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## **Campus Computing News**



IT Shared Services: *More* questions answered here.

By Claudia Lynch, Benchmarks Onlin Editor

 ${f T}$ he Shared Services Initiative, as we reported in this column last month, is "a collaborative system-wide governance model for Information Technology and Human Resources functions." Michael Di Paolo (pictured), Associate Vice Chancellor and Chief Information Officer for the UNT System has produced a series of FAQs to answer questions staff members may have about shared services and their place within UNT and/or the UNT System.



## **CITC Support for UNT: What's still** local?



By <u>John Hooper</u>, Acting Vice President for Information Technology and CIO for UNT, Deputy CIO for the UNT System

On September 1, 2011 the employees of UNT's Computing and Information Technology Center who were providing and supporting shared services were moved, organizationally, to the UNT System. The question many people have now is, "What's

still local?"

Read more



# **High-Performance Computing Research Update**



By Dr. Scott Yockel, HPC Services Manager

In the past 12 months, since I have been in the position of HPC Services Manager, I've witnessed first hand the tremendous

growth of research computing here at UNT. There has been a growth of over 50% in new research groups whose numerically intensive computations are now being performed on Talon, as opposed to desktop computing. With this growth CITC has

#### By the Numbers

#### CITC Help Desk Activity, 2010-2011:

Total support contacts: 39,768

Support contacts by contact type:

- Phone: 25.034 - E-mail: 10.600

- Ticket: 2169 - Walk-in: 1293

Support contacts by institution:

- UNT: 95%

- UNT Dallas: 3% - UNT HSC: 1%

- UNT System: 1%

Support contacts by service category:

- Identity Management: 17.403

- Blackboard Vista: 5,850

- UNT CITC Receptionist: 3,748

- General Tech Support: 3,344

- EagleConnect: 2,578

- EagleNet: 2,250

- MyUNT: 2,090

- Admissions/Registration: 1,147

- Student Acct/FinAid: 588

- Other: 454

- UNT Employee Email: 316

http://it.unt.edu/benchmarks/issues/2011/09/news[4/28/16, 12:45:54 PM]

begun expanding Talon to service the needs of the HPC research community.

Read more 

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# What We Did This Summer: General **Access Computer Lab Edition 2011**



 $By\ \underline{Dr.\ Elizabeth\ Hinkle-Turner}, Assistant\ Director\ -\ Academic\ Computing\ and\ User\ Services$ 

Though it seemed like the majority of folks this summer were expending the most energy simply trying to beat our recordbreaking heat, IT personnel in general and General Access Computer Lab (GACL) management in particular got several large and small projects completed to enhance this popular and

still-necessary service.



# **EIS Status Report**



By Claudia Lynch, Benchmarks Onlin Editor

The latest issue of the Enterprise, Enterprise Information System Status Update, is now available.







Click on the link above for an information age laugh.





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# **Campus Computing News**



IT Shared Services: *More* questions answered here.

By Claudia Lynch, Benchmarks OnlinEditor

 ${f T}$ he Shared Services Initiative, as we reported in this column last month, is "a collaborative system-wide governance model for Information Technology and Human Resources functions." Michael Di Paolo (pictured), Associate Vice Chancellor and Chief Information Officer for the UNT System has produced a series of FAQs to answer questions staff members may have about shared services and their place within UNT and/or the UNT System.

We published the first two FAQs last month:

- 1. IT Shared Services FAQs 07-25-2011.pdf
- 2. IT Shared Services FAQ #2.pdf (This answers employee questions arising from the first FAQ.)

A third FAQ was issued the week of September 9:

• IT Shared Services FAQ #3.pdf

In an e-mail message introducing the third FAQ, Di Paolo said:

Attached is IT Shared Services FAQ #3 that answers additional employee questions about IT Shared Services. I hope that these questions and answers help you understand the impact of the transition.

If anyone has additional questions, please forward them to me directly so I can answer it for everyone. If it's a personal question, please pose it to either myself or your campus CIO (Wil Clark, Dr. Renee Drabier, or John Hooper).

UNTHSC CIO and Directors, please forward this FAQ #3 to your staff.

Thanks.

Michael

#### Michael Di Paolo

Associate Vice Chancellor Chief Information Officer University of North Texas System 817.308.3211

michael.dipaolo@unt.edu

#### An Interview with Michael Di Paolo

The <u>August issue</u> of *The Enterprise, Enterprise Information System Status Update*, includes an interview with CIO Di Paolo by Cathy Gonzalez, Editor of *The Enterprise*. Gonzalez sat down with him in July "to discuss his thoughts after his first three months on the job." Click <u>here</u> to read the interview.

Attachment	Size
IT Shared Services FAO3.pdf	314.69 KB





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## CITC Support for UNT: What's still local?

By John Hooper, Acting Vice President for Information Technology and CIO for UNT, Deputy CIO for the UNT System

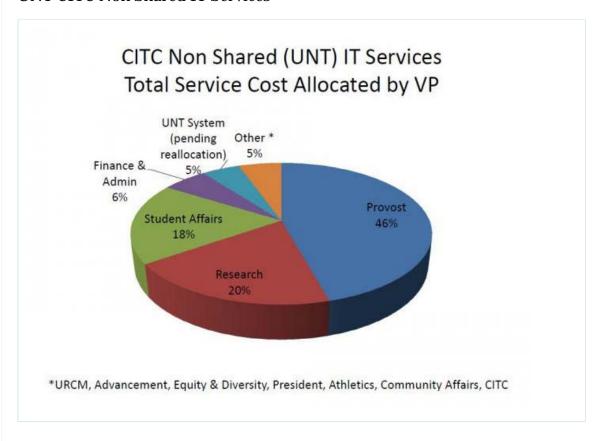
On September 1, 2011 the employees of UNT's Computing and Information Technology Center who were providing and supporting shared services were moved, organizationally, to the UNT System. The question many people have now is. "What's still local?"

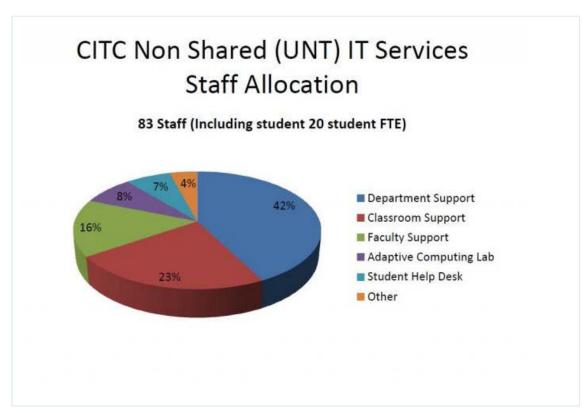
The information that follows is taken from a presentation given to the Distributed Computing Support Management Team (DCSMT) on Friday, September 16.

#### **IT Shared Services Overview**

- Service Catalog Completed by October 1, 2011.
- Organizational Splits of Personnel Decided for 2 Waves.
  - Wave 1 September 1, 2011 for all currently shared functions.
    - 180 UNT IT employees notified August 19th.
    - Town Hall meetings with IT Directors and Managers completed.
    - Frequently Asked Questions documents provided to all employees.
    - · Culture and norms team engaged.
    - · All hands meeting later this month.
  - Wave 2 December 1, 2011 for local functions that will be shared.
    - Eight teams, 5 led by UNT IT Directors, 3 led by UNTHSC IT Directors, making recommendations by October 15th.
    - Wave 2 employees will come from UNT, UNTD and UNTHSC.
- Campus-Specific Local functions will remain campus-based due to their unique needs (e.g., UNT Housing System, UNTHSC Clinical System, etc.)
- Some Local functions can one day become shared (e.g., Classroom systems).
- Organizational Structures being defined and will be rolled out prior to the Towers Watson HR Study that begins in Late October.
- New Governance Model proposed for implementation late fall 2011.

#### **UNT CITC Non Shared IT Services**





## **Departmental Support (AITS)**

• Desktop support for all 11 VP's, president's office, UNT System, all non-academic units

- 3200 desktops, 600 laptops, 90 Apples
- 450 printer /copiers
- 30 cash registers Cameras, access control, tablets, etc.
- Services provided in 40 buildings
- 100 servers (Mostly virtualized)
- Application administration
  - -Dining services including PCI compliance
  - -Health Center
  - -Housing-Access Control
  - -OGC
  - -Internal audit
  - –Facilities

#### **Classroom Support & Microcomputer Maintenance**

- Classroom Support Services—294 rooms including 24 in the new BLB—Standard configuration with PC's, visualizers, projectors, clickers—Piloting lecture capture with CLEAR—Room security
- Microcomputer Maintenance Shop-On site warranty repairs for Dell and Apple-13500 devices supported

## **Academic Support**

- High performance computing
- Student help desk
- Adaptive computing lab
- Research & statistical support services
- Computer classroom management (RP)
- Visualization
- Statistical software license administration
- Data management Surveys, exams, etc.

• Student computing services advocate

For more information about IT Shared Services, see the Campus Computing News article in this issue of Benchmarks

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## **High-Performance Computing Research Update**

By Dr. Scott Yockel, HPC Services Manager

In the past 12 months, since I have been in the position of HPC Services Manager, I've witnessed first hand the tremendous growth of research computing here at UNT. There has been a growth of over 50% in new research groups whose numerically intensive computations are now being performed on Talon, as opposed to desktop computing. With this growth CITC has begun expanding Talon to service the needs of the HPC research community. In the past year, we saw a huge demand for largest memory compute nodes (64GB) and have now added 24 of Dell's R410 servers (which include the Intel® Xeon® Processor X5650 with 12 cores) to bring the count to 56 nodes with 64GB of memory. Additionally we added a "fat node" with 256GB of memory (a Dell R910 with four Intel® Xeon® Processor X5650 for a total of 32 cores); this is the largest single computing node on campus. Many of the computational chemistry are excited about this addition as it will allow for accurate thermochemistry of much larger chemical systems to be computed, where many of the matrix elements will be able to stored in memory instead of swapped out onto disk. Calculations which store arrays in memory instead of disk are at least 10x faster.

Additionally, we have added the first compute nodes on campus with an Nvidia's Tesla M2050 GPU computing module; these include 448 GPUs per node! Software codes with CUDA instruction sets have the ability for a 30x speed up in computation time. Professor Tom Cundari hopes that this speed up will allow his groups enzyme kinetics simulations to run long enough (hundreds of nanoseconds) to be able study in detail the temporal effects on catalytic activity as experimentalist have hinted at. Professor Krishna Kavi's group is currently working along side of Oak Ridge National Laboratory to develop tools to help streamline the process of writing software codes for this type of hybrid CPU/GPU nodes and will finally have a resource on campus for a test bed.

## The dawn of a new age ...

We are also at the dawn of a new age of computing on campus which is not numerically intensive, but data intensive. A pilot program for a centralized large-scale research storage solution has also begun that will include hundreds of TB of storage. This storage solution is intended for researchers with single data sets larger than 1 TB, and will continue to need easy access to this data throughout their funded project. This storage solution will be interfaced with Talon so that compute intensive research can be performed without the timely process of transferring TBs of data over traditional Ethernet. Lastly, this storage solution will be expandable, and researchers will have the option to use grant money to purchase allotments of dedicated storage beyond the shared storage space. The HPC Services Team is excited about the opportunity this opens up for a whole new direction in research computing at UNT.

## Questions?

Contact me:

Scott Yockel, PhD **HPC Services Manager** Academic Computing and User Services - CITC University of North Texas http://citc.unt.edu/hpc/

Office: 940-565-3882, ISB 126











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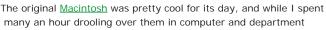
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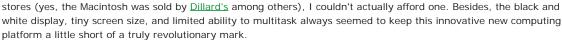
## **Network Connection**

By Dr. Philip Baczewski, Director of Academic Computing and User Services

Why do the Good (Technologies) Die Young?

Perhaps some day I should be named the patron saint of orphaned computing technologies. Given the chance, I'll alway pick technological elegance over the popular or monopolistic. After years of receiving scorn for being a Mac User, Macs are finally cool, but unfortunately I've left a sad trail of other devices that were ground breaking in their day, but either could not get a foothold in the marketplace or were managed into oblivion by the companies that produced them.







A year after the launch of the Macintosh came the Commodore Amiga which seemed to address many of the deficiencies that held me back from being an initial Macintosh devotee. Originally conceived as a game console, the Amiga featured stunning color graphics, animation and video editing, a unix-based multitasking graphical operating system (think Mac OS X, but 16 years earlier), and four-channel sound. This magic was achieved by integrating special-purpose chips (Agnus, Denise, and Paula) with the Motorola 68000 CPU to offload video and sound processing and provide greatly enhanced performance.

These Amiga technologies were the best available for the price at the time, and I was able to scrape enough credit together to get myself an Amiga 1000 when they were released in 1985. When the less elegantly-designed but harddrive supporting Amiga 2000 was released, I traded in my 1000 and eventually expanded it to boot from the hard drive. (In those days, most personal computers booted and read their software from floppy disks, which led to a ballet of disk swapping when you wanted to change software or save data.) I still have my Amiga 2000, although I'm not sure it will still boot up, since it's been years since I've tried.

The Amiga was quite successful in the late 1980's selling over 6 million units with a particular popularity in Europe, a land yet to be conquered by the evil empire from Redmond. Unfortunately, the Amiga's downfall was Commodore's incompetence. Lacking the marketing skill of Apple, the luck of Microsoft, or the technological persistence of IBM, Commodore was bankrupt by 1994. In the meantime, I had managed to complete my dissertation in Amiga Wordperfect 4.1 and had produced several musical scores in <u>Dr. T's Copyist</u>. But, in 1994, I succumbed to an Apple Macintosh 7100 AV, running the old and crusty original Mac OS, but that could produce music and video as well as connect to the Internet, but I've never lost my fondness for the Amiga.

#### WebOS ...

So fast forward to 2009. After living though a couple of Palm Treo smart phones (a combination of a Palm Pilot PDA and cell phone), I adopted the Palm Pre as my new smart phone of choice. The Pre runs a multitasking operating system called WebOS which is based on a Linux kernel with a graphical interface that features the multi-touch gestures that are now common to smart phone interfaces. While not as voluminous as the iPhone world, WebOS as always had an active developer community, with a "home brew" movement that has extended the capabilities of the kernel and developed some clever applications and utilities such as a shell interface to the underlying operating system.

Unfortunately, the Pre which was supposed to be Palm's savior was hampered by the iPhone's two year head start and tremendous popularity. Sprint, which introduced the Pre as its counter to AT&T's iPhone soon wandered away from it in favor of a stable of <u>Android</u> phones and Palm's fortunes diminished further. However, in April 2010, Hewlett-Packard acquired Palm, and it seemed that WebOS had found a home within an established technology company that had the resources to develop WebOS to its full potential. HP announced several new phones as well as a tablet planned to run WebOS. HP also had plans to integrate WebOS into its Windows PCs which would have bolstered the WebOS developer community and made the applications even more useful by removing barriers between the mobile world and the desktop OS.

HP introduced a tablet running WebOS on July 1, 2011. The <u>TouchPad</u> runs version 3 of WebOS and has features that are unique in the mobile arena. WebOS has always featured true application multitasking, something that only came to the iPhone in it's fourth iteration. WebOS Synergy melds contacts from multiple sources into a unified address book. Type-to-search allows you to just type a name or phrase from the home screen and find it wherever it appears in contacts, notes, web search engines or application names. This makes for a very efficient interaction with the device. The TouchPad uses the same Touchstone technology as the Pre that allows the phone or tablet to charge via magnetic induction -- just set the device on the charger and it will recharge without the need to connect a USB cable.

WebOS is just good technology and Palm and HP have produced some elegant hardware on which it runs. I eagerly awaited the Pre 3, a slightly larger version of the original Pre and Pre 2 which was expected in October 2011 and I was even prepared to change cell phone service providers to get it. I decided to take the plunge into the tablet world in early August and the TouchPad was not a disappointment. A solid piece of hardware with the same elegant interface I'd come to know on my original Pre, I was quite pleased with my new acquisition. Quite pleased until August 18, 2011 when HP inexplicably announced they would be suspending all production activities on WebOS devices, and were intending to sell off their consumer desktop/laptop computer business. Their plans for WebOS remain unclear.

#### Take Note



So once again the superior technology loses out to the quasi-monopolistic popular standard, due to incompetent management at worst or just a lack of patience at best. With their recent announcement, HP has removed any incentive to buy their desktop and laptop computers since it is unclear what the future of those devices may be (I hope Dell sent a thank you card.) Frankly, I don't have much confidence in HP as a company any more either. They may remake themselves as did IBM or they may just manage themselves into obscurity, following the lead of Palm, the company whose technology they saved. And I have a brand new tablet with no apparent technological future. But at this point, I'm used to it. I'll just have to get out my Apple Newton and make some notes about this situation.





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#### Parking: You may have more options than you think

Parking is always high on the list of things people complain about on college campuses, UNT included. This year UNT folks have a new parking option on campus, the Highland Street Parking Garage. The Parking and Transportation Services offices have moved to the ground floor of the Highland Street facility. The entrance to their offices is on Avenue A, across from the new Business Leadership Building.

Other services available, according to Joe Richmond, Director of Parking and Transportation Services, are:

· Parking lots for faculty and staff include D and A lots -- permits are required.



- A pre-loaded meter value card an excellent option for students or anyone who is on campus for short periods. Meters are available on streets around campus, and the cards are available from the parking office.
- DCTA operated Shuttle Bus Service fare free with a valid UNT ID in Denton.
- DCTA A-Train services special rates for UNT students, staff and faculty.
- DCTA Connect, local bus service fare fee with a valid UNT ID.
- Rideshare a free web-based matching program to arrange carpools.
- Bicycle the campus has space for more than 2,500 bikes.

Noteworthy also is the e-ride Late Night Transportation Service for students. According to the Parking and Transportation website "Students are able to request late night transportation between locations on the main campus, Discovery Park, Mean Green Village and Victory Hall campuses by making a call to the dispatcher at 940-565-3014." The service is available from 9 p.m. to 2 a.m., 7 days a week.

Last but not least, it's also a good idea to check Facilities' construction reports periodically for changes in parking and general accessibility to various areas.





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## Helpdesk FYI

By Jonathan "Mac" Edwards, CITC Helpdesk Manager

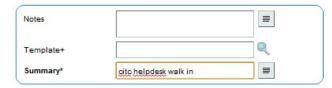
#### Using the Modify All Function in ITSM 7.6 (Remedy)

In the new version of Remedy there is a new modify all option that allows you to make changes to many tickets at once. This can be especially helpful when you need to assign or resolve a number of similar tickets at once.

Open Remedy and chose Search.

This will open the Incident (search) window.

In our example we will search for "CITC Helpdesk Walk In" from the Summary field.



#### Click Search.

The Search results will appear near the top of your screen. Shift-select the tickets you wish to modify, or click Select All, and then click Modify All.

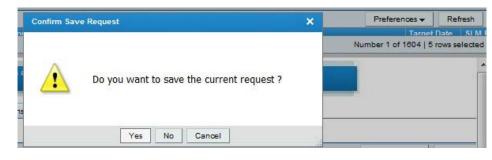


You can now make the desired ticket changes, in our example we will choose to Resolve the ticket.

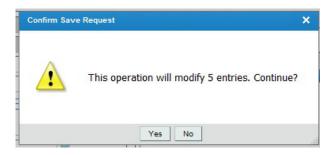
Choose Status\*: Resolved, then choose your Status Reason. In this example all of the tickets already have a resolution entry so one is not needed.



To save your changes you will need to click on the Refresh option in the top right corner of the screen. A Confirm Save Request will appear, click Yes.



Another Confirm Save Request window will appear, click Yes.



The Modify All operation may take a few moments, once it completes all of your tickets will now be modified.





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## **IRC News**

Minutes provided by Christine Valenzuela Recording Secretary\*

The IRC -- unofficially now known as the INFORMATION TECHNOLOGY COUNCIL (ITC) -- is currently undergoing a reorganization, see the May 20, 2008 minutes for more information.\*\*>

No IRC/ITC minutes were available for publication this month.

\*For a list of IRC Regular and Ex-officio Members click here (last updated 12/12/08). Warren Burggren is now the

\*\*DCSMT Minutes can be found here.





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#### RSS Matters

# Research and Statistical Support **University of North Texas**

# Go Forth and Propagate: Book Recommendations for **Learning and Teaching Bayesian Statistics**

Link to the last RSS article here: Multinomial Logistic Regression -- Ed.

By Dr. Jon StarkweatherResearch and Statistical Support Consultant

If you've read more than a couple of these RSS Matters articles, then you have likely noticed we, rather unapologetically, advocate two things frequently: 1.) using the R statistical programming language environment, and 2.) using the Bayesian statistical paradigm. The current article recommends some books (not just textbooks) which can be used to hoist oneself into the wonderful world of Bayes. This article was motivated by the publication of a few books this year (2011) which offer some unique insights and benefits to those seeking to understand (and teach) Bayesian statistical inference.

There have always been Bayesian materials available of course, dating back to the Reverend Thomas Bayes himself (1701 – 1761), and to some extent Pierre-Simon Laplace (1749 – 1849). During most of the 20<sup>th</sup> century, the frequentist perspective has dominated and as a result, there were relatively few Bayesian texts published. The Bayesian texts published during this time were often obscure and not widely distributed (e.g., Jeffreys, 1939; 1948). These texts kept Bayes alive and offered invaluable resources for those who happen to need them for practical problem solving and inferential decision making (e.g., Stone, 1975). However, beginning with the last two or so decades of the 20<sup>th</sup> century, the advent of relatively cheap but substantial computing power has allowed a resurgence of the Bayesian perspective. It seems inevitable that the Bayesian perspective will supplant the frequentist perspective as the most used statistical paradigm in the near future. For that reason, it seems equally appropriate that we should be advocating the adoption of the Bayesian perspective to professional researchers and instructors at both the graduate and undergraduate levels. In order to facilitate that adoption, it is often necessary and convenient to have a few texts which can be used as instructional materials - both for researchers and instructors, as well as the students enrolled in statistics classes. Below, we begin by offering some recommendations for a couple of recent books which describe the history and philosophical underpinnings of the Bayesian perspective. Then, we recommend some books which are general treatments of Bayesian statistical analysis. Next, we recommend books we have come across which offer more domain or field specific treatments of the Bayesian perspective.

## **History & Philosophy**

One of the books which was published this year which also motivated this article and composition of the listing(s) below was McGrayne's (2011) book discussing the history, application, spread and future prospects of Bayesianism. It is important to note that McGrayne's book is not a textbook and does not attempt to teach Bayesian inferential techniques. Rather, McGrayne offers a very thorough, informative, and often entertaining (in our humble opinion) discussion of the Bayesian perspective. The book discusses how Bayesianism developed, was dismissed as not terribly useful (without computers capable of making the necessary and intensive computations), and it's sporadic but extremely important applications during World War II, as well as its recent resurgence. As mentioned, McGrayne's book is not a textbook, but it is strongly recommended as it provides the theoretical underpinnings of the Bayesian

perspective and shows how Bayesianism has been applied to *real world* inferential / statistical problems – often with great success.

Bayesianism is sometimes considered a learning strategy as it is much better suited to the (empirical) accumulation of knowledge than the traditional frequentist perspective. Williamson's (2010) book covers Bayesianism from a philosophical and epistemological approach, discussing the philosophy of science implications of, and justifications for, the Bayesian perspective. Williamson's book deals with empirical theory building, based on probabilities, as well as the notion of priors and the researcher's (agent's) ability to use them to empirically express uncertainty.

#### General Introductions to Bayesian Statistics

The books in this section offer a general introduction to Bayesianism, without field or domain specific applications; although they all have application examples, the books are not tailored to fit into a specific field (e.g., biology, political science, etc.). Generally, these books are written by individuals who work as applied statisticians, either as faculty or as researchers (i.e. they do not tend to be theoretical statisticians). The purpose of such books is to introduce the Bayesian perspective to individuals who are interested in statistics; primarily students, at the undergraduate and graduate level.

Berry (1996) was one of the earlier texts (of those mentioned here) to be used as a statistics course textbook and although it is a bit dated now, it offers a very familiar structure to those who have been exposed to traditional applied statistics textbooks. The book briefly advocates Bayesianism by pointing out its advantages over the frequentist perspective. Berry's book is designed to be an undergraduate textbook and begins with chapters which reflect that audience. The initial chapters cover topics such as; Statistics and the Scientific Method, Displaying and Summarizing Data, Designing Experiments, and Probability. Only then does the book progress to Bayes Rule. The book is fairly limited in its reach, with the last few chapters covering Comparisons of Two or More Means, Data Transformations and Nonparametric Methods, and Regression Analysis. The limited reach is a benefit; because, it allows each chapter to progress at a gradual pace which facilitates thorough coverage of each chapter's content. Also, as stated in the book itself, use of a computer is not necessary with the book. However, a 3.5" disk containing some Minitab program codes, as well as all the necessary data files, is included.

Bolstad (2004) is a book which is similar to Berry (1996) from above, in that Bolstad is targeting undergraduate students in a first course of statistics. Bolstad is, clearly: updated, and uses both Minitab and the R statistical programming environment, but like Berry in that both books rely primarily on hand calculation for examples (end of chapter exercises are designed to be done with a computer). One advantage to Bolstad is that his book contains some comparisons between frequentist and Bayesian results / inferences.

Hoff (2009) represents a relatively common style of book which is intended for graduate students of the first or second year. Hoff's book begins with some introduction to Bayesianism and probability, and then transitions into more practical applications – with one-parameter models appearing in Chapter 3. The book utilizes the R statistical programming environment and covers topics such as the Monte Carlo method, Gibbs sampling, multivariate analysis, and hierarchical modeling. Linear mixed effects models and latent variable modeling round out the book in the last few chapters. Other similar texts designed for graduate students in a first course of statistics are available; such as Ghosh, Delampady, and Samanta (2006) as well as Marin and Robert (2007).

Congdon (2006) offers a more narrowly focused approach, specifically toward Bayesian statistical modeling. This book is geared toward more advanced learners (not just students) and assumes more in the way of statistical knowledge than the books mentioned above. The book utilizes the WinBUGS software and at nearly 600 pages and 15 chapters it provides a fairly exhaustive review of modeling techniques in order to allow the research to fit the model most appropriate to the data. Congdon (2005) also has a Bayesian text specifically for the treatment of categorical data. Both books offer chapters on such important, but often not covered, topics as dealing with missing data.

A book which offers a relatively gentle introduction to Bayesian statistics comes from Lee (2004). Lee covers some common Bayesian analysis techniques while using examples from a variety of fields (e.g. biology, political science, etc.). Because of the varied examples, the book is accessible for a variety of audiences / readers. Lee uses primarily the R statistical programming language environment (as well as some WinBUGS) and maintains a website in support of the book (http://www-users.york.ac.uk/~pml1/bayes/book.htm).

Albert (2007) offers an extremely useful book simply titled *Bayesian Computation in R*. As the title suggests, the Albert book is not a textbook *per se*, rather it is more like a reference book, in that it offers a tutorial style for applying Bayesian methods in the R statistical programming language environment. For those unaccustomed to R, the first chapter offers a brief introduction to the software and provides references for other sources specific to the use of R. Chapter 2 provides an introduction/overview of the Bayesian perspective and subsequent chapters focus on types of Bayesian analysis (e.g. one-parameter models, Markov Chain Monte Carlo [MCMC] methods, regression models, hierarchical models, etc.). An additional benefit to using Albert's book is the R package he created and maintains for the book, <u>LearnBayes</u>.

For those seeking a more technical exploration of the *nuts and bolts* of Bayesian inference, see Tanner (1996) which provides derivations and formulaic presentations of most algorithms used to construct posterior distributions and likelihood functions. It is not for the faint of heart; or more precisely, it is not for the faint of math.

#### Biology, Ecology, Genetics, and Medicine

It seems as though the bio-oriented fields have embraced Bayesianism more so than some other fields. As such, there are several Bayesian texts available which are directed toward researchers and students in biology based fields.

Perhaps the most comprehensive of the bio-based books mentioned here is Sorensen and Gianola (2002), which covers a variety of inferential methods and is tailored for the study of genetics. Sorensen and Gianola do not recommend (or use) a specific statistical software and instead show all the elaborate formulas or mathematical and algebraic proofs (i.e. "giving step-by-step derivations and fully worked-out examples" p.vi). As such the authors recommend "some mathematical and statistical prerequisites...in order to be able to extract maximum benefit from the material presented in this book" (p. vi). The benefit of this approach is that each chapter is lengthy and covers each topic extensively; leading to a rather substantial volume of 758 pages. Another bio-oriented text which focuses on genetics is *Bayesian Analysis of Gene Expression* (Mallick, Gold, & Baladandayuthapani; 2009). Mallick et al. also do not advocate or use particular statistical software, but they do cover such topics as False Discovery Rate and clustered data analysis.

Woodworth (2004) offers what might be considered a less intimidating treatment of Bayesian statistics for the biooriented researcher. Woodworth's book utilizes SAS, WinBugs, and MS Excel; and although the book is not as extensive as Sorensen and Gianola (2002), it does offer some additional benefits. First, there is a companion web site <a href="http://www.stat.uiowa.edu/~gwoodwor/BBIText/Index.html">http://www.stat.uiowa.edu/~gwoodwor/BBIText/Index.html</a> which contains data sets and computer codes, as well as sample exams and computer exercises. Second, it does not assume as much prior knowledge of statistics.

Another highly recommended book is Bolker's (2008) text, *Ecological Models and Data in R*. Bolker offers one of the most down-to-Earth introductions to Bayesianism we have come across. Another positive of the Bolker book is the treatment of frequentist methods, as well as maximum likelihood methods, even though the text focuses primarily on Bayesian methods. The book covers a range of topics from the simple to the complex, and as the title suggests, it uses the R statistical programming language environment. Bolker also maintains a website for the book (<a href="https://www.math.mcmaster.ca/~bolker/emdbook/index.html">https://www.math.mcmaster.ca/~bolker/emdbook/index.html</a>) which contains exercises, data, and R code.

Link and Barker (2010) also offer an introduction to Bayesian statistics from the ecological perspective. Link and Barker also use the R statistical programming language environment and BUGS. They maintain a website for the book (<a href="http://www.maramatanga.com/LinkandBarkerBook/Book.php">http://www.maramatanga.com/LinkandBarkerBook/Book.php</a>) which includes code, data, and errata. The book assumes some (limited) prior knowledge of statistics. Still, the book represents a very gentle introduction to the Bayesian analysis of ecological data types and methods; including Closed-Population Mark-Recapture Models (Chapter 9), Latent Multinomial Models (Chapter 10), Open Population Models (Chapter 11), Individual Fitness (Chapter 12), and Autoregressive Smoothing (Chapter 13).

Other examples of bio-oriented Bayesian statistical texts are relatively plentiful. One such example is *Bayesian Biostatistics and Diagnostic Medicine* (Broemeling, 2007), which uses WinBUGS and Minitab and is primarily directed at research into diagnostic testing accuracy, agreement, and treatment efficacy. Another narrowly focused text, within the bio-oriented arena is *Bayesian Adaptive Methods for Clinical Trials* (Berry, Carlin, Lee, & Muller; 2011). As one of the books published this year, this book presents some of the more modern approaches to Bayesian analysis, thanks in large part to the constantly advancing progress made with the R statistical programming language environment; which the book uses along with WinBUGS. Finally, Day, Ghosh, and Mallick (2011) offer a book with a wider bio-oriented audience in mind. As an edited book, each chapter presents a different group of authors' take on a specific topic. The topics/chapters are each thorough in their treatment of the topic they cover and each is approached from a strong biological perspective. The focus of the book is on Bayesian modeling and therefore it is recommended for an audience with some previous statistical background.

#### **Political Science**

One author well known in Bayesian statistical circles, as well as the R community, is Andrew Gelman of Columbia University. Gelman and colleagues have published several books and articles related to Bayesian analysis and he (Gelman) maintains a very active blog dedicated to (primarily) "Statistical Modeling, Causal Inference, and Social Science". In terms of book recommendations, there are three which will be strongly recommended here; regardless if the reader is interested in political science. First, one of the most frequently used/cited texts for Bayesian statistics is simply Bayesian Data Analysis (2<sup>nd</sup> ed.; Gelman, Carlin, Stern, & Rubin; 2004). This book is very useful for a variety of reasons, primarily because it covers such a variety of topics well. The first sentence of the Preface gives one an idea of the multifaceted nature of this book: "this book is intended to have three roles and to serve three associated audiences: an introductory text on Bayesian inference starting from first principles, a graduate text on effective current approaches to Bayesian modeling and computation in statistics and related fields, and a handbook of Bayesian methods in applied statistics for general users of and researchers in applied statistics" (Gelman et al., p. xix). As the authors advise, this book has many intended purposes and can be used as a reference text; or using select chapters, as a text for either an advanced undergraduate class or a graduate class. In short, there is very little lacking from this book and researchers would likely find it very useful regardless of field or study design.

Second, Gelman and Meng (2004) is an edited book which contains a great deal of practically useful techniques for *Applied Bayesian Modeling and Causal Inference from Incomplete-Data Perspectives*. As the title suggests, this resource is directed toward modeling situations in which, as is often the case, missing or messy data is at hand. The text has four sections with the first generally addressing observational studies, quasi-experimental designs, and

'broken' experiments. Topics such as propensity score analysis, stratification, and sensitivity are covered in the chapters of section two; while section three covers modeling and section four covers applied Bayesian inference methods. Although this book is listed here in the political science section of this article, it should be noted that each chapter is written by a separate group of authors and often the chapters approach a topic from a specific field other than political science.

Third, Gelman and Hall's (2007) text is recommended not only as a general regression and linear modeling text, but also as a Bayesian approach to those subjects. The book offers a comprehensive review of linear and generalized linear modeling techniques from a Bayesian perspective. Like most published materials Gelman is a part of, it uses the R statistical programming language environment (and BUGS). The book is broken down into 5 parts (1A, 1B, 2A, 2B, & 3); single-level regression, working with regression inferences, multilevel regression, fitting multilevel models, and from data collection to model understanding to model checking. Multiple chapters flesh out each part of the book, allowing the reader to grasp concepts and application.

#### Education, Psychology, and Sociology

This section is directed toward what are typically lumped together as the 'social sciences'; meaning psychology, education, and sociology. However, they are distinguished here from political science and economics, which are also considered social sciences, but have specific books available for their respective fields. One of the books which was recently published and motivated this article was Kruschke (2011). Kruschke's Doing Bayesian Data Analysis is clearly directed toward an audience of education, psychology, and sociology instructors and their students. Instructors who have experience teaching statistics in these fields will recognize the general structure of the book as similar to countless (traditional frequentist) books designed for students of these disciplines. The book primarily uses the R statistical programming environment, but also uses BUGS, and is written with special care to be as easily digestible by a wide audience which may or may not have previous experience with statistics. Those familiar with traditional frequentist methods will find useful the author's direct referencing of those familiar methods when discussing their respective Bayesian counterparts (e.g., simple linear regression with its Bayesian counterpart covered in Chapter 16, t-test for two independent means and oneway ANOVA with their Bayesian counterparts covered in Chapter 18, etc.). The text covers essential components such as Bayes rule, power and sample size considerations, Markov Chain Monte Carlo (MCMC) methods, and writing up Bayesian results; as well as advanced subjects such as hierarchical models and generalized linear models. Kruschke also maintains a rather extensive website for the book (http://www.indiana.edu/~kruschke/DoingBayesianDataAnalysis/).

Another similar text which has as its audience the social science crowd is Lynch's (2007) *Introduction to Applied Bayesian Statistics and Estimation for Social Scientists*. The Lynch text is not as thorough as the Kruschke (2011) book mentioned above, but it too uses primarily the R statistical programming language environment and seeks to provide a basic introduction to applied Bayesian analysis for social sciences. Familiar key analyses covered include linear regression, generalized linear models, hierarchical models, and multivariate regression models. Throughout the text, as in Kruschke, mention is made of the traditional frequentist connection to the analysis covered, which makes both books very accessible to the newcomer to Bayesianism.

A third book aimed at introducing social scientists to the Bayesian perspective is Jackman's (2009) *Bayesian Analysis for the Social Sciences*. Jackman is a political scientist, but the book is listed here as it appears to have more in common with those directly above. Again, this text uses the R statistical programming language environment, and WinBUGS, and contains social science specific examples in great detail. The text has essentially three parts; Part one introduces the Bayesian perspective and principles, Part two covers simulations with Monte Carlo methods, Markov chains, and the combination of the two (each with a chapter), and Part three covers advanced topics such as hierarchical models, binomial response models, and multinomial response models. Jackman also maintains a website dedicated to the book and class he teaches with it (http://jackman.stanford.edu/mcmc/).

#### **Econometrics**

Econometrics as a field also has a variety of books which expound the Bayesian perspective. Koop (2003) offers a gentle introduction which is directed at the econometric audience. As stated in the preface, the book requires only a single course in calculus for the reader to benefit. Koop, understandably, focuses primarily on various forms of regression analysis; but, also covers topics such as time series, tobit and probit models; as well as Bayesian model averaging. The book recommends MATLAB and at the end of each chapter there are theoretical exercises and computer exercises.

Koop and colleagues (Koop, Poirier, & Tobias, 2007) also published a thorough volume of exercises which covers a great deal of research and analysis situations. Koop et al. is not necessarily a workbook *per se*, but offers a description, an exercise, and then a solution for each topic covered. The topics range from simple topics such as 'Conjugate normal analysis with known mean and unknown variance' (in Chapter 2) to more complex topics such as; asymptotic Bayes (Chapter 9), hierarchical models (Chapter 12), latent variable models (Chapter 14), mixture models (Chapter 15), and Bayesian model averaging (Chapter 16). Again, this book recommends and uses MATLAB.

Similar to Koop et al., (2007) is the book by Geweke (2005), which offers a technical introduction to Bayesian econometrics. The Geweke book is similar to Koop and colleagues in that it offers a vast array of well described and

detailed examples. Also like Koop and colleagues, the Geweke book uses a combination of software, primarily MATLAB, but also the Bayesian Analysis Computation and Communication (BACC) extension; as well as Splus and the R statistical programming language environment. Like other books mentioned above, the Geweke book assumes some exposure to statistics and calculus as it is aimed at professional researchers and graduate students.

Lancaster (2004) offers *An Introduction to Modern Bayesian Econometrics* which is designed for professional applied econometricians and advanced graduate students. Lancaster uses BUGS, Splus and the R statistical programming language environment. Lancaster covers basics of Bayesianism (prior, likelihood, posterior, model comparison, etc.), linear and nonlinear regression models, observational data studies, panel data studies, and time series. Thoughtful examples and exercises are given with plenty of code so that the reader may replicate what is in the text.

#### Marketing and Forensic Science

Rossi, Allenby, and McCulloch (2005) are direct in stating that their book is aimed particularly at marketing professionals and graduate students. Their book uses the R statistical programming language environment and specifically the package <u>bayesm</u> which they developed in support of the book. The book is essentially two books, with the first half focused on basic Bayesian concepts, Markov chain Monte Carlo (MCMC) methods, models for discrete data, hierarchical models, model selection and decision theory, and dependent error models. The second half of the book provides a series of very detailed case study examples (with R code and data available in the bayesm package); each of which focus on a realistic marketing study situation. The book also contains two appendices; the first covers hierarchical Bayesian modeling in R and the second provides documentation for installing and using the bayesm package.

Taroni, Bozza, Biedermann, Garbolino, and Aitken (2010) seek to introduce Bayesian inferential procedures to the forensic sciences and decision analysis. Taroni et al. make clear they are advocating the adoption of Bayesian methods for criminologists, forensic scientists, and those interested in decision analysis (e.g., court decisions). The book is divided into two parts, the first focuses on basic concepts and principles; while the second focuses on practical applications. The book uses the R statistical programming language environment to explore point estimation, interval estimation, hypothesis testing, sampling analysis, and classification. Although the Taroni et al. book does not cover a wide variety of Bayesian methods, it is significant as one of the first texts to address forensic sciences with the Bayesian perspective.

#### **Conclusions**

It should be noted that many more books are available for learning and teaching Bayesian statistics, only a few have been mentioned here. It was hoped that in producing such an annotated bibliography; professional researchers, faculty, and students would be motivated to find at least two books to begin implementing Bayesian methods – either in their own research or in their own classes. The phrase 'two books' is necessitated by the opinion that the McGrayne (2011) text is considered essential for anyone interested in Bayesian methods. Although we have tried to provide books from most academic and professional fields, we acknowledge that inevitably some fields were not represented by the books listed. However, the section on *General Introductions to Bayesian Statistics* provides recommended books which are applicable regardless of field. Having stated that, we encourage anyone who has suggestions for fields not represented to email those suggestions to this article's author. A copy of the reference list is (and will continue to be) maintained on the Research and Statistical Support's Do-It-Yourself Introduction to R website in the Bayesian section (Module 10). If suggested recommendations are received, they will be reviewed, and if approved, added to that list.

Until next time, I'll be tapping my foot for 20, Miles. \*

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## **Staff Activities**

#### **Transitions**

#### **New Employees:**

- Yonathan Khoe, ACUS/Adaptive Lab Manager. Yonathan has been employed in ACUS part-time as the Checkin Support Technician.
- Jackson Miller, Student Assistant, Data Communications (part-time).
- Andre Mardian, Student Assistant, Data Communications (part-time).
- Ting Ting Yang, ACUS/Adaptive Lab consultant (part-time).
- Douglas Swofford, ACUS/Adaptive Lab consultant (part-time).
- Sergio Tassinari, Programmer Analyst, Student Administration Business Analyst Team (AIS).
- Paul Durnin, CSS Tech, Classroom Support Services (part-time).
- Scott Hunter, CSS Tech, Classroom Support Services (part-time).
- Jeffrey Dale Jackson, Communications Specialist, Telecommunications, Communications Services.
- James Austin Martin, ACUS/Adaptive Lab consultant (part-time).

## No longer working in the Computing and Information Technology Center:

- Taylor Manning, CSS Tech, Classroom Support Services (part-time).
- Lauren Cater, CSS Tech, Classroom Support Services (part-time).
- Lee Wattron, CSS Tech, Classroom Support Services (part-time).
- Laura Smith, Student Assistant Data, Communications (part-time).
- Jackson Miller, Student Assistant, Data Communications (part-time).
- Trent Ryan, ACUS/Adaptive Lab consultant (part-time).
- Larry Talley, IT Manager, CITC Sharepoint Services.
- Vinitha Kulkarni, Webmaster, Enterprise Messaging and Directory Services Group (part-time).
- James A Gould, CSS Tech, Classroom Support Services (part-time).
- Sonal Manandhar, CSS Tech, Classroom Support Services (part-time).
- Donley Antoine, CSS Tech, Classroom Support Services (part-time).

## Changes, Awards, Recognition, Publications, etc.

#### Service to UNT

Congratulations to **Frank Arnold**, IT Programmer Analyst, Financial Information Systems (AIS), who celebrated **10** years of Service to UNT and Alan Parcel, IT Specialist, Enterprise Systems Technical Services, **5** years of Service to UNT. They were <u>recently recognized</u> in *InHouse*.

#### Accolades!

**Dr. Elizabeth Hinkle-Turner**, Assistant Director - Academic Computing and User Services, received a 2011 <u>ASCAP</u> grant. The award is for \$500 and recognizes creative contributions to American music in the past year. This is one of many ASCAP awards Hinkle-Turner has received through the years.

#### **Staff Council Representatives**

Representing CITC on the <u>Staff Council</u> this year is **Kristina Randolph**, IT Specialist, EIS Security Administration (EISSEC) and **Scott Windham**, Communications Manager, Data Communications, who is also Vice Chair of the Council. Your hard work is appreciated.

## Gone but not forgotten

Sue Ellen Richey, long-time staff member in Administrative Services, decided to retire completely. Her last day of work at UNT was August 31. She retired partially in 2005.





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# What We Did This Summer: General Access Computer Lab Edition 2011

By <u>Dr. Elizabeth Hinkle-Turner</u>, Assistant Director - Academic Computing and User Services

 ${f T}$ hough it seemed like the majority of folks this summer were expending the most energy simply trying to beat our record-breaking heat, IT personnel in general and General Access Computer Lab (GACL) management in particular got several large and small projects completed to enhance this popular and still-necessary service. Even though most UNT students have their own computers and mobile devices are ubiquitous on campus, the labs are busier than ever as students still need to print classwork and utilize high-level software applications that run best on the more powerful lab desktop machines. Entrance to the GACLs on the main campus and at Discovery Park is obtained by showing your valid picture ID but many of the machines are self-service-checkin meaning the end of long lines and logjams at the front lab desk. The GACL system features 14 labs across the main campus and the Discovery Park. All are open until midnight, many stay open until 2 AM and the labs in the Willis Library and Chilton Hall are open 24/7 and 24/5 respectively. All information about the GACL system including current lab occupancy, lab locations and maps, and lab rules and regulations can be found at gacl.unt.edu.

#### New! Checkin 5!

The biggest project completion of the summer will not even be a visible one: the formal launch of Checkin 5 - the access and security software for admittance to the labs and other regulated multi-user facilities on campus. Richard Sanzone, project manager for Checkin 5, provides much documentation about this application at this Checkin FAQ website. Checkin is UNT's "home-grown" resource access management system that has been utilized at the university since its initial incarnation in 1994 (interested geeks can find a complete past history of Checkin 1-4 at cbt.unt.edu/checkin/checkingenesis.html). Sanzone gives the additional following data about Checkin 5:

#### Checkin consists of two modules:

- 1) Standard Checkin: A web interface used by lab personnel to swipe a patron's ID card to process their access into a resource. There are currently 5,375 standard Checkin stations in Checkin5 (up from 5,137 in Checkin4).
- 2) iCheckin: A client installed directly on a lab station or kiosk that processes self-help logins. Checkin can be configured to qualify on enrollment data, such as major, courses and sections, and even username & password (on iCheckin stations). Clients are now available for WinXP, Win7, Mac OSX Leopard, and Mac OSX Snow Leopard. There are currently 746 iCheckin stations in Checkin5 (up from a peak of 345 iCheckin stations in Checkin4).

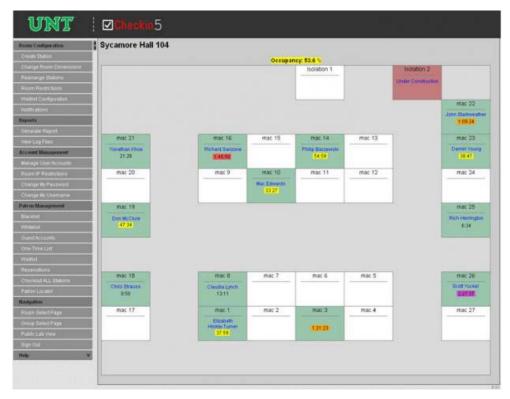
#### Who created Checkin5?

Checkin version 5.0+ project information:

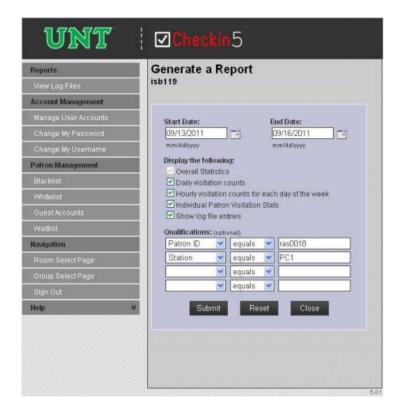
- Project manager, designer, and developer: Richard Sanzone, User Services Manager, CITC, University of North Texas
- Art, iCheckin clients for version 5, and overall design assistant: Yonathan Khoe, Checkin Support Technician, CITC, University of North Texas
- Checkin 5 was developed between September 2010 and August 2011
- The development project involved 3,000+ man-hours
- The Checkin 5 core is written in PHP

Checkin 5 is based off concepts of Checkin 4 and was designed as a complete replacement for that system. Many of the improvements to the system include enhanced security and account management, greater reporting features,

and better efficiency through improved server-side management. Additionally, lab managers can now customize their Checkin management "windows" to replicate the physical layout of their labs. Checkin also allows for the reservation of individual machines, rooms, and facilities:



Checkin lab screens now reflect the actual location of resources in the lab



Lab managers can generate usage reports much more easily in Checkin  $5\,$ 



Facilities and machines can be reserved ahead of time in Checkin 5

For further information about Checkin 5 and how it may help in your facility, contact Richard Sanzone at <a href="RichardSanzone@unt.edu">RichardSanzone@unt.edu</a>. A continuously updated list of new Checkin features is found at <a href="https://checkin.acs.unt.edu/help/updates">https://checkin.acs.unt.edu/help/updates</a>.

## Major Lab Moves and Upgrades

In addition to the major changes in Checkin, several facilities added new machines and services as well. The Willis 24-hour lab is now sporting 40 new 27-inch iMacs dual booting Lion and Windows 7. The lab also added Open Office and Chrome for both Mac OS and Windows as well as Audacity and Handbrake. The new Macs are quite popular with students - the Willis lab is a busy place!





Lots of students want to use the nice new Macs in the Willis lab!

It should also be noted that the Willis Library itself is now open 24/5 and the entire Willis building has expanded hours for access.

Another dramatic change involves the College of Business lab which has a whole new space over in the beautiful new Business Leadership Building. The lab - located on the main floor - has 123 machines in a lovely facility with lots of windows. The lower level of the building (classroom level) also features brand new kiosks:





The lab in the Business Leadership Building has lots of room and a great, open facility



Kiosks for use are located on the lower level by all the classrooms

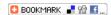
The College of Education made improvements to its outside kiosk area. Printing is enabled at the kiosks. Documents are limited to 12 pages or less and to the reprinting of the same document. Printing is black and white duplex. This handy printing and work area may not meet all the needs that going into the Matthews Hall lab might but for many students, these kiosks will be a great convenience for quick tasks.



The kiosks outside of the Matthews Hall lab have printing available

## Ready to Welcome Customers!

The College of Engineering replaced their older Dell machines at their Discovery Park facility with new machines (Optiplex 790s with Core i7 processors). The ACUS Adaptive Technology Lab has a new manager, Yonathon Khoe. Yonathan also works on the Checkin system and was a major developer of Checkin 5. Other labs (College of Arts and Sciences, College of Visual Art and Design, College of Music, College of Public Affairs and Community Service, College of Information) did their usual application upgrades and maintenance this summer. All the labs are ready to welcome back the students of UNT for another successful year!





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## **EIS Status Report**

By Claudia Lynch, Benchmarks Onlin Editor

 ${f T}$ he latest issue of  $\it the Enterprise$ , Enterprise Information System Status Update, is now available. Click on the link below to read about the CITC move to a UNT System function, Blackboard analytics. an interview with Chief Information Officer Michael Di Paolo, and many more informative articles.

https://eis.unt.edu/the-enterprise/2011/aug2011.htm





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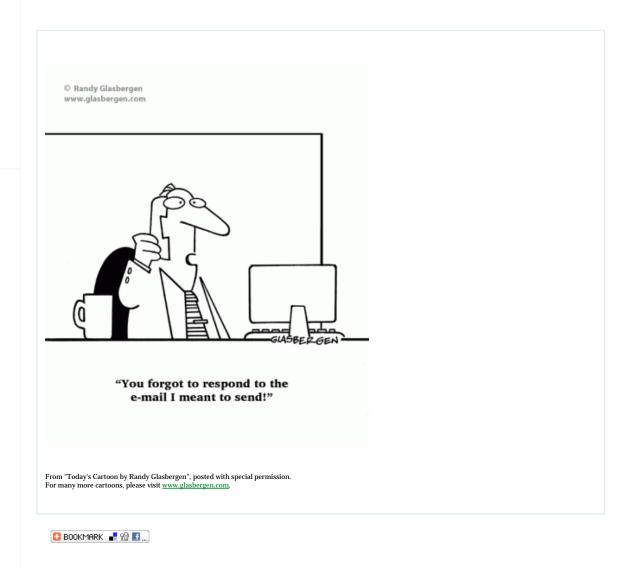
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# **Today's Cartoon**





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