APPLE CUSTOMER PROFILE

SCRIPPS CLINIC AND RESEARCH FOUNDATION

Scripps Clinic and Research Foundation does advanced biochemical research, which demands a mix of computing resources to capture and analyze data and access international networks. They needed a standard platform to run UNIX applications and use a wide range of TCP/IP internetwork services.

They chose Macintosh.

Scripps Clinic and Research Foundation
Division of Preclinical Neuroscience and Endocrinology
La Jolla, California

COMPUTER SYSTEMS
Apple Macintosh Plus, SE, SE/30, II, IIcx, and IIfx personal computers
Convex MiniSupercomputer
Cray supercomputer
Digital VAX minicomputer and MicroVAX™ II/GPX computer
Hewlett-Packard 9000 computer
IRIS Workstation
Sun SPARCstation 370

APPLICATIONS
Operating systems: Macintosh, A/UX
Data acquisition: Telnet, FTP
Databases: Informix Wingz, ORACLE, ACIUS 4th Dimension, FoxBASE+/Mac from Fox Software, Claris FileMaker®, Ingres
Electronic mail: UNIX SMTP mail
Learning/Reference system: Silicon Beach SuperCard, Claris HyperCard
Reports: FoxBASE+/Mac, Microsoft Word, Microsoft Excel, Wingz, ORACLE, 4th Dimension
Scientific/Lab data/Research: Wingz, ORACLE, X Window System Version 1 Release 4 (X11R4)

NETWORKING AND CONNECTIVITY
Bridges: Cayman GatorBox
Digital VAX connectivity: FTP, Telnet, NFS, X Window System Version 1 Release 4 (X11R4)
File server: AppleShare®
Network protocols: LocalTalk, TCP/IP, Apple EtherTalk, EtherPort, Kermit
Network topology: Ethernet, DECnet™ , FDDI
Terminal emulator: Apple MacX
Telecommunication protocols: V.35, T1

PERIPHERALS
Apple StyleWriter®, ImageWriter®, and LaserWriter® printers
Apple scanners
Dove FaxModem
Hewlett-Packard DeskJet and LaserJet printers
Hewlett-Packard plotters
Liberty external hard drives
MassMicro removable hard drives
MicroNet Technology Micro/Optical Storage
Microtech scanners

Company Background

Based near San Diego, California, Scripps Clinic and Research Foundation is one of the world's leading centers for neuropharmacology, the study of interactions between drugs and brain cells. Most of the Scripps staff members are scientists who specialize in areas such as neuroanatomy and neurophysiology. By locating the physical areas of the brain associated with particular dysfunctions, these researchers hope to further the diagnosis and treatment of such disorders as AIDS, Alzheimer's disease, alcoholism, and schizophrenia.

"Macintosh is a low-cost solution that gives us sufficient power to do what we need, at a tenth the cost of a UNIX workstation"

The Institute has 200-plus Apple® Macintosh® computers, many of which are found on the desks of scientists. Since UNIX is the operating system commonly used in the scientific environment, the Macintosh computers are equipped with A/UX® 2.0, Apple's version of UNIX®. A/UX enables Scripps researchers to exchange information seamlessly with a variety of other computers and also provides them with a low-cost but high-powered scientific computing platform.

Access to Many Systems

"Macintosh is a low-cost solution that gives us sufficient power to do what we need, at a tenth the cost of a UNIX workstation," says Dr. Warren Young, director of neurosciences computing at Scripps. "We use a lot of computers in science: Sun, many VAX™ systems, Cray, and Convex. But you can't have a large computer in every part of the laboratory. Instead, we have Macintosh computers on desks and benchtops to connect to the large machines. The Macintosh not only lets you look at data, but also allows you to merge the data with other things you're doing, such as your research paper. Macintosh lets you do it all in one place."

At Scripps, Apple LocalTalk® twisted-pair wiring connects most Macintosh systems. A single gateway links the LocalTalk networks to an Ethernet backbone running TCP/IP. According to

PROFILE AT A GLANCE
Scripps Clinic and Research Foundation, La Jolla, California.
Research and Development—Data capture, analysis, visualization, and integration; three-dimensional modeling.
Organizational Productivity—Data sharing, network communications.
Industry—Biochemical research.

Young, the LocalTalk networks provide low-cost networking at sufficient speed for most of his users. For other, more specialized cases, where speed is more important, computers are connected directly to Ethernet through NuBus™ Ethernet cards and communicate via Apple EtherTalk® or TCP/IP.

Most researchers use Macintosh computers to access a broad range of TCP/IP network services, transferring files via FTP from one computer to another. With Macintosh, users log on to UNIX host computers via Telnet, rlogin, or X. Then they access resources such as databases and remote devices, including light, electron, and laser microscopes, and MRI and MEG systems. And they send electronic mail globally via UNIX SMTP mail.

UNIX interfaces. The Macintosh interface is popular because it takes the drudgery out of typical UNIX computing. "Our scientists really don't care for the awkwardness of command-line–oriented operating systems, or the cryptic jargon of UNIX or VMS," says Young. "That's why A/UX 2.0 is a godsend."

The neuropharmacology department at Scripps provides several examples of the use of A/UX-equipped Macintosh computers as scientific computing platforms. The first application, called EMMA (Electronic Morphometry Mapping Analysis), allows scientists to capture, map, and analyze neural structures from brain tissues. The EMMA system uses central Macintosh computers with imaging cards as data acquisition systems and image servers. Scientists can access EMMA from remote Macintosh servers so that scientists can visualize the data directly from their Macintosh computers.

"MEG will ultimately provide the scientist with a three-dimensional model that is representative of the average, normal brain," says Young. "Using the Macintosh system, scientists can not only visualize that normalized three-dimensional brain—in any virtual plane or slice they want—but also superimpose their own data to compare it with known data."

The third project in the neuropharmacology department is the Brain Browser database. It has two purposes. First, it allows researchers across the country to share neuroanatomical results, raw data, and graphical images. Second, it standardizes physical coordinate reporting so that researchers using different dissection techniques can effectively compare their data.

Brain Browser is a Claris® HyperCard® application integrated with an ORACLE database. Scientists can access the database and add their own research via modem or by using the TCP/IP protocol over the Internet network. Young wants to provide a solid, central foundation to neuroscientists who would like to share data, and is working with the Institutes of Medicine and the National Library of Medicine to promote national support for the project. "We need to show the neuroscience community that computer-based systems can be useful, and fun," says Young. "The Macintosh has played a supporting role in that task, and will continue to do so."

"What used to cost us thousands of dollars per month for dial-up services, specialized subscription services, CD-ROM, and so forth is now available at much lower cost to every user. And it's easy to use because it's done through Macintosh."

Scripps Macintosh users also frequently log on to the statewide University of California network. Many access a Sun system at the UC Santa Cruz campus that indexes scientific publications. "What used to cost us thousands of dollars per month for dial-up services, specialized subscription services, CD-ROM, and so forth is now available at much lower cost to every user," says Young. "And it's easy to use because it's done through Macintosh."

Macintosh in the Lab

Apple's A/UX runs UNIX applications, including X Window applications, with the option of using the Macintosh interface or standard computers over TCP/IP and NFS networks, using Apple MacX™ software to view moving images.

The second project, MEG (Magnetic Encephalography), is a method of recording the magnetic flux coming from the brain. "Studying the brain's magnetic fields allows us to determine the basic underlying composition and structure of the brain," says Young. MEG currently runs on a Hewlett-Packard 9000 system, which is being replaced by a Sun SPARCstation 370 running the X Window System. Macintosh users currently employ terminal emulators or Kermit to extract data from the database and copy the data into spreadsheet programs, such as Informix Wingz, for analysis. Young plans to install MacX

Cost-Effective UNIX Systems

The neuropharmacology department notes the measurable cost advantages of the Macintosh as a UNIX platform. "We aren't in the business of creating low-cost systems; we'll

spend whatever it takes to build our computer systems for our scientists," says Young. "But the marvelous thing about Apple and A/UX is that you get power, sophistication, expandability, complete technical support, and the ability to run Macintosh software, all rolled into a package that costs a fraction of the price of competing systems."

Dr. Floyd Bloom, chairman of the department, says that Macintosh networking has enhanced his organization's research capabilities and overall efficiency. He points out that for very advanced studies, Scripps does not have the computing power or software routines to model an entire brain.

"We ship our data to a collaborator at another location who's spent years putting brain data together," says Bloom. "The network is so transparent that I can be running a program 300 miles away and not be aware of the distance."

With Macintosh, Scripps has also reduced the number of people who handle computer repair and maintenance. And Macintosh users require less training, which allows them to spend more time in their research.

Apple Computer, Inc.