a minimum of 1 GB of memory and for any real work needs 2 GB of memory. Addressing this change is going to be a challenge for the department since almost all of our existing computers are unsuitable for running Vista. Many software programs are not compatible with Vista and updates will have to be purchased if and when they become available.

Implementation of a Laptop Requirement

Background. The department is interested in the possibility of instituting a laptop requirement for its undergraduate chemistry majors. To this end I was asked to explore the steps that would need to be taken to implement such a requirement.

Process. I began by using the NAG email list on campus to find out if any other departments or units had a computer requirement. I learned that Design and Engineering do. The College of Design requires that their students buy a computer in their sophomore year, not their freshman year. The rationale is that by waiting until their sophomore year the students will get a faster computer that will not need replacing during the rest of the stay. Each department within the College of Design has different computer recommendations.

Engineering is closer to chemistry in the types of courses they teach than is Design so I focused my attention on them. I was contacted by Amy Craig in engineering and she was very helpful in telling me what they do. They do not call it a “requirement” but a “recommendation” but every student is expected to have a laptop or tablet computer. Engineering has worked with Lenovo and has selected six different laptops ranging from \$1100 to \$2000 plus one tablet computer that the students can purchase through the campus bookstore. They strongly recommend that students purchase the accidental damage warranty which would cover dropping it, spilling cola into the keyboard, etc., but not theft. Students do not have to purchase one of these computers but can buy whatever they want, including Apple. I inquired about students who can't afford to purchase a computer. Engineering has an arrangement with the Pack Promise program on campus to purchase a computer for Pack Promise students with money from the Pack Promise program. Other students can use up to \$3000 of their financial aid packages to purchase a computer. ETF monies can not be used to purchase computers to give to students.

I next inquired about software. They suggest that the students purchase Microsoft Office at the bookstore for ~\$60 since much of their time will be spent using Word, Excel, and Powerpoint. Other software is made available to students through the Virtual Computing Laboratory (VCL). Engineering makes a great effort to use software that is available for both Windows and Macintosh. To use the VCL students go to a web page and request a VCL session. Some time later the student gets an email saying that their VCL session is ready. I was told that the delay between the request and the granting is typically only a few minutes. Currently the VCL is primarily for engineering students but the campus is expanding it to all students. I exchanged emails with Aaron Peeler (Program Manager, IT Advanced Academic Computing Initiatives) who told me that the campus can handle a few chemistry courses with their current hardware but if our computing needs were extensive we might be asked to purchase some blade servers for the VCL. Blades are ~\$4000 each and accommodate up to 4 users simultaneously.

I asked Amy Craig about how they support their students and faculty. Engineering has two full time employees plus a consultant hired on an as needed basis to assist the faculty with incorporating computers into their courses and to support the student-owned computing program in general. They also have a Help Desk system to deal with software issues, software installs, viruses, OS issues, etc. with a full-time manager and a large number of students hired to assist other students. Hardware problems are passed off to the vendor under the warranty on the laptop. The Help Desk operates an 8-5, M-F schedule. Other full-time ITECS employees work shifts at the Help Desk as well.

I raised the issue of students using the computers to browse the web, do instant messaging, etc. during class and was told that the way they have dealt with this is to keep the students busy. Make in-class assignments that are due at the end of class, not the end of the day or week. Don't give the students time to do other things.

I asked what aspects of their operation they consider as essential to the success of the program. They are 1) courses were altered to reflect the laptop emphasis BEFORE a laptop requirement was put in place. 2) the support staff for faculty and the Help Desk for students. 3) software is chosen so that students who prefer to run a Macintosh may do so without any disadvantage.

How many of our students already have computers? Ken Hanck contacted University Planning and Analysis and Nancy Whelchel, Ph.D., Assistant Director for Survey Research gave us the following figures. For 2006 First Year Survey results, 93% of Chemistry majors are bringing a laptop to campus, 2% a desktop, 0% both, and 5% say they don't know what, if anything, they will be bringing. 0% said they would not be bringing a computer of any kind.

What does all this mean for us? An overwhelming majority of our students already have computers and almost all of them are laptops. Adding a laptop requirement will have little financial effect on the students. The faculty and department have to make a firm commitment to making this happen. Courses need to be modified BEFORE the laptop requirement is instituted. A Help Desk system needs to be put in place to help the students with problems that will arise. Software above and beyond MS Office will need to have license agreements signed and arrangements made with the VCL to host the software. Extra hardware may need to be purchased for the VCL depending on the software we decide we need to run and the number of students involved. License agreements can take many months to work out the details. We may want to investigate whether Open Source software can be used in some instances and save the expense and negotiation time for commercial software licenses. We can also expect issues with student laptops running out of battery power during class and being unable to do the class assignment. Engineering is putting power to the desktop in all their new classrooms and is looking into retrofitting old classrooms to add power to the desktop. We may also have students who say their laptop isn't working right in order to get out of a class assignment.

Data Backup

Background. I was asked to investigate the options for backup of data. In order to comply with disaster recovery guidelines a second copy of the data must be kept at a different site.

I spoke to Barry Erikson about the campus Storage Area Network (SAN). The campus is currently looking into expanding the current SAN and looking for new users. His estimate is that 1 TB (1,000 GB) of data would cost \$2000 per year to store. They plan to have the expanded SAN running sometime in FY 2008, Erikson was not more specific as to the timing. We would also have to purchase and maintain a computer that would be located in a campus server room, most likely Poe Hall, that would be the interface between our users and the SAN.

The campus still has a number of issues to resolve. A main concern is what constitutes a different site for the backup. Does a different building on campus suffice or would the backup have to be kept off campus somewhere? The campus is seeking clarification on this topic. How is the cost for researchers to be handled? Is money going to come from overhead funds or will faculty need to request the funding when writing the grant proposal? What happens to the data when funding for the project runs out? The campus is in the process of creating a survey instrument for the research faculty about their anticipated use.

While all this is being resolved there are alternatives that can be used. The standard unity account has 300 MB of space that can be mixed between email and file storage and additional space can be rented. The current cost is \$1.80 per 100 MB per year with a \$20 set up charge and \$10 per year renewal fee. The maximum that can be gotten is 2 GB. Project lockers can be set up with up to 2 GB of storage for the same cost/fees as for regular unity space. External USB drives are readily available, at low cost, with up to 500 GB of space and 1 TB drives are just around the corner. The disadvantage of USB drives is that they are typically stored in the same area with the computers they are serving as backup storage for, not something approved of in disaster recovery guidelines. Having multiple drives, rotated a weekly or semimonthly basis, and the drive(s) not currently in use being stored off campus, or at least in another building, would make this scheme much more robust in case of damage to a laboratory or a building. There are commercial firms that will archive data. Amazon is one of the recent companies to enter into this business. Amazon charges \$0.15 per GB per month for storage and \$0.20 per GB of data uploaded/downloaded. [On June 1, 2007 upload fees will drop to 0.15 per GB and download fees will change to \$0.18 per GB - first 10 TB / month data downloaded; \$0.16 per GB - next 40 TB / month data downloaded; \$0.13 per GB - data downloaded / month over 50 TB]. To store 1 TB on Amazon for one year would cost $\$0.15/\text{GB}/\text{month} \times 1,000 \text{ GB} \times 12 \text{ months} = \$1,800$ plus \$200 ($\$0.20 \times 1,000$) to upload the data. The campus estimate of \$2000/TB/year is equivalent to what Amazon charges. As with the campus system, you have to pay to maintain the data. More information on the Amazon service can be found at <http://aws.amazon.com/s3>.

Barry Erikson advised against our setting up any kind of server of our own. The necessity of off site replications/backup to meet disaster recovery guidelines is expensive to provide for.