

# COMPUTING NEWS

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UO and Verio hosted the 16th meeting of the North American Network Operators Group (NANOG) at the Eugene Hilton on May 23-25th. This meeting of the Internet's core network engineers covered the latest developments in network technologies, such as IP over DWDM, MPLS, network exchange points, network security and spam management, and many other topics. For information about the next NANOG meeting, which will be held in Montreal this October, see <http://www.nanog.org/>

# IP Phone Technology Arrives

By José Domínguez  
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You may have heard advertisements for cheap long distance services that allow you to call anyone, anywhere, for less than 10 cents a minute. Some of these services are made possible by a new technology, "Voice over IP" (VoIP), that allows long distance companies to use their data networks and the Internet to transport voice calls.

The technology itself is pretty simple: analog voice is coded, using one of the many available Coder-Decoders (CODECs), depending on the desired voice quality. Then it's bundled into IP packets and transported to the other end, where a decoder transforms it back into analog voice.

**VoIP at the UO.** During the past year, the University of Oregon Network Ser-

vices and Telecomm Services groups have been experimenting with this technology. Currently, we use VoIP to provide the Oregon Institute of Marine Biology (OIMB) with two tie trunks, replacing the existing Off-Premises eXtension (OPX). This provides OIMB with two tie trunks instead of one, and also saves them \$3600.00/year. Using the VoIP trunks allows us to interconnect our Lucent's Definity G3 PBX to OIMB's Merlin Legend key system. To provide these services, we're using equipment manufactured by Cisco Systems, a company known for its leading-edge networking solutions.

**IP Telephones.** We've also been experimenting with a purely IP solution for voice communications (usually referred to as an "UnPBX" solution), using a product from Selsius Systems, Inc. (Selsius was acquired by Cisco Systems last November.) The system, which is analogous to a PBX (but in an IP environment), comprises three components:

1. **A Call Manager** to handle phone configuration, call setup, and call routing.
2. **An Access Gateway** to route calls to and from the existing Public Switched Telephone Network (PSTN).
3. **IP telephones.** These devices look and act like regular telephones, but they connect to a data network jack just like your computer.

## Quality and Reliability

While the new technology sounds exciting, at this point it's far from being perfect. Quality and reliability are by no means assured.

**Voice Quality.** When deploying a VoIP solution, you need to choose an encoding/compression algorithm to encode/compress your analog voice. Voice quality is most often evaluated using a subjective measurement called the Mean Opinion Score (MOS). Using this method, a score from 4 to 5 is considered toll quality, 3 to 4, communication quality; and less than 3, synthetic quality. The most common options and their MOS scores are shown below:

- G.711 - Pulse Code Modulation (PCM). Wave form decoder. Used widely by voice carriers. Uses a rate of 64Kbps (4.4 MOS)
- G.721, G.723, G.726 - Wave form decoders. Adaptive Differential PCM. Also used by voice carriers. Running at rates of 16, 24, 32 and 40 Kbps (4.2 MOS)
- G.728 Low-Delay Code Excited Linear Predictors (LD-CELP). Toll-quality speech at a rate of 16Kbps (4.2 MOS)
- G.729 Conjugate-Structure Algebraic CELP (CS-ACELP). Provides near toll-quality at rates of 8 Kbps (4.2 MOS)
- G.729a A reduced-complexity version of G.729 (4.2 MOS)
- G.723.1 Another CS-ACELP at rates of 5.3 and 6.3 Kbps (3.5 and 3.98 MOS).

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*IP telephones may one day allow users to more easily move their telephones with them from one ethernet jack to another...or even run their phone through their computer if they choose.*

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**Delay.** Transmission/delivery delay is another important quality consideration. In transporting voice over a packet switching environment, delays play an important role. According to the International Telecommunications Union (ITU) guidelines, delays below 150 milliseconds are considered acceptable for most communications. Delays ranging between 150 and 400 ms could also be acceptable, depending on the voice quality desired, but over 400 ms is deemed unacceptable.

Delays on VoIP sessions are measured in two categories—fixed and variable:

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# on Campus

**1. Fixed delay.** Fixed delay can include

- *Propagation Delay*, the time it takes for the packet to be transmitted over the physical link. This delay is usually bound by physical characteristics of the transmission media (e.g., when using a fiber optic circuit, we would be bound by the speed of light).

- *Serialization Delay*, the time it takes to place the bits from the transmission buffer into the transmission media. The higher the speed, the less serialization delay.

- *Processing Delay*, which includes the time it takes to code, compress, decompress, and decode the voice signal, and the time it takes to collect enough voice samples to be placed on the payload for a data packet. This varies depending on the algorithm used.

**2. Variable delay.** An example of variable delay is Queuing Delay, the time a packet has to wait in a router before it can be serviced. This delay will occur at every router in the path of a VoIP session.

**Techniques to Improve QoS.** Several techniques can be used to reduce end-to-end delay and improve Quality of Service (QoS) for a VoIP network. They can be applied independently or as a set to keep delay below the recommended 150ms:

- *Dejitter buffer.* Jitter is the variation on packet arrival. By storing packets on a buffer before they're played out, we can convert a variable delay into a fixed delay, giving voice a better quality. This buffer is usually set to twice the coder delay, but the administrator can adjust it.

- *Type Of Service (TOS).* The structure of an IP packet includes an 8-bit field called TOS. Of this field, 3 bits are used for precedence (unused until now), 4 bits are for TOS (minimize delay, maximize throughput, maximize reliability, minimize monetary cost) and an unused bit which must be set to zero. By using the (until now unused) IP precedence bits, we can color packets so they can be easily identifiable by the routers and end-nodes.



- *Weighted Fair Queuing (WFQ).* This should be configured on every router on your network to allow for a fair service to all the flows passing through that router, including the data packets containing voice. Using a combination of IP Precedence and WFQ could greatly reduce the end-to-end delay.

- *Random Early Detection (RED).* This technique takes advantage of the congestion avoidance mechanism used by TCP. When the queues in a router start to get full, the router will randomly drop a packet for one of the flows passing through the router. This packet drop indicates that the source should decrease its transmission speed.

- *Weighted RED (WRED)* is Cisco Systems' implementation of RED. It uses the concept of RED in conjunction with IP Precedence to randomly discard packets for flows with the lowest priority. Giving voice a higher priority ensures that voice traffic won't be discarded by the router.

- *Multilink PPP (MLPPP).* For slower point-to-point links we can use MLPPP fragmentation and interleaving to break every packet that goes through the slower link into smaller packets. This prevents one big packet from monopolizing the link for too long.

- *Resource reSerVation Protocol (RSVP)* is a protocol used to reserve a certain amount of bandwidth along the path between source and destination. The reservation process is started by the source, and every router/node along the path must be able to understand the protocol. The fact that every router has to know about RSVP makes this technique harder to use in a wide-scale network like the Internet.

## QoS Summary

To run a smooth VoIP service, you'll have to select a CODEC and compression algorithm that has the lowest processing delay and the ability to reproduce good quality speech. You should also consider providing some type of QoS over your network to help reduce the queuing delay on each router along any path.

## IP Technology Still Experimental

IP technology is still very much in the experimental stage and you shouldn't expect to have an IP phone on your desk any time soon. While we're still a long way from achieving the seamless convergence of voice and data, we're looking seriously at this new technology, and when the time comes, the University of Oregon will be ready.

IP telephones may one day allow users to more easily move their phones with them from one ethernet jack to another as they permanently or temporarily relocate around the campus, or even run their phone through their computer if they choose. They may also make it easier to extend campus phone service to off-campus locations. The improved voice compression inherent in IP voice, whether at the phone or in the backbone, will eventually reduce the amount of bandwidth required to carry telephone calls long distance or even to the local phone company.

## Want to Learn More?

For more information about VoIP and its applications, feel free to contact José Domínguez at [jad@ns.uoregon.edu](mailto:jad@ns.uoregon.edu)

# Building Your Own PC



by John Kemp  
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Over the past few months I've had the opportunity to build a number of PC systems from scratch.

Building systems from scratch gives you some benefits you might not have otherwise, such as selecting high quality components, including features you want and leaving out features you don't, reusing parts from older systems, and shopping around for the best deals on particular parts. There is also a certain sense of pride that comes from building a computer system from scratch.

If you feel confident handling computer components, building a computer can be a fun and rewarding experience.

## Components

This article lists the categories of components typically involved in putting together a PC system, and suggests particular components you might choose for assembling a relatively high quality system. It should be noted that there are many different choices for components, and the products mentioned here are merely a list of some of my own personal preferences. You will almost assuredly have your own needs and preferences, and should make your own choices accordingly.

**CPU.** The first choice you have to make is the CPU. The best price/performance choice at the moment seems to be the Celeron 400. The recent Celerons have onboard 128KB caches, and they are just as fast as Pentium-II processors in just about every application. In addition, the Celeron 400 can (depending on luck and courage) occasionally be over-clocked to 500MHz, so it does have the potential of offering cutting-edge performance for those who want to attempt running their CPU at unsup-

ported clock speeds. Alternatively, the Celeron 300A and Celeron 333 are still available through some suppliers, and also provide over-clocking potential.

**Motherboard.** Once you've selected a CPU, you should choose a motherboard. The key difference between motherboards is the kind of CPUs they support (SEPP or PPGA, commonly referred to as Slot-1 or Socket-370), and at what clock speeds they run. A feature gaining in popularity is whether or not the motherboard is software configurable. This means you don't have to use "jumpers" to make changes to the motherboard or the BIOS. Beyond that, there are the range of usual choices in motherboard options, such as the number of PCI/ISA slots, whether or not they have an AGP slot, whether they support one or two CPUs, and whether they have onboard graphics/network/SCSI/sound, and so on.

Motherboards manufactured by ABIT have been popular recently (models: BH-6/BX-6/BM-6/ZM-6), particularly because of their software configurability and over-clocking options. TYAN also continues to be an extremely popular brand. GIGA-BYTE Technologies likewise has a reputation for producing some of the best performing motherboards.

It should be noted that you can adapt a Socket-370 CPU to fit into a Slot-1 motherboard with an inexpensive adapter. This can be an important trick to know if you accidentally end up with a Socket-370 CPU in one hand and a Slot-1 motherboard in the other.

**Memory.** Selecting memory is a relatively simple matter. PC100 CAS2 168-PIN memory is commonly used now, and is well supported and widely available. 64MB is usually an adequate total for most uses, although 128MB is also common in server-class machines. In general, buying a single SIMM is easier to deal with, and makes it easier to upgrade later if necessary. It is often convenient to buy the CPU/motherboard/memory all from the same supplier, and many vendors of-

fer these parts grouped in a package at no extra charge.

**Case.** At this point, you can select a case. Cases typically come in mini-tower, mid-tower, or full-tower sizes. Some of the options are whether the case has a floppy drive, a case fan, or a built-in power supply. It is quite convenient to have these items built in, but this varies from manufacturer to manufacturer.

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*If you feel confident handling computer components, building a computer can be a rewarding experience.*

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Many users prefer the mid-tower size because it's easier to work with and allows for more expandability than a mini-tower case. Full-tower cases are rather tall and can be expensive. The Super-Micro SC-730A is a nice mid-tower case with plenty of room; it has side panels that can be removed individually, and a lockable front door. The SC-701 is slightly smaller. Both are sturdy metal cases. Super-Micro, EnlightCorp, and In-Win are all popular case manufacturers, and each company produces a wide variety of cases.

A good mid-tower ATX case is usually the best choice. However, a desktop ATX case can also be used if space is at a premium.

**Graphics Card.** Computer graphics cards are probably the most varied and rapidly changing segment of the component market. The best general purpose card I can recommend at this time is the forthcoming ATI All-In-Wonder 128. It will be the first graphics card to combine the features of a

# . . . the Cowboy Way

TV-tuner, video capture, and DVD-decoding-assist with the power of high performance 3-D acceleration for computer gaming.

If 3D computer gaming is really your primary concern, you might consider the current ASUS V3400 TNT/TV card instead. The ASUS has video capture, TV-out, and excellent image quality, and the TNT chipset has very good driver support. For maximum performance, however, you might want to wait for one of the newer cards, which are based on either the 3dfx Voodoo3 chipset or the Nvidia TNT2 chipset.

From a purely business perspective, the Matrox Millennium G200 is still one of the best choices. The G200 has a crystal-clear image quality that is unsurpassed. Matrox also has a G400 model coming out this summer that could turn out to be an excellent all-around card.

**Disk Drive.** Before selecting a hard drive, you'll have to decide whether you want to build an IDE-based or SCSI-based system. In general, it's cheaper and easier to build a system that's IDE-based. IDE support is built into the BIOS of most motherboards, so no special drivers are required prior to installing the operating system.

The IBM Deskstar GXP drives are a good choice for IDE systems. They are known for good performance, low heat, and quiet operation. Some of the more recent drives by Western Digital have also been getting good reviews.

For better performance, you might also consider installing a high performance disk subsystem, such as Ultra-Wide SCSI, Ultra2 (LVD) SCSI, or Ultra DMA/66 IDE. Select the appropriate PCI card and drive to match the subsystem of your choice. The performance of UltraDMA/66 should compete closely with the high-end SCSI systems, and it should still end up costing less than a similarly configured SCSI machine.

**CD-ROM.** You can kill two birds with one stone by purchasing a CD-R or CD-RW drive instead of a plain old CD-ROM. A CD-R performs all of the

same functions as a normal CD-ROM drive, but also allows you to use write-once recording on CD-R media for backing up your system or archiving important files. CD-RW extends that to give you rewritable media.

The speed designations for CD-R and CD-RW mechanisms are in order of write/rewrite/read, so for example, a 4X/2X/20X CD-RW can write to CD-R at 4X speed, can rewrite a CD-RW at 2X speed, and can do normal CD reads at 20X speed. Buy a 4X writer if you can afford it. One drive that recently got good reviews is the Hewlett Packard CD-Writer Plus 8100i CD-RW 4X/2X/24X IDE drive. For SCSI systems, I'd choose a Plextor Plexwriter drive.

**What about DVD drives?** My own preference is to leave DVD out of the computer-building equation. I use a standalone DVD player when I want to watch DVD movies. But if you do want a DVD player built into your computer, there are drives available. You may also need a decoder board to assist in the DVD decoding and to provide additional audio channel output. The Pioneer DVD-0103S drive and Utobia Hollywood+ decoder card are a promising choice if you want to go this route.

**Monitor.** Monitor selection is a highly personal choice. Two of the more popular brands are Sony and Viewsonic. Seventeen-inch monitors are quite common, while 19" monitors are gaining in popularity. Really the best advice is to make sure you see an example of the monitor with your own eyes before you buy it. Any of the GS-series Sony monitors are usually safe bets. For example, the 17" CPD-220 GS is a nice monitor. The Viewsonic professional series is excellent, and the PT-775 would be an outstanding choice.

**Sound Cards.** The Creative Labs Soundblaster Live! Value is a very good sound card. Creative has dominated the sound card business for quite a while, and this card performs well and sounds great. Gamers might also want to take a look at the Diamond Monster MX-300 or one of the other cards based on the

Aureal Vortex 2 chipset, as these cards offer some interesting features involving positional sound for certain games.

As for desktop speakers, this is one product area where it's getting harder and harder to find good products. The Altec Lansing ACS41 was a good speaker, but the more recent Altec Lansings come with no tweeter. Altec still dominates the desktop speaker market, though. I'd tend to stay away from the newer USB-only speakers, as the USB bus topology was not really designed to support sound and can cause problems.

Finally, if you already have a desktop mini-stereo with speakers that has an available line-input connector, the mini-stereo can act as an excellent substitute for a computer-only speaker setup.

## Conclusion

Considering everything I've said so far, you've probably concluded that it would be much easier to buy a complete system than to build one from scratch. (Yes, that would be the easy way, but it wouldn't be the cowboy way!) But there is another option: you can purchase a system from a vendor who allows you to customize parts of the order prior to purchase. Many of the online sales outlets (such as Gateway, Dell, Sys Technology, etc.) provide web pages that allow you to modify or delete items that you don't want. This is a nice alternative because the vendor will still be doing most of the work of gathering parts and assembling the machine for you, and you will only have to pay attention to the customizations you feel are most important.

**One final note:** it's always a good idea to do a little homework before you make a purchase. Some magazines worth looking at are "Computer Shopper," "PC Magazine," and "Maximum PC." And, of course, you can always find good information about computer components on the web at sites like AnandTech, TomsHardware, or Cnet. Both AnandTech and Cnet currently have online articles on how to build your own PC.

# Wondering Which Mac



by Dan Albrich  
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If you're confused about which dial-in Internet software to choose for your Mac, you're not alone. The array of possible choices can be overwhelming, especially to new users.

My experience as a technical consultant has been that novice users don't like being confronted with a long list of software choices, especially when the distinctions between those products are insignificant. Most often, new users are simply looking for a product "that works."

Unfortunately, there's no *one* simple answer when you're talking about Macintosh Internet dialers. This article discusses common dialer options and gives some specific recommendations.

## Dialer Jargon 101

Before I describe the list of dialers and discuss their pros and cons, you'll need to become familiar with a few terms:

**MacOS (the Macintosh Operating System).** This is the core set of software programs that enable the use and configuration of your computer.

By analogy, if your Macintosh were a car, the system software would include the steering wheel, pedals and dashboard. The system software governs what's displayed on the screen, input from the user via the mouse and keyboard, and how programs use resources. You can find out what version you're running by selecting "About this Macintosh (or Computer)..." from the Apple menu.

Mac OS is commonly referred to as "System Software." This term is often abbreviated by the word "System" followed by a version number (e.g., "System 7").

**TCP/IP Internet Protocols.** The *TCP/IP* protocols are efficient and "globally routable," which means that communication between computers on the worldwide Internet is possible from any location to any other location. The protocol is efficient because of a large "packet size" or data payload and good error detection and correction.

While *TCP/IP* has many advantages, it's complex to set up, which is one reason why not all vendors chose to implement it as their regular communication method. Some popular programs that utilize *TCP/IP* services include *Netscape*, *Internet Explorer*, *Telnet*, *Fetch*, *NewsWatcher*, and *Eudora*.

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## Unfortunately, there's no *one* simple answer when you're talking about Macintosh Internet dialers.

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**AppleTalk.** This is Apple's original networking protocol. *AppleTalk* is the protocol used when Macs share files and printers. Its best feature is its ease of setup and use, but it is slower and less efficient than *TCP/IP* because of its small packet size. It's also a "chatty" protocol that's not globally routable.

**Classic Networking.** This is the original Apple networking software included with Macintosh computers. In the early days of Macintosh, *Classic* networking referred only to *AppleTalk*. Later, however, *TCP/IP* support was added via a control panel called *MacTCP*.

Because *Classic* design wasn't conducive to expansion, *MacTCP* was bolted on to the existing system instead of being integrated. Nonetheless,

*MacTCP* does work well, and it requires very little memory.

**OpenTransport.** This is Apple's new modular and extendable networking system that's integrated into System 7.6 and higher. *OpenTransport* includes *AppleTalk* and *TCP/IP* support and can be configured via control panels of the same name. But note that this networking system requires quite a bit of memory. If you have an older Mac or less than 32Mb memory, I'd recommend sticking with *Classic* networking, which uses far less RAM.

**Modem Initialization String.** All modern modems can take commands that affect their configuration. These commands include the ability to turn off the modem's speaker or set its volume and information relevant to connecting with other modems. For example, fax modems require one initialization string to tell the modem to do fax, and another to do data. The best connection setting is usually AT&F or AT&F1, the factory defaults.

**CCL.** This is a modem description file used by several popular dialers. Among other settings, the CCL contains the modem initialization string. While *ARA 2* and *ARA 3* both use CCLs, the *ARA 2* CCLs are not necessarily compatible with *ARA 3* and vice versa. There is no easy way to determine which version of CCL you have, and they aren't easy to edit or change. Apple intended the CCL to make modem use easier, but that hasn't been my experience! Choosing a dialer that doesn't need CCLs is often the simplest path.

Now that you have some background, let's move on to a brief overview of basic dialer software:

## Dialers 'That Work'

**ARA 3 (TCP/IP and AppleTalk).** Recommended for modern Macintosh, G3 and iMac, or those users running Mac OS 8.5 and higher. We generally recommend *MacPPP* due to its ease of

# Networking Software to Use?

support, but the new Macs come with *ARA* preinstalled, which is a good reason to use it instead. I also recommend this package to other users who have a modern Macintosh OS (8.5 and higher) and need to use *AppleTalk*'s file or printer sharing.

**MacPPP (TCP/IP only).** Recommended for all users running System software earlier than Mac OS 8.5, or who have less than 32Mb of memory. (Note that the new Apple G3s, including the iMac, come with *ARA 3* preinstalled, so use it instead.) Here are MacPPP's strengths:

1. *Ease of use.* MacPPP works with all Macintosh models, regardless of RAM size.

2. *It doesn't use Apple's modem description files ("CCLs"), which are difficult to modify.* Instead, MacPPP allows you to easily change a modem initialization string to accommodate your individual situation. This allows the program to be sufficiently generic to work with almost *any* modem out of the box.

MacPPP works with all Mac models running System 7.0 and higher and has no RAM requirements to speak of. The dialer requires less than 400K. On the down side, MacPPP isn't glamorous. You'll find no slick 3D buttons or anything with a polished look. But the program works well with all Macintosh models and isn't very difficult to use.

**OT PPP (TCP/IP only).** *OT PPP* is *ARA 3*'s predecessor. This dialer is included with some Macintosh systems and requires *Open Transport*. It's efficient and has a clean user interface. I recommend its use on Mac OS 7.6 and 8.1 only because MacOS 8.5 and higher include the updated *ARA 3* instead.

I don't recommend *OT PPP*'s use on systems earlier than 7.6 due to their lack of the recommended version of *OpenTransport* (v.1.1).

*OT PPP* is available free from the Fall 1998 Duckware CD-ROM, along with Apple's installer and a configurator for the UO campus.

*Note:* Do not install this program on new G3 or iMac hardware. Those systems usually come with MacOS 8.5, which would use *ARA 3* instead. *OT PPP* appears to be incompatible with the new G3 systems, since they have its successor, *ARA 3*, preinstalled.

**InterPPP (TCP and AppleTalk).** Obsolete! While this software is free to UO members and can be made to work, it's not recommended. It is designed for older Mac models and doesn't work with *OpenTransport*.

*InterPPP* is an option for those who use older Macs and want both *AppleTalk* and *TCP/IP*. There are minor incompatibilities between this dialer

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*While there are many options available and minor trade-offs between them, those looking for the simple path should choose either ARA3 or MacPPP*

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and our current communication server setup that produce incorrect but innocuous error messages.

**Zterm (terminal emulation).** This software works well for slower modems (1200/2400/9600) or for those who have limited memory (4MB or less). However, you won't be able to run *Netscape* or *Eudora*, or share files or printers. Your only email option is to use a text-only interface to run *pine* and read email.

## Bottom Line: We Recommend ARA3 and MacPPP

While there are many options available and minor trade-offs between them, those looking for the simple path should choose one of two options:

1. If you have a new G3 (including the iMac), use the preinstalled *ARA 3*.
2. The simple path for everyone else is *MacPPP*, which is available from the 1998 Duckware CD-ROM or our network file server, "CC Public Domain."

## Netscape 4.6 is Here... but not for Windows 3.1

Netscape Communications recently released a new version of its popular web browser. The new version, *Communicator 4.6*, includes various updates including *Instant Messenger*, updated *NetHelp* content, and improved security.

The update itself is relatively minor, but it marks the end of Windows 3.1 support in the Netscape product—a far more significant issue. While Microcomputer Services does not recommend upgrading for the sake of upgrading, we *do* recommend that UO departments plan to replace Windows 3.1 computers with 95/98 or NT (soon to be called *Windows 2000*).

**Other 3.1 Drawbacks.** Windows 3.1 users currently lack file-format compatibility with current versions of *Microsoft Office*, a commonly used software package that includes *Word*. Moreover, Windows 3.1 computers may also have Year 2000-related problems.

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# Consulting Line Adds Hold Queue

by Hervey Allen

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Over the past two years, Microcomputer Services has seen a dramatic increase in the number of users calling its main consulting line at **346-4412**. Last September we received 3,400 calls (an average of 170 calls per day) during our business hours, and on several peak days during fall term we logged over 300 calls.

To respond to the mounting demand, Microcomputer Services has increased its student staff. We have also increased our full-time staff from two people to three. And to become even more efficient in serving the campus community, we will add a hold queue to our consulting line by July 1999.

Currently, if our staff can't answer our support line at **346-4412**, customers are routed to our Audix voicemail system where they can leave a message. The more calls there are, however, the less efficient this system becomes, as it re-

quires quite a bit of staff time to transcribe messages, return calls, and keep track of the entire process.

Every member of our staff has had occasion to call technical support for help, so we fully understand how frustrating it can be not to get someone on the line. We're hopeful that giving our customers the option of waiting for a consultant instead of leaving a message will alleviate some of the frustration, and increase the number of people we can assist.

When the new hold queue is installed this summer, we'll be accepting calls in the order in which they arrive. We generally have two or three people staffing our main consulting line during our business hours (9 am - 5 pm, Monday through Friday). Our experience has been that calls rarely arrive in an orderly fashion. Instead, they tend to come in clumps, with spaces of quiet in between. During our peak times (10:30 am - 1:30 pm and 3:00 pm - 5:00 pm) we attempt to staff our lines with additional people.

**Note that use of a hold queue will prevent us from accepting voicemail messages.**

## Please Do Your Part

As computer use continues to increase, so will the number of requests for help. Microcomputer Services asks that you do your part by reading the documentation included with your software. Most of our software installers include documentation that contains troubleshooting sections. Because of the increased consulting load, our student staff may request that you perform complex software installations or reconfigurations on your own time; at that point, we can help troubleshoot any particular problems that may arise.

## Other Help Resources

If it's not convenient to call us, you can always drop by Computing Center Room 202 during business hours, write to [microhelp@oregon.uoregon.edu](mailto:microhelp@oregon.uoregon.edu), or visit our web site at <http://micro.uoregon.edu>

# Coping with SPAM: Should You Try to 'Unsubscribe'?

By Joe St Sauver

[joe@oregon.uoregon.edu](mailto:joe@oregon.uoregon.edu)

Victims of SPAM (unsolicited commercial email) may have noticed that the unwanted message often contains an email address or web page where they can try to "opt out" or "unsubscribe" from future mailings.

In our opinion, attempting to unsubscribe is unwise for many reasons:

- Incredible as it may sound, some unscrupulous spammers actually use "unsubscribe" addresses as a source of known-valid, known-active addresses for future spamming runs.
- In other cases, "unsubscribe" addresses provided by the spammer often won't work when you try them.

This could be because the spammer simply fabricated them in the first place, or because the address has already been removed by ISPs inundated by user complaints.

- Some spammers even list "unsubscribe" addresses that actually belong to antispammer activists or totally unaffiliated innocent parties—either to punish antispammers or to obscure their own identity. Thus, by sending email to what is purported to be an "unsubscribe" address, you may actually be participating in a distributed mail-bombing attack on an innocent party.

- Unsubscribing, or "opting out," unfairly puts the burden on *you* to avoid SPAM. You shouldn't have to beg to be left alone by online marketers.

- Unsubscribing isn't a scalable model—spammers can create new

SPAM lists faster than you can possibly attempt to remove yourself from them.

- Many spammers harvest new addresses to spam each and every time they do a SPAM run, so there's nothing for them to remove your address *from*.

## What Can You Do?

Your best bet is to complain to the source of the SPAM, which will often *not* be the address that's listed in the "From:" line of the email message.

For information on determining the *true* origin of SPAM you receive, please consult the FAQ titled "Figuring Out Fake Email" at <http://www.faqs.org/faqs/net-abuse-faq/spam-faq>

# Virus Alert! Installing Antiviral



by Hervey Allen  
Microcomputer Support  
Specialist  
hervey@oregon.uoregon.edu

Over the past few months, Microcomputer Services has seen a large increase in the number of computers damaged by computer viruses. In particular, the *Chernobyl* virus, which struck on April 26th and will activate again on June 26th, damaged the hard drives of over 30 University of Oregon students, faculty and staff—and these are just the people who contacted us directly.

In each case, victims either lost all data on their hard drives or had to spend several hundred dollars recovering data if they didn't have a good backup. On some machines, virus damage required replacing the on-board BIOS chip.

In addition to *Chernobyl*, we've also received numerous reports of *Happy99* and *Melissa* virus outbreaks. While not as destructive as *Chernobyl*, these viruses did cause headaches for those involved. Many people received the *Happy99* virus from trusted acquaintances who didn't know they were transmitting the virus via their email.

Unless you use your machine in complete isolation (i.e., you don't use disks from anyone else, receive email, or download files), installing an antiviral program is absolutely essential to protect your data.

These cases reflect the prevalence of viruses in the computing community at this time. Fortunately, there's a remedy: because the UO has a site license for *Norton AntiVirus* ("NAV") software that runs through June 2000, NAV software is available free of charge on the Fall 1998 Duckware CD-ROM or via Computing Center public domain file servers. This software includes NAV for Macintosh, Windows 95/98/NT, Windows 3.1/DOS, and Netware File Servers.

Generally, we do not unequivocally recommend installing a package as intrusive as antiviral software, but in this case the benefits outweigh the possible risks.

Finally, remember that if you have a backup of—at the very least—your critical data files, then even if a virus does cause damage you will likely be able to get back up and running in a reasonable amount of time.

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*Unless you use your machine in complete isolation... installing an antiviral program is absolutely essential to protect your data.*

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## Q & A

Here are some answers to common questions about installing and using the *Norton AntiVirus* programs:

**Q - If I install *Norton AntiVirus* during the upcoming year, what happens after June 2000?**

A. - At this time, the Computing Center is investigating whether a site license will be possible after June 2000. If pricing increases dramatically, as is possible, we may not renew our license. However, even if this happens, you'll still have the right to run the last version of NAV we made available.

**Q - I've heard that installing antiviral software can sometimes cause problems. Is this true?**

A - This is true. In order to function properly, antiviral software must install itself in the "guts" of your machine. This means it makes modifications to your operating system files (your underlying filesystem), and runs in the background at all times. Once it's installed, you can specify how intrusive the antiviral software should be, but generally we've found that the

defaults chosen by the NAV installer are the best.

When installing NAV or any other antiviral software, be sure to have any previously-installed virus software turned off. As the NAV ReadMe files describe, installing NAV 5.0 on top of a previous version of NAV in Windows 95/98 can cause problems if the software is active during installation.

**Before you install antiviral software, we recommend that you back up your data files.** Microcomputer Services has installed NAV 5.0 on dozens of PCs and Macs internally without encountering serious problems, but we have seen instances where an additional restart of Windows machines was necessary.

We feel that, on balance, **not** running antiviral software is much riskier than installing the software.

**Q - What if I already have a virus on my machine? Can I install NAV and then remove it?**

A - The answer to this is, "It depends." Some viruses only affect files. If that's the case, you can often install antiviral software to eradicate the virus (this is particularly true of the many thousands of Microsoft Macro viruses). The NAV installer will scan your machine's memory while it installs. If it detects a virus, it may ask you to remove it before continuing.

On the other hand, if you're infected with a **boot sector** virus, you'll need to remove it *before* installing antiviral software. Boot sector viruses infect the initial few sectors of your hard drive and load into your machine's memory each time you start your machine. Removing these viruses often requires first running a special utility that targets the particular virus.

**If you're installing NAV from floppy disks, remember to lock your floppies before inserting them in your machine.** To do this, slide the tab located on the back of each floppy's upper left corner until you can see through the square notch that's normally covered by the tab.

# Software is No Longer Optional

**Q - Since so many new viruses are being created, how can I protect myself from all of them?**

A - After installing NAV, you can run a program called *LiveUpdate*, which is built into the NAV product. *LiveUpdate* connects to the Symantec file server and downloads the latest antiviral definition files to your machine, updates your installed software, and scans (or offers to scan) your drives. You must either have a full-time Internet connection, as do most on-campus machines, or dial in and connect to the Internet before running this program.

You can schedule *LiveUpdate* to run automatically at selected intervals, or remember to run it once a month. Below are instructions for running *LiveUpdate* on both Windows and Mac machines, as well as a tip for downloading antiviral software from the web:

**Windows 95.** Activate *LiveUpdate* by going to the Start menu, choosing "Programs," selecting "Norton AntiVirus," and then opening either the *Norton AntiVirus* or *LiveUpdate* programs. If you run *Norton AntiVirus*, just click the *LiveUpdate* button to start the *LiveUpdate* program.

**Macintosh.** Go to the Apple Menu, choose Control Panels, and open *Norton AntiVirus*. Click the *LiveUpdate* button to start updating your NAV software. Note that on a Mac the *LiveUpdate* process is quite slow, even on fast Internet (i.e., on-campus) connections.

**Downloading from the Web.** You can always download the latest PC and Mac antiviral definition files manually and run an update program from Symantec at <http://www.symantec.com/avcenter/download.html>

**Q - What about older systems like DOS, Windows 3.1, and Macs running a System version prior to 7.5?**

A - Currently, Symantec does not have a new version of NAV for Windows 3.1/DOS. The last version released was

4.0 in July 1997. Symantec continues to make antiviral definition files available for this product, but it may discontinue this service in the future. DOS users should note that no supported version of NAV is available. Instead, the Windows 3.1 version has a rescue disk set that you can create and run in DOS if you need to remove a virus.

If you're using an older Mac with a System version earlier than 7.5, you should use Symantec Antivirus for Macintosh (SAM) version 4.5.3. This product has been discontinued, but for the time being Symantec continues to make antiviral definition files available for this product. NAV 5.0 on the Mac requires 8MB of free memory, 10MB of hard drive space and System 7.5 or above.

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*At the very least, back up your critical data files! Then, even if a virus does cause damage, you'll likely be able to recover in a reasonable amount of time.*

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**Q - OK, so I'm ready to install NAV on my machine. Where do I get it?**

A - Below is a list of each available NAV product with instructions for obtaining it:

**1. NAV for Windows 3.1/95/98/NT**  
This software is available from the **Fall 1998 Duckware CD-ROM**. To run the installer, insert the CD, start the Duckware interface (this happens automatically on most machines), and click on the following links:

- Install "Other Software" (it's the big purple button to the left)
- Antiviral Software

Then choose the appropriate version to install.

**On-campus users:** If you're on campus, you can obtain NAV from our

public domain file server, *Public*. To do this, go to the "Network Neighborhood" under Windows 95/98/NT, double-click the "Entire Network" icon, then double-click the "Public" icon. Log in as "Guest" (no password is necessary) if you're prompted for a username and password; then open the following folders:

- Software
- Antivirus
- *Norton AntiVirus*

Select the appropriate version to install. **Be sure to read the *ReadMe.txt* and *Install.txt* files before installing. If you don't, you may not get the installer to work correctly.** Note that full documentation for each product is available in the Docs folder in PDF (*Acrobat Reader*) format.

**Windows 3.1:** On-campus Windows 3.1 users with access to Novell *Netware* can get NAV 4.0 for Windows from the *Public* server by following these steps:

- Go to the DOS prompt (i.e., exit Windows, but don't shut down)
- Type "login public/guest"
- Go to the "S" drive, where *Public* is mapped, by typing S: and hitting ENTER.
- Type `cd win31/antivirus`

Be sure to read the file *Readme.txt* to get detailed instructions for installation.

**Note: In most cases, using the installer on the Duckware CD-ROM will be easier than copying it from public domain servers.**

**2. NAV for Macintosh**  
This software is available from the **Fall 1998 Duckware CD-ROM**. To run the installer, insert the CD, start the Duckware interface (this happens automatically on most machines), and click on the following links:

- Install "Other Software" (the big purple button to the left)
- Antiviral Software

- continued on page 12

# Antivirus, continued...

Then choose to install *Norton AntiVirus* 5.0 (for System 7.5 and above) or *Symantec Antivirus for Macintosh* 4.5.3 (for older Macs).

**On campus:** On-campus users can obtain NAV and SAM from our public domain file server called *CC Public Domain*. To do this,

- Go to the Apple menu; select *Chooser*
- Select the *AppleShare* icon
- Select the *UOnet AppleTalk* zone
- Double-click on *CC Public Domain*
- Log in as *Guest*
- Choose to mount the *CC Public Domain* volume

Open the *Virus Software* folder to find the NAV and SAM software installers and full documentation.

**Q - Where can I go for more information about Norton AntiVirus, viruses in general, and the latest virus outbreaks?**

**A -** There are numerous web sites that provide general virus information. The Symantec Antivirus Research Center site provides good information on *Norton AntiVirus* at

<http://www.symantec.com/avcenter>

Another good resource is the Data Fellows Virus Information Centre (located in England) at

<http://www.datafellows.com/vir-info/>

## More Questions?

If you have further questions about obtaining or using *Norton AntiVirus* at the UO, you can contact Microcomputer Services from 9 am to 5 pm, Monday through Friday.

Call a consultant at **346-4412**, stop by Computing Center Room 202, or send an email message to [microhelp@oregon.uoregon.edu](mailto:microhelp@oregon.uoregon.edu)

You might also want to check out our web site at <http://micro.uoregon.edu>

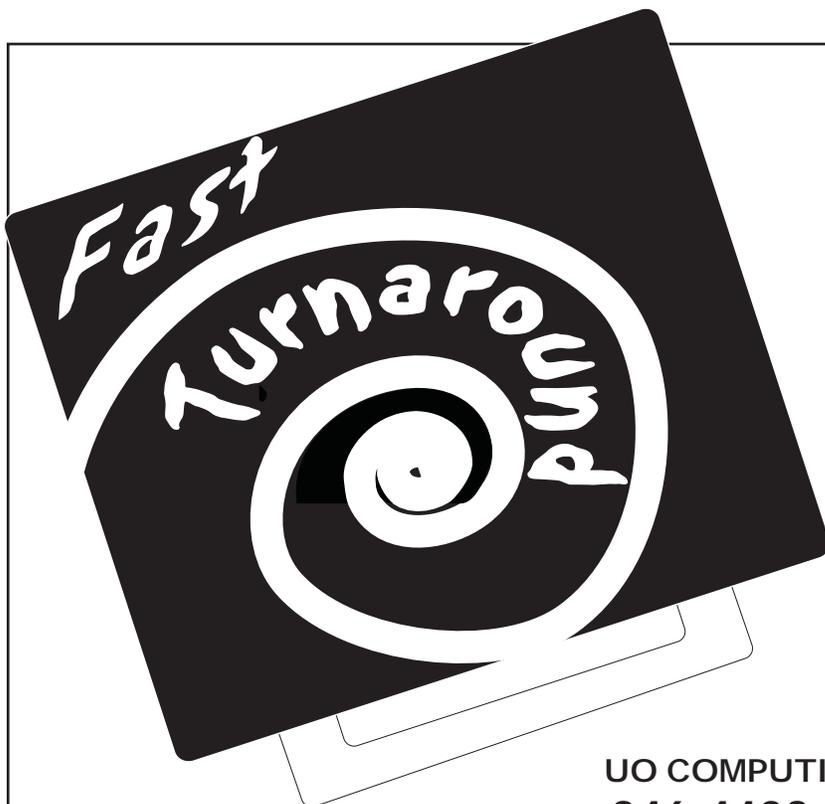
## Honor Music Copyrights!

From time to time, it comes to our attention that a student or other UO affiliate may be making copyrighted music—often in CD-quality MP3 format—available via the World Wide Web (or via an *FTP* or *Hotline* server).

Please remember that online distribution of copyrighted music via UOnet without the permission of the copyright holder is strictly forbidden and will not be tolerated by the University.

If we learn of such activities involving UO facilities or connectivity, we'll cooperate fully with the copyright holder and law enforcement to resolve the incident, just as we would in resolving any other incident involving criminal misuse of University facilities.

We urge you not to risk large civil penalties and criminal prosecution. Don't illegally distribute copyrighted music!



computer repairs  
upgrades  
custom systems

# E-Shop

UO COMPUTING CENTER ELECTRONICS SHOP

**346-4403**

[hardwarehelp@oregon.uoregon.edu](mailto:hardwarehelp@oregon.uoregon.edu)

[http://cc.uoregon.edu/e\\_shop.html](http://cc.uoregon.edu/e_shop.html)

# Will Buying a Used Computer Save Money?

■ Before you buy used, take a close look at what's available new...you may be surprised.

by Dan Albrich  
dalbrich@oregon.uoregon.edu

Many people assume that buying a used computer will save money, but this is not necessarily true.

For example, if you paid \$3000 for a new computer a couple of years ago, you might think you're doing someone a favor by selling it for \$1500 now. But unfortunately, that is not the case. In fact, a brand-new computer is likely to be on the market that is both better and cheaper than the used one you're offering at half price!

One example of this phenomenon includes the increased storage capacity that can be had for the same price over the past year. A year ago, a 2 Gigabyte hard disk would sell for about \$150 from a mail order catalog. Today, you can buy a 10.1 Gigabyte disk—five times the capacity!—for the same price. This price doesn't include professional installation or shipping charges, but it does give you an idea of how fast technologies change.

**The role of high-density platter technology.** It's also interesting to note that the 10.1 Gigabyte drive is faster due to new higher density "platters." Hard disks spin platters like a record player spins records. A "read-head," similar to a record player's needle, can read (or play) the data on the platter. If the old hard disk and the new hard disk spin at the same speed, the one with the higher density platters will be faster since more data moves past the read-head in the same amount of time. In addition, these new drives may actually be smaller than their precedes-

sors and produce less heat, which means they're likely to work longer.

In short, it is highly unlikely that any used hard disk could be sold that would be a better drive than a new hard disk, or have a better price.

## Price and Value

With technology items, there's definitely a price point that's optimal for a particular item.

Going back to the hard disk example, while it is true that you can buy a 10.1 Gigabyte disk for \$150 today, this doesn't mean that a 5 Gigabyte disk would cost half as much. The 5 Gigabyte drive was very likely manufactured six months or more ago, and the price at that time might have been \$220. If you buy 5 Gigabyte drive now, you would still have to pay around \$200 dollars. **The older, smaller drive is actually more expensive than what is in mainstream production now.**

This is the case for most, if not all, technology. There is always an optimal price point during any given time, and it's a continually moving target. Luckily, the price will remain the same over time (or get cheaper). You simply get more for the same—or less—money.

Products that have followed this trend most dramatically are, of course, computers, and new popular electronics like digital cameras, camcorders, etc. The moral of the story is to take a close look at what is available new prior to purchasing used. While the newer-is-better paradigm definitely works for a new computer, it also works for hardware upgrades and software.

## Upgrade Issues

Often, when you add a new device (like a video card) to a computer, a new "software driver" is required to use it.

Software drivers are the necessary link between hardware and your operat-

ing system (like MacOS or Windows). Most vendors include a diskette or CD-ROM with the software driver that must be installed prior to using the new hardware. Unfortunately, in many cases the hardware vendors are in such a hurry to ship a new product that the driver's disk they provide doesn't work well, or at all. Check the vendor's web site for updates prior to using a vendor-provided driver's disk, and install the updated driver instead of the one provided on disk. In the worst case, the old driver must be removed prior to installing the update—a process which can be exceedingly arduous.

## Other Factors to Consider

While buying new technology usually makes the most financial sense, many other factors may influence your purchasing decisions.

For one thing, not everyone needs an upgrade or would benefit from one. If what you have now works, you'll want to be careful about changing it. Other issues, such as the environmental impact of discarding nonreusable materials, may also influence your purchasing decisions.

On the other hand, if you must use a computer for work, you may eventually be forced to upgrade in order to continue to run the current versions of software used in the workplace. For example, there is no new version of *Microsoft Office* that works with Windows 3.1, so upgrading to a computer with Windows 95/98 may be essential to your continued ability to read documents created on another computer. *(Prior to upgrading to Windows 95, be sure to check hardware compatibility carefully!)*

## Want Advice?

If you'd like help with your pre-purchase decisions, we'll be happy to assist you. Call our Microcomputer Support Staff at 346-4412 from 9 am - 5 pm weekdays, or send email to [microhelp@oregon.uoregon.edu](mailto:microhelp@oregon.uoregon.edu)

# Who's Who at the

by Vickie Nelson

*vmn@oregon.uoregon.edu*

Our summer "Who's Who" again features both longtime and brand-new staff members. All their faces should be familiar, however, as the most recent employee of the group, statistical consultant Robin High, is returning to work here after a ten-month hiatus in Tennessee.

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**Dave Ulrich**

*"Scribe Emeritus"*

While his most recent official title was "Assistant Director, Documentation Services," Dave Ulrich has always preferred the less formal moniker "Scribe." Over the past quarter century, he has written and edited countless publications for the Computing Center and other UO departments.

After graduating from UC Riverside in 1963 with degrees in math and physics, Dave was hired by IBM to write software for Apollo test firings. He spent five years at IBM, first on the West Coast and then on the East, branching out into technical writing, graphic design, and consulting. After IBM, Dave ran a natural food business in Poughkeepsie, New York, and, later, a clothing store on Berkeley's Telegraph Avenue before moving to Oregon.

Originally hired as a FORTRAN consultant at the Computing Center in 1973, Dave saw a pressing need for documentation and soon talked his way into a technical writing position. Over the next 26 years, Dave produced numerous manuals, handouts, users guides, online documents, and eventually web pages. By 1981 he was heading a group called Documentation Services, and in the early 1990s he became an assistant director.

Officially retired in March '98, Dave has been transitioning into full retirement on a halftime contract. He'll be leaving us for good at the end of June.

What does the future hold? More time for his three grand passions (windsurfing, skiing, and deck building), extensive travel, some international homebuilding stints with Habitat for Humanity, and working on his memoirs.

**Elaine Erwin**

*Oracle Database Administrator  
Administrative Services*



Elaine Erwin's work touches everyone on campus. Elaine is the administrator for the Oracle database, which underlies BANNER, the system that runs such essential university functions as registration, admissions, financial aid, and human resources.

Elaine grew up in LA and went to USC, where she majored in electrical engineering. After graduation she worked for Hughes Aircraft building radar systems and became involved in computing, doing computer simulations and FORTRAN programming.

Although Elaine liked the West Coast, she wanted to live in a city smaller than LA. She left Hughes, spent time traveling, and settled on Eugene. She was employed locally by Advanced Lab Systems before coming to the UO in 1989 to work with Jim Bohle in database management. At the time, Bohle's group was working on the huge task of moving student information from an outdated system to BANNER.

Elaine has responsibility for all aspects of the Oracle software, including installing updates, keeping things running smoothly, and security. She is also a member of the BANNER Coordinating Group.

Elaine and her husband Jake, three-year-old daughter Catherine (Casha), poodle Nigel, and Siamese cat Harley,

# Computing Center

have recently moved to a five-acre spread in Peaceful Valley. When she isn't busy being a mother or fighting blackberries and poison oak, Elaine enjoys doing needlework.



**Robin High**  
*Statistical Consultant*  
*Academic User Services*

If you don't find Robin High at the Computer Center, look for him at the School of Music. He frequently practices the concert organ in Beall Hall before work, takes organ lessons from UO music professor Barbara Baird, and accompanies soloists or choral ensembles.

Born and raised in Nebraska's corn country, Robin attended the University of Nebraska in Lincoln, where he majored in piano performance, before heading off to the University of Texas-Austin to earn an MBA and an MA in Mathematical Statistics. While in Austin he worked as a statistical consultant for a civil engineering consulting firm.

In 1991 he began postgraduate work in statistics at OSU while working as a consultant and also studying music. Music eventually drew him to Eugene, and in 1993, while pursuing an MM in organ performance, he began work as a student statistical consultant at the Computing Center. After graduation he was hired as halftime professional staff.

He left the UO briefly for a consulting position at the University of Tennessee in Knoxville, then recently returned to the UO when a full-time job as a statistical consultant became available here.

As a statistical consultant, Robin spends much of his time with graduate students and faculty providing advice on

the design of studies, data collection and coding, and how to use various statistical programs, such as SAS and SPSS.

In addition to music and math, Robin enjoys reading and hiking.

**Doug Simpson**  
*Academic Micro Lab Manager*  
*Computing Facilities*



Doug was born in Oregon City and grew up around Canby and Portland. He took classes at Clackamas Community College and PSU and then entered the UO to work on a degree in computer science. While a student here, he began his career at the Computing Center as a student assistant in the Documents Room Library.

After graduation Doug worked for Software Sciences, a local real estate software company, writing technical documentation, doing customer service and technical help, and networking. He returned to the UO as manager of the CC-EMU Lab in February 1995.

As a lab manager Doug maintains software and hardware, hires and supervises student assistants, and works with Mary Bradley, the lab coordinator, to keep the lab as up-to-date as possible.

Doug says he's a generalist and enjoys his job because it allows him to move from project to project.

Doug is a folk dancing enthusiast and met his wife, Sarah, at a folk dancing session. The birth of their son, Doran, now 20 months old, has put a temporary halt to folk dancing, however, and Doug now spends most of his non-work time being a father. When he finds the time he also enjoys backyard gardening and tinkering with amateur radio.

# Help for Your Hands: Tips for Healthy

## ■ Sitting at a desk and using a computer seems to be such a physically easy activity. How can it possibly hurt you?

By Vickie Nelson  
vnm@oregon.uoregon.edu

Computer-related injuries to nerves, muscles, and tendons—usually called repetitive stress injuries or RSIs—are an increasing problem for people who spend long hours at the keyboard or with a mouse.

The most-discussed RSI is carpal tunnel syndrome, damage to the median nerve at the wrist, but problems can occur anywhere from the neck and shoulders to the fingertips.

RSI is not an actual diagnosis. It's a term that refers to how an injury was caused, like the term "sports injury." Symptoms of RSI can include pain, tenderness, tingling, numbness, weakness, and clumsiness. Symptoms can range from mild to severe, from annoying to career- and life-changing. A person with a severe RSI may experience difficulty turning a key, pushing a grocery cart, lifting a child, or opening a can of tuna fish.

Sitting at a desk and using a computer seems to be such a physically easy activity. How can it possibly hurt you? RSIs develop slowly, as Dr. Emil Pascarelli explains in his book on the subject. "Fine hand movements, repeated hour after hour, day after day, thousands upon thousands of times, eventually strain the muscles and tendons of the forearms, wrists, and fingers." Poor posture, improper setup of equipment, and using the keyboard or mouse for long uninterrupted periods of time help create the problem.

Fortunately, RSIs are preventable. Preventing RSIs involves adjusting equipment, work habits, and posture. Experts generally agree on the following precautions for both keeping yourself healthy and helping injuries to heal:

The monitor should also be low enough to allow you to see the top of the screen without tipping your head back. If you wear glasses, especially bifocals, you may need to get a pair specifically for computer use.

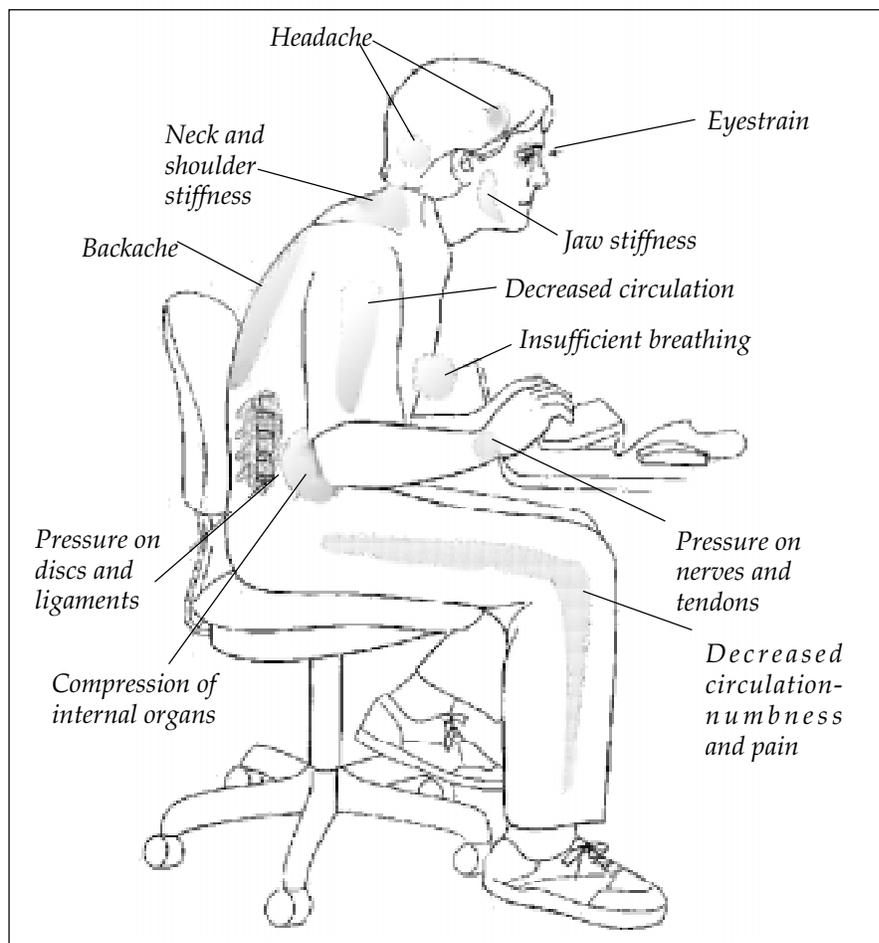


Figure 1. The repercussions of sitting with your head forward (reprinted with permission from *The Computer User's Survival Guide*, ©1995, O'Reilly & Associates, Inc.)

## Set Up an Ergonomic Workstation

Key items include a desk and a chair that adjust to fit you, a keyboard three to five inches below the average 29-inch-high desk, a mouse at the same level as the keyboard, and a monitor screen 18 to 30 inches from your eyes.

## Sit Properly

Sit with your feet flat on the floor (or on a foot rest), your thighs and forearms level or sloping gently downward, and your wrists straight, level, and not resting on anything as you type. Your head should be upright, supported on your spine—not poked forward toward the screen. The head-forward position con-

# Computing

tributes to many physical discomforts, including eyestrain, headache, and backaches as well as RSIs (see illustration).

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*No matter how good your posture and how ergonomically correct your workstation, you need rests from constant computer use*

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## Take Plenty of Breaks

No matter how good your posture and how ergonomically correct your workstation, you need rests from constant computer use. Take several micro breaks an hour (micro breaks are breaks from the computer, not from working!). You could talk on the phone, read a document on paper, file, or sign letters—or simply stretch and breathe deeply for a few seconds.

When you stop keyboarding for a moment to read the screen or speak to someone, don't leave your fingers tethered to the keyboard. Instead, turn your hands wrists up or on their sides on your lap.

In addition to micro breaks, take any longer breaks to which you're entitled. If you can squeeze in a walk or another physical activity, so much the better.

Voice dictation is another possible way to break long stretches of keyboarding.

If you experience pain from computer use that doesn't go away after a day or two of rest, you should see a doctor. For more computing health tips, see the list of resources on this page.

# Where to Find Help: Resources for Healthy Computing

## Books

*Repetitive Strain Injury: A Computer User's Guide* by Emil Pascarelli and Deborah Quilter, Wiley, 1994.

Generally regarded as the bible for advice for computer users, this book is available from bookstores and the Documents Room Library in the UO Computing Center.

*The Computer User's Survival Guide* by Joan Stigliani, O'Reilly, 1995. This excellent source of information includes clear diagrams of anatomy, stretches, postures, etc. Unfortunately no longer in print but available at the Documents Room Library in the UO Computing Center.

*Conquering Carpal Tunnel Syndrome and Other Repetitive Strain Injuries: a Self-Care Program*, by Sharon J. Butler, Advanced Press, 1995. Compendium of stretches targeted for specific problem areas and specific occupations. Includes a good discussion of proper stretching technique. \$17.95 plus \$4 Shipping. Call 1-800-909-9795 to order.

## Internet

### Sorehand Mailing List

This is the forum for people who want to discuss RSIs. You'll find lots of advice—both good and bad, so judge carefully—on exercises, supplements, health care practitioners, ergonomic equipment, daily life, etc. To subscribe, send email to [listserv@itssrv1.ucsf.edu](mailto:listserv@itssrv1.ucsf.edu) In the body of the message put:

subscribe sorehand *Firstname Lastname*. (Be prepared for lots of mail.)

### News Group

[misc.health.injuries.rsi.moderated](mailto:misc.health.injuries.rsi.moderated)

This newsgroup publishes a highly regarded FAQ that covers the basics of RSIs succinctly. People send in questions to be answered by a panel of experts. There's also an unmoderated group that gets very little traffic.

### Typing Injury FAQ

<http://www.tifaq.com/index.html>

This well-organized site contains an abundance of information and links to other good sources of information on RSIs.

## Campus Offices

### Environmental Health and Safety

This office does ergonomic evaluations on request and lends some ergonomic input devices for people to try before buying. The office also trains people to do workstation evaluations within their own departments.

A two-day training session may be held later this year. For more information, contact Kay Coots or Michelle Gillette at 346-3192.

### Adaptive Technology Lab

Located in Knight Library, this student lab offers several adaptive technologies, including voice dictation products such as DragonDictate and Dragon NaturallySpeaking.

Call James Bailey, the Adaptive Technology Access Advisor, at 346-1076 to arrange a demonstration of voice dictation.

# SUMMER WORKSHOPS

What is The IT Curriculum? "IT" stands for Information Technology, and the Library and Computing Center are committed to making sure you have opportunities to build your technology skills. Want to learn how to publish a web page? How about find what you need on the 'net? Or just how to use that darned computer? We provide a full range of computer and Internet training, from novice to advanced skill levels.

These workshops are free and open to currently enrolled students, as well as staff and faculty. No advance registration is necessary; just show up a few minutes before the scheduled start. All seating is available on a first-come, first-served basis. We do ask, however, that you meet the workshop prerequisites as stated in the description; otherwise, you may be asked to relinquish your place. If fewer than five people are present ten minutes after the scheduled start, the workshop may be canceled or rescheduled at the discretion of the instructor.

This publication will be made available in accessible formats upon request to the Office of Library Instruction, 346-1817. Requests for accommodations related to disability should be made to Jon Cawthorne (346-1897) at least one week in advance of the workshop.

For more information, contact the Office of Library Instruction, 346-1817 (email: [cbell@darkwing.uoregon.edu](mailto:cbell@darkwing.uoregon.edu)).

Workshop	Day/Date	Time	Location	Presenter
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This schedule is subject to change. See <http://libweb.uoregon.edu/it/> for course outlines/materials and the most current information.

## Using the Internet

### Beyond Just Surfing

Become a savvy web searcher. Find out how search engines work and how they differ from one another; learn searching techniques and special features to look for. **Prerequisite:** *Introduction to the World Wide Web* or familiarity with a graphical web browser (e.g., *Netscape Navigator*).

Thu July 1	2 - 3:20pm	EC	Heinzkill
Wed July 7	1 - 2:20pm	EC	Frantz
Tue July 20	noon - 1:20pm	EC	Esau

### Power Web Searching

Learn advanced search techniques, such as boolean and proximity operators and "field" limiters, to make your web searches more precise and relevant. Meta search engines are also discussed. **Prerequisite:** *Beyond Just Surfing* or experience using at least two different search engines.

Wed July 14	1 - 2:20pm	EC	Jenkins
Tue July 27	noon - 1:20pm	EC	Paynter

## Electronic Communication

### Managing a Majordomo List (<http://darkwing.uoregon.edu/~llynch/majordomo>)

Covers basic majordomo commands for list administrators (e.g., info, who), how to subscribe and unsubscribe people, how to change your list's information message and configuration profile, and how to approve posts to a moderated list.

Thu July 15	3 - 3:50pm	EC	Lynch
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### Using MHonArc to Create a Web Archive for a Majordomo List (<http://darkwing.uoregon.edu/~consult/deptcomp/>)

Introduction to the MHonArc software. Includes a discussion of setup and configuration options, using procmail to automate your archive, and tips for managing your archive. Also covers the use of htaccess to protect list privacy and simple search scripts.

Thu July 22	3 - 3:50pm	EC	Lynch
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## \* WORKSHOP LOCATION CODES \*

EC: Electronic Classroom (Windows)	144 Knight Library
ITC: Macintosh Classroom	267B Knight Library
RSR: Reed Seminar Room (Windows)	235 Knight Library

# SUMMER WORKSHOPS

Workshop	Day/Date	Time	Location	Presenter
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## Electronic Research Resources

### Net a Job: Use the Web

Link up to thousands of jobs, internships, and employers, companies and organizations. Plus, learn how to submit your résumé electronically.

**Prerequisite:** Familiarity with a graphical web browser (e.g., *Netscape Navigator*); basic working knowledge of the web.

Wed July 28	3 - 4:20pm	EC	Songer
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## Web Publishing: Basic ☆

### Web Publishing I (<http://libweb.uoregon.edu/it/webpub1/>)

Learn how to create your own web page using HTML (HyperText Markup Language). This workshop teaches you the HTML elements (tags) you need to create a basic web page, and will show you how to publish it on the web. **Prerequisites:** Familiarity with a graphical web browser (e.g., *Netscape Navigator*); an account on DARKWING OR GLADSTONE (you must know your username and password).

Fri July 2	noon - 1:50pm	EC	TD Smith
Tue July 6	1 - 2:50pm	ITC	Bell
Thu July 22	noon - 1:50pm	EC	Johnson

### Web Publishing II (<http://libweb.uoregon.edu/it/webpub2/>)

Continues to build on the skills learned in the Web Publishing I workshop. Focuses on adding images and color; using tables and frames; and HTML entities (diacritics, and symbols such as copyright). **Prerequisites:** Web Publishing I or equivalent knowledge and skills; an account on DARKWING OR GLADSTONE (you must know your username and password).

Fri July 9	noon - 1:50pm	EC	Bell
Tue July 13	1 - 2:50pm	ITC	Bell
Thu July 29	noon - 1:50pm	EC	Johnson

## Web Publishing: Advanced

### Web Graphics I (<http://libweb.uoregon.edu/it/graphics1/>) - ✓ Prerequisites

Tue July 20	2 - 3:50pm	RSR	Holman
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### Web Graphics II (<http://libweb.uoregon.edu/it/graphics2/>) - ✓ Prerequisites

Tue July 27	2 - 3:50pm	RSR	Holman
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### Web Design Principles and Practices (<http://libweb.uoregon.edu/it/design/>) - ✓ Prerequisites

Tue Aug 3	2 - 3:50pm	RSR	Bell
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### Web Site Planning and Promotion (<http://libweb.uoregon.edu/it/planning/>) - ✓ Prerequisites

Fri July 16	noon - 1:50pm	RSR	TD Smith
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### Web Programming I: Forms & CGI Scripts (<http://libweb.uoregon.edu/it/programming1/>)

Fri July 23	noon - 1:50pm	RSR	Johnson
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### Web Programming II: Javascript (<http://libweb.uoregon.edu/it/programming2/>)

Fri July 30	noon - 1:50pm	RSR	Johnson
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## Workshops Available on Video

Looking for an alternative to the workshop format? The Computing Center Documents Room and Media Services in Knight Library have a growing collection of videos on using computers and computer software. You can use your UO picture ID to check out these videos, or schedule a viewing room in Media Services. For a list of available titles and descriptions, visit <http://micro.uoregon.edu/workshops/> Call 346-4406 or 346-3091 for more information.

### \* WORKSHOP LOCATION CODES \*

EC: Electronic Classroom (Windows)	144 Knight Library
ITC: Macintosh Classroom	267B Knight Library
RSR: Reed Seminar Room (Windows)	235 Knight Library

☆ Requires an active account on DARKWING OR GLADSTONE

# Meyer Chairs Network Research Council

Dave Meyer, director of the UO's Advanced Network Technology Center (ANTC) and senior software engineer at Cisco Systems, Inc., was recently appointed chairman of the Network Research Liaison Council (NRLC).

The NLRC is one of three advisory committees assisting the University Corporation for Advanced Internet Development (UCAID) in advanced network development within the university community. Drawn from industry, academia, and government, UCAID's advisory committee members have all made significant contributions to Internet development. (Two of UCAID's well-known projects are Internet2, a technical collaboration of over 110 U.S. research universities (including the UO); and Abilene, the ultra high-performance network developed in partnership with Qwest Communications, Nortel, and Cisco Systems.)

A specialist in interdomain IP routing and IP multicasting, Meyer has been an NLRC council member since its inception in March 1998. During his long association with the University of Oregon, he has helped design high-speed, high-bandwidth networks for such notable projects as NERO (Network for Engineering and Research in Oregon) and the NSRC (Network Startup Resource Center).

Meyer's considerable expertise in network architecture and his unique experience in both academic and industrial settings make him an ideal liaison between the worlds of business and academia.

# New FITT Center Offers Instructional Technology Help to Faculty

by Kathy Heerema  
[heerema@oregon.uoregon.edu](mailto:heerema@oregon.uoregon.edu)

Need help preparing a *PowerPoint* presentation for your class? Would you like to put some great photos or video clips on your web site? Perhaps you need to use equipment or software you don't have in your office...or maybe you just want to learn new ways to apply technology to your course?

Whatever your teaching technology needs, the newly formed Faculty Instructional Technology Training Center (FITT Center) in the UO Library's Media Services department can help. The Center, which is subsidized by the UO's Educational Technology fund, supports and encourages faculty to understand, explore, and design ways of integrating effective technology into teaching, and provides free individual consulting and training to any UO faculty member or GTF.

**Services:** The new training center's initial services include assistance with multimedia, online communication and collaborative learning tools, and useful software and hardware, such as

- web publishing and communication tools (browsers, authoring, email, lists, conferencing)
- graphics (creation, design, scanning)
- digital images (slide scanning, digital cameras)
- presentations (creation, design, color transparency printing, clipart collection, coordination with classroom support, and travel presentation help)
- digital video and audio (analog conversions, editing, camera and production help)

- CD-ROM mastering
- text scanning/OCR conversion

Faculty can also use the center to experiment, to meet and exchange ideas with peers, to discover what other faculty members are doing, and to learn about relevant emerging technologies.

**Facilities:** The FITT Center is located in Room 18 in Media Services, on the ground floor of the Knight Library. It has two current-generation multimedia workstations (Windows and Macintosh) and a range of related software and additional hardware (including cameras, flatbed scanner, slide scanner, projector, CD-ROM recorder, and color printer). The staff gives technical support and offers one-on-one tutoring in the use and appropriate application of these instructional technologies. The Center also has small lounge and conference areas.

**Hours:** Plans are to be open Monday - Friday 11 am - 6 pm for drop-in visits, as well as to offer by-appointment and referral services.

## Need More Information?

To find out more about the FITT Center, call 346-1942 or check out its web site at <http://libweb.uoregon.edu/fitt/>

## Lotus Chooses Linux Over NetWare

Lotus Development Corporation recently confirmed that it will not market a NetWare-compatible version of its Domino server in the coming year. Instead, the company plans to launch a Linux version by year's end.

For full details of Lotus' decision, see [http://www.nytimes.com/techweb/TW\\_Lotus\\_Chooses\\_Linux\\_Over\\_NetWare.html](http://www.nytimes.com/techweb/TW_Lotus_Chooses_Linux_Over_NetWare.html)

# Principles of Internet2 Application Planning

## ■ A few more things to consider when writing I2 applications...

By Joe St Sauver  
joe@oregon.uoregon.edu

Our last issue featured some tips for writing applications for Internet2, the high-speed academic and research network utilized by the UO and an increasing number of other academic and research institutions.

Here are some additional considerations for I2 network application authors:

**1. The application itself is (relatively) easy; it's obtaining the content to deliver via that application that can be most difficult.** For example, we already know how to deliver TV-quality video over multicast-enabled data networks using commodity hardware and software. The hard thing is obtaining TV programming to actually deliver that way.

**2. Consider applications vis à vis pipe size.** If an application doesn't involve high resolution graphics, audio, video, N-dimensional data ( $N > 2$ ), or real time applications, it probably isn't a problem that requires I2's large pipes.

**3. No meaningful application that involves one single server talking to another single server will fill the pipe.** Plan from the start for an architecture involving farms of servers servicing scores (or hundreds, or thousands) of remote systems (and thus, implicitly, plan from the start for economically replicable server architecture).

**4. All interesting applications generate unbalanced network flows.** As a strategic corollary, the best set of applications complement applications that have disproportionate *incoming*

flows with other applications that generate disproportionate *outgoing* flows.

**5. Network applications need partners.** Partners will be more inclined to work with you if you make it easy and cheap for them to do so. Applications that require partners to purchase expensive specialized hardware or expensive commercial software will struggle.

**6. Meet the needs of non-I2 entities.** Applications that allow an I2 institution to meet the needs of non-I2 entities (while respecting the I2 Acceptable Use Policy) have great utility, simply because the number of non-I2 entities is huge relative to the number of I2 entities.

**7. Consider your platform.** The typical "I2 desktop" is/will be a comparatively slow Intel-based PC running some flavor of Windows that's connected to a campus backbone via regular (not fast, not switched, not full duplex) ethernet.

You may use a Mac, or a Linux box, or a Sun workstation, and it may be connected to the network via a ripping fast connection, but your application, if it is successful, will be ac-

cessed mainly from Pentiums running Windows over a 10Mbps connection. Make sure your application is relevant to that type of platform.

**8. Distance education may not figure prominently in I2 applications.** Virtually all distance education users will connect via dialup connections, and typically from non-Internet2 connected dialup connections at that. Users working from behind dialup connections don't have enough bandwidth for most I2-related purposes. Thus, by implication, distance education will likely not be a critically important I2 application area, hype to the contrary notwithstanding.

**9. What about QoS?** QoS ("Quality of Service") is a hot buzz word in Internet2 circles. However, notice that (a) QoS can't manufacture bandwidth where existing bandwidth is simply inadequate, (b) bandwidth via Internet2 isn't in short supply anyway, and (c) the administrative/accounting issues associated with offering "premium" or "better than generic best efforts" service on an Internet scale dominate any technical issues involved.

## Search the Web

A next-generation search engine service pioneered by Fast Search & Transfer (FASTTM) and Dell Computer Corporation is making searches of the *entire contents* of the World Wide Web available worldwide. Currently, FAST's search site at <http://alltheweb.com> offers users 80 million searchable documents, a number that's slated to nearly triple by summer 1999.

FAST's new technology transforms the web search engine from a static application into an "organic" one that grows daily as new web sites are

added. Its advanced search capability uses a high-performance, low-cost software/hardware system that's able to search virtually the entire web in response to every request, with outstanding speed and relevant results.

FAST's unique web search architecture was developed by several Ph.D. students and professors from the Norwegian University of Science and Technology, who founded FAST in 1997. For more information about FAST and its products, see <http://www.fast.no>

# High-Speed Networking Updates

## I2 Connectivity Continues to Expand

In the last three months, a number of new sites have come up on Internet2, including Portland State, the University of Hawaii, Washington State, and the University of Alaska.

Portland State, like Oregon State and the UO itself, makes its I2 connection via the Oregon Gigapop, which is located in Eugene and is operated and managed by the UO.

I2 now also peers with Surfnet and Nordunet. Surfnet is the high-performance network servicing educational institutions in the Netherlands (<http://www.gigaport.nl/>), including Twente, Utrecht, Erasmus, Vrije, and dozens of others. Nordunet is the high-performance network servicing Norway, Finland, Sweden and Denmark. Among other locales, Nordunet serves Oslo, Bergen, Tromsø, Lund, Linköping, Oulu, Uppsala, Umeå, and Gothenburg. For an updated list, see <http://www.ogig.net/routes.html>

The Mexican I2 effort is also coming along (see <http://www.cudi.edu.mx/>)

## UO Joins NLANR Measurement Program

The University of Oregon is now one of more than 50 sites participating in the NLANR Active Measurements Program (AMP) sponsored by the National Science Foundation.

The AMP conducts site-to-site performance measurements across the vBNS and Abilene, tracking connectivity, loss, and round-trip time measurements. To view AMP's performance measurements for the UO, see <http://amp.nlanr.net/active/amp-uoregon/vBNS/body.html>

See <http://amp.nlanr.net> for more information about AMP.

## Internet2 Newswire Debuts

A new high-speed academic and research networking information resource is now available: *Internet2 Newswire*, an online mailing list, offers a way to share news for and about the I2 community. *Internet2 Newswire* reaches nearly 1000 people at Internet2 member organizations, as well as thousands around the world who are interested in advanced networking.

Typical *Newswire* postings include:

- I2-related developments at member organizations
- I2-related event announcements
- additions to the I2 community
- international news of interest to the I2 community

### How to Subscribe

While only I2 members may post to *Internet2 Newswire*, anyone may subscribe: just send email to [listproc@internet2.edu](mailto:listproc@internet2.edu) with **subscribe i2-news** in the body of the message.

Aside from getting up-to-the-minute news, I2 member subscribers also have the opportunity to let the world know what's going on in their organization. Postings are moderated to ensure the list is interesting and relevant.

To see web-accessible public archives of the *Internet2 Newswire*, go to <http://archives.internet2.edu/guest/main/>

## New NLANR Quarterly

Last month marked the debut of *NLANR Packets*, a new web-based newsletter (<http://www.nlanr.net/NLANRPackets/>) intended to serve scientists and engineers at National Science Foundation (NSF) High Performance Connections sites and in the general high-performance networking community.

The new newsletter is published quarterly by the National Laboratory for Applied Networking Research (NLANR), an NSF-sponsored support organization for high-performance networking.

Every three months, NLANR emails subscribers the latest issue's table of contents, article summaries, and links. Instead of changing its table of contents abruptly with each new issue, however, NLANR adds news items incrementally as they arrive and archives older articles. This lets subscribers keep up with networking developments without having to wait for a new issue.

To subscribe, fill out the form at <http://www.nlanr.net/NLANRPackets/subscribe.html> NLANR welcomes contributions of interest to the high-performance networking community—especially items for its calendar of events at <http://www.nlanr.net/NLANRPackets/calendar.html>

If you have questions or comments about the new newsletter, write editor Mike Gannis at [packets\\_editor@nlanr.net](mailto:packets_editor@nlanr.net)

## SETI@Home Is Here!

*SETI@Home*, a program that downloads and analyzes radio telescope data for possible extraterrestrial intelligence signals, is now available from the Internet. You may download the program from <http://setiathome.ssl.berkeley.edu/> More

information about the software and its use is also available from this web site.

**Note:** As always, don't run *SETI@Home* on any shared system or lab machine without first getting permission from the system administrator.



WITH THE  
RIGHT  
RESOURCES,  
YOUR IDEAS  
REALLY CAN  
CHANGE THE  
WORLD.

At Active Voice, our software is making communications easier and faster for virtually every type of business worldwide. We're the leading provider of PC-based voice processing systems. And we're committed to staying out in front for years to come. Repartee®, TeLANophy®, and Lingo™ are just the beginning. What's next is in your hands. Seattle based Active Voice Corporation has the following job opportunities available. We're looking for employees to work in our Seattle office.

### SOFTWARE QUALITY ASSURANCE ENGINEER

**Responsibilities:** • Develop and maintain quality standards for communications software • Develop and execute test plans and automated systems tests • Coordinate with multiple disciplines to define requirements and design features for communications, networking, and desktop software • Ensure quality of software throughout development cycle; from conception through design and development to release **Requirements:** • Strong analytical and critical thinking skills • Ability to analyze problems, communicate, and lead in a team environment • BS/BA or equivalent: CS, EE, Math, or Physics preferred • Experience with communications software and PC hardware, exposure to C/C++ programming a plus • Strong desire to learn about and participate in the software development process **Job Code - SQA-710UO**

### PROGRAMMER

**Responsibilities:** • Design, develop, maintain, and test new and existing commercially available voicemail and call processing software applications for enterprise computing environments • Participate in a cross discipline team development environment to obtain creative solutions involving hardware and software in a real-time, telephony environment • Assist with technical documentation and support **Requirements:** • Experience developing PC-based applications in C/C++ under Windows • Strong troubleshooting and analysis skills • BA/BS in one of the following majors: Computer Science, Math, Physics, Electrical Engineering • Strong verbal and written communication skills • Excellent time management skills and a strong desire to develop complete, product oriented solutions **Job Code - SWP-125UO**

### SOFTWARE TEST ENGINEER

**Responsibilities:** • Develop and execute test plans and automated systems tests • Define requirements and design features for communications, networking, and desktop software **Requirements:** • Strong programming skills in C • Ability to analyze, communicate and lead • BSCS/BSEE or equivalent • Experience with communications software, PC hardware, OS/2, and Windows preferred **Job Code - SWT-710UO**

For complete job descriptions, please visit our web site. We offer an energetic and spirited workplace and fantastic benefits packages including medical/dental insurance, 401(k), stock purchase plan, profit sharing, and much more. **Send a resume and cover letter to [personnel@activevoice.com](mailto:personnel@activevoice.com) or Active Voice Corporation, 2901 3rd Avenue, Suite 500, Seattle, WA 98121.** Active Voice is an equal opportunity employer.

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# COMPUTING CENTER GUIDE

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## Computing Center Web Site

<http://cc.uoregon.edu/>

## Microcomputer Services

(Room 202)

- microcomputer technical support
- help with computing accounts, passwords
- scanning, CD-burning, digital video
- help with damaged disks, files
- system software help
- Internet connections, file transfers
- public domain software, virus protection
- software repair (carry-in only, \$60/hr, 1<sup>1/2</sup> hr. minimum)

**346-4412**

[microhelp@oregon.uoregon.edu](mailto:microhelp@oregon.uoregon.edu)

<http://micro.uoregon.edu/>

## Large systems consulting

(Rooms 233-239)

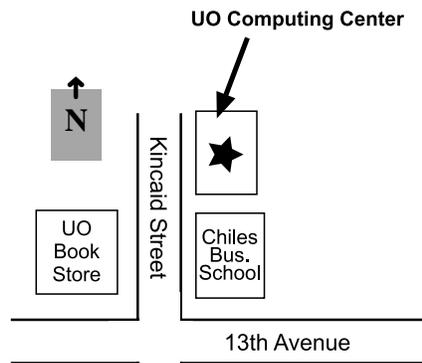
- VMS, UNIX (GLADSTONE, DARKWING, OREGON)
- statistics packages
- email

**346-1758**

[consult@darkwing.uoregon.edu](mailto:consult@darkwing.uoregon.edu)

[consult@gladstone.uoregon.edu](mailto:consult@gladstone.uoregon.edu)

[consult@oregon.uoregon.edu](mailto:consult@oregon.uoregon.edu)



## Documents Room Library

(Room 205)

**346-4406**

<http://cc.uoregon.edu/~docsrn>

## Electronics Shop

For computer hardware repair, installation, and upgrade services, call **346-4403**.

## Network Services

Provides central data communication and networking services to the UO community.

**346-4395**

[nethelp@oregon.uoregon.edu](mailto:nethelp@oregon.uoregon.edu)

<http://ns.uoregon.edu>

## Modem Numbers

Dial-in modem numbers for UOnet, the campus network:

- V.90/x2 **346-6520**
- Kflex/V.90 **346-3565**
- V.34+ (33.6 Kbps) **346-5975**

## Computing Center Hours

Sunday	9 am - 8:30 pm
Monday - Friday	7:30 am - 8:30 pm
Saturday	9 am - 4:30 pm

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COMPUTING NEWS  
UO COMPUTING CENTER  
1212 UNIVERSITY OF OREGON  
EUGENE, OR 97403-1212