

UNIVERSITY of PENNSYLVANIA

# Almanac

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Photograph by Tommy Leonardi

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On February 14 the computer world honored ENIAC and the Penn pioneers who ushered in the Information Age at SEAS 50 years ago. In this photo, Mayor Ed Rendell, left, and Vice President Al Gore flank President Judith Rodin in a midday procession to Irvine Auditorium, where Dr. Rodin presented Penn's Medal for Distinguished Achievement to Mr. Gore. Later, members of the original ENIAC team and students representing the next wave joined the ceremony as ENIAC was rebooted. Please see Dean Farrington's thank-you note on [page 3](#) as well as *Compass* coverage of the computer's birthday (pp. 4-8) and a center [pullout](#) containing key speeches of the day.

## COUNCIL

### Agenda for University Council

Wednesday, February 21, 1996

4-6 p.m. McClelland Hall, The Quad

- I. Approval of the minutes of January 17, 1996, meeting
- II. Reports (President, Provost, and Chair of Steering; Chairs of GAPSA and UA); Chairs of PPSA and A-3 Assembly (Reports and clarifications, 30 minutes)
- III. Representation on University Council. (30 minutes)
- IV. Committee on Communications Draft Policy on Privacy of Electronic Information (20 minutes)
- V. Update and discussion on administrative restructuring. (30 minutes)
- VI. Adjournment by 6 p.m.

### Chaplain's Search Committee

Provost Stanley Chodorow has announced the appointment of the search committee for a Chaplain, the post now held on an interim basis by The Rev. Frederic Guyott, III.

The committee consists of:

Barbara Cassel, Office of the VPUL  
Stephen Dunning, Religious Studies  
Patrick Harker, Transportation, *Chair*  
Susie Lee, Col '97  
David Ruderman, Center for Judaic Studies  
Dave Slarskey, Col '98

## DEATH

**Dorothy Everett Martin**, a teacher and social worker at Penn for 18 years until her retirement in 1988, died February 13 at the age of 76.

A specialist in family planning, sex education and abortion counseling, Mrs. Martin was an instructor in psychiatry at Penn's division of family study from 1970 until 1977. She then moved to the School of Social Work to teach a course on human sexuality to graduate students.

With her husband, Dr. Samuel Martin, she also helped shape the initial Ware College House's focus on health and society. As co-masters they conducted programs on aspects of public health for more than a hundred Penn students who were interested in working in the field.

At various times, Mrs. Martin had also served as director of counseling at Philadelphia Family Planning Inc.; supervisor of social work at Albert Einstein Medical Center; and supervisor of social work with the Philadelphia schools in a special program for teenage parents.

Mrs. Martin also contributed as a consultant on staff sex education to Home Health Services, Women's Medical Services Inc., Planned Parenthood and other social-service agencies. Her commitment and dedication in these areas began in Massachusetts, where she served as a field director for the Planned Parenthood League and a member and president of the League of Women Voters in Brookline, where she and her family had lived until the death of her first husband, Donald D. Matson.

She moved to Philadelphia in 1970 when she married Dr. Martin, now director emeritus of the Clinical Scholars Program. Besides her husband, she is survived by her daughters Martha M. Ehlers and Barbara B. Matson; sons Donald E. and James E. Matson; a sister, and five grandchildren. A memorial service will be held at a future date.

### Service for Dr. Goldstein: February 29

A memorial service will be held Thursday, February 29, for Dr. Kenneth S. Goldstein, the distinguished emeritus professor of folklore and folklife who died on November 11 (*Almanac* November 21/28). Members and friends of the University are welcome to attend the service at 5 p.m. on the 6th floor of Van Pelt Library.

## Perelman Quad's \$2 Million Study Center

College alumnus David Silfen and his wife, Lyn, have given \$2 million for the David and Lyn Silfen Student Study Center in the Perelman Quadrangle.

The gift will create a sculpted, light-filled single-story addition on the north side of Williams Hall—the new addition that Perelman Project planners have referred to as the “lantern” or beacon that will change the ambiance of the area at night. It will be a semicircular pavilion, with a computer-equipped study lounge, lobby, cafe, and meeting rooms.

The Silfens “look forward to a creatively designed setting where small to large groups of students will be able to congregate and interact at any hour of the day,” Mr. Silfen said. President Judith Rodin called the Silfen Study Center both a “much-needed” space and “an exciting addition to the campus.”

In the design by Philadelphia architects Venturi, Scott Brown and Associates, Inc., the east steps from Williams Hall to Admissions Walk and Houston Hall will be removed and filled in with a new entry to Williams, student activities offices and meeting rooms, including a meeting room in the Silfen Center.

Mr. Silfen, a partner in the New York investment firm of Goldman Sachs, is a 1966 graduate of the College of Arts and Sciences, for which he currently serves as an Overseer. The gift commemorates his 30th Reunion in May. A history major in his Penn undergraduate days, he is a strong advocate of the liberal arts. Past gifts from the Silfens include a term chair in American Art History—now held by Dr. Elizabeth Johns—and Art History Junior Travel Fellowships. Mr. Silfen has also helped underwrite *The Penn History Review*, published by undergraduate history majors. He has been an SAS Overseer since 1991 and served on the gifts committee for his 25th Reunion.

Mrs. Silfen is also a strong supporter of the liberal arts, now serving as a member of the History of Art Visiting Committee. Their son, Adam, is a sophomore in the College of Arts and Sciences.

## FROM THE PROVOST

### On the Communications Decency Act and its Implications

*To the Penn community:*

Recent federal legislation has significant implications for all members of the Penn community who use telecommunications or electronic networks. The Telecommunications Act of 1996, signed into law by President Clinton on February 8, includes provisions, known as the Communications Decency Act, that prohibit dissemination of certain materials to persons under the age of 18.

One provision prohibits using a telecommunications device to make and transmit any “obscene or indecent” communication to anyone known to be under 18. Another prohibits using any “interactive computer service” to display, in a manner available to anyone under 18, any communication that, “in context, depicts or describes, in terms patently offensive as measured by contemporary community standards, sexual or excretory activities or organs.” While the terms “indecent” and “patently offensive” are not defined in the law and their meaning is unclear, the terms may be construed to include materials with literary, scientific, artistic, or educational value.

The constitutionality of these provisions has been challenged in Federal court on the grounds that they prohibit speech protected by the First Amendment and are impermissibly vague and overbroad. The court has entered an order that temporarily bars enforcement of the prohibition against “indecent” communications, but the order does not bar enforcement of the Act's other provisions. Penn believes the constitutional challenges are important and should be resolved quickly, because we believe the Act may chill the free exchange of ideas and information that is central to the University's mission. It may also significantly restrict the development and usefulness of new forms of electronic communication.

Members of the Penn community should be aware, however, that although enforcement of the “indecent” provision is temporarily barred, the bill's other provisions are and will remain in effect unless overturned or repealed. Those provisions subject violators to substantial criminal penalties. Individuals or institutions that make information or materials available on electronic networks have an obligation to comply with the statute. Individuals who distribute information through the University's computing resources are responsible for the content they provide and may wish to evaluate the material they make available in light of the Act's requirements. The University is unable to prevent information that is posted to publicly accessible resources, such as newsgroups and homepages, from becoming available to persons under the age of 18.

We regret the uncertainty and disruption caused by this legislation and will try to keep you informed (via *Almanac* and the University's home page on the WorldWideWeb) of significant developments as they occur.

— Stanley Chodorow, Provost

## From The College: Undergraduate Research Grants

One of the great strengths of the University of Pennsylvania is its capacity to offer significant research experiences to its undergraduates. The College of Arts and Sciences each year makes available a number of Undergraduate Research Grants to support original research and scholarship by students in the College. With eight grants developed and funded in perpetuity by alumni and the College Alumni Society, this program has grown with the subsequent establishment of the Dean's Research Award by alumnus Dr. Harry E. Gruber.

These grants are intended to help pay the costs of research projects proposed by students and approved by a faculty panel.

The grants will be administered according to the following guidelines:

1. The project shall represent original research or scholarship allowing the student to make a significant contribution to knowledge.

2. The project shall be largely conceived and executed by the student and not simply represent faculty research in which the student assists.

3. Grants will be made only for research that is conducted after the proposal has been approved. Decisions will be made by April of each academic year for projects that are to be carried out during the summer or the following academic year. In no case will projects already completed be funded.

4. Each approved project shall have a faculty advisor who will normally be a member of the SAS standing faculty. In some cases, a qualified advisor from outside the SAS faculty may be assigned, subject to the approval of the student's undergraduate chair or program director.

5. Students awarded these grants are expected to document their research in the form of a formal research paper and to present their papers orally at a meeting of faculty and peers in their fields. The meetings will be held prior to or during the subsequent Alumni Weekend. Copies of the papers shall be submitted to the alumni donors as well as the College Alumni Society or other funding organization as appropriate. Recipients are expected to complete their projects before graduation, and therefore students in their final semester are ineligible to apply.

6. Funding provided should be used to help defray the student's research costs and should not be a substitute for financial aid for which he or she is otherwise eligible nor for the advisor's research funding.

Types of expense to which the funds may be applied include travel to libraries, museums, archives, and research sites; living expenses that would enable the student to remain at the University during the summer; research equipment and supplies, including books, films, and photocopying; computer or laboratory fees; and, specialized computer peripherals and software. Items costing \$500 or more with a useful life of one year or more must be purchased with a University purchase requisition and will remain the property of the University.

Last year's awards ranged from \$750 to \$1,000; the maximum for each award this year is expected to be about \$1,000.

Students will be expected to submit a final report of expenditures to the Associate Dean for Undergraduate Education.

### Application Procedures: Proposals Due by March 1

1. Obtain an application form from:  
Dr. Robert A. Rescorla  
Associate Dean for Undergraduate Education  
College of Arts and Sciences  
133 South 36th Street, Mezzanine/3246
2. In consultation with a prospective faculty advisor and with the undergraduate chair in your major department or your major program director, prepare a prospectus describing the background to the proposed topic, the main thesis or hypothesis to be investigated, the method or methods to be used, and a budget.
3. Request a letter of recommendation from your advisor in support of your project.
4. Obtain signature of your project advisor and your undergraduate chair on the application form.
5. Make 7 copies of the entire proposal (application form, prospectus, and budget). Give one copy to your undergraduate chair, one copy to your advisor, and the other 5 copies, plus the signed original, to the Associate Dean for Undergraduate Education.
6. Research involving animal or human subjects or hazardous materials must also be submitted at the same time for approval by the relevant University oversight committees. Students should consult with their advisors.
7. Proposals will be reviewed by a faculty committee designated by the Associate Dean for Undergraduate Education.
8. Students whose projects are approved may want to register for Independent Study in their departments or programs. Credit may be given for one or two semesters, at the discretion of the undergraduate chair or program director.



## Thanks

*Thank you to all the wonderful Penn people who worked so hard and so enthusiastically to deal with the complexity of a Vice-Presidential visit and make the ENIAC Celebration "a picture perfect Wednesday, as the University captured the national spotlight". (The Daily Pennsylvanian 2/16/96).*

*If we missed your name because of the short press deadline, please send an email note to [stbrown@eniac.seas](mailto:stbrown@eniac.seas) or call 8-6564. We in SEAS want to personally thank everyone who helped make the ENIAC 50th such a great success.*

— Greg Farrington, Dean  
School of Engineering and Applied Science

Janet Ackerman	Gerald J. Leddy
Sulynn Amrhein	Shane Lipson
Helen Anderson	Eileen Lynch
Richard J. Archer	John MacDermott
Amelia Balonek	Janice K. Marini
Barbara A. Beck	Franc Marmo
Marc Berman	Dan Martineau
Roopa Bhatiani	Carl Maugeri
Matt Bixler	Sarah M. McLaurin
Marge Brittingham	Christian Metcalfe
Dennis Brown	Donna Milici
Stephen Brown	Ellen Morawetz
Glenn Bryan	David Morse
Rick Buckley	Micheline Murphy
Lori Busch	Rose Murphy
Jon Caroulis	Nancy Jean Nowicki
Doug Carroll	Chris Olsen
Michael D. Carroll	Carter Page
Tim Carvis	Michael Palladino
Jamie Chan	Patricia D. Pancoast
Allison Chow	Patricia Petz
Kevin Chun	Alisa Plesco
Virginia B. Clark	Tracey Quinlan
Jennifer Cohen	Josh Rockoff
Therese Conn	Lance Rogers
John Connell	Maureen Rush
Christopher R. Cook	Esaúl Sanchez
Joe D'Emilio	Lisa Sasser
Carlos Decena	Carol Scheman
Bonnie N Devlin	Lee Schroder
Faquiry Diaz	Stephen D. Schutt
Cathy DiBonaventura	Tom Seamon
Mark Ford	Winnie Smart-Mapp
Deborah Fox	Ben Smith
Flo Freeman	Kim Smith
Marie Gallagher	Kirby Smith
Al Gore	Sandy Smith
Felicia Green	Selden Smith
Jeffrey Greenhouse	Kenneth Stanley
Sid Holmes	Sean Steinmarc
Phyllis Holtzman	Barbara R. Stevens
Yuwei Huang	Peter Stris
Martha Jablow	Sid Suri
Susan Golden Jacobson	John Teitel
Jerry Janda	Elaine Thomas
Franca Jenkins	Dan Updegrove
John Keleher	Jean Marie Vance
Camille Kellett	David Wachs
Jane Kiesel	Estelle Waters
Linda Koons	Ira Winston
Margaret Kowalski	Kathy Wohlschlaeger
Billy Kung	Nancy Wright

The University of Pennsylvania Band



# VP and VIPs Celebrate ENIAC's Golden Age

COMPASS  
Feature

Crossing 33rd Street Wednesday, a graduate student noticed a limousine, police cars and a small crowd gathered on the east side of the street.

"What's going on?" she asked a student leaning against his bike.

"Al Gore. You know, ENIAC."

Flying above the nearby intersection, the ENIAC banner, commemorating the giant machine that spawned the computing revolution, snapped in the breeze above Walnut Street. The crowd waited quietly for the vice president to exit the Moore Building, where he had switched on a portion of the original ENIAC.

As most people at Penn know by now, Vice President Gore came to campus Feb. 14 to celebrate the 50th anniversary of ENIAC, the world's first large-scale, general-purpose, all-electronic digital computer, which was built at the University's Moore School of Engineering and Science.

Mr. Gore served as honorary chairman of the ENIAC 50th anniversary, and his visit to Penn marked the high point in a year-long celebration of events that commemorate both the history of the computer and its continuing impact on education, science, business, communications, the arts and culture.

## THE SPEECH

The vice president's 45-minute speech was peppered with wide-ranging references—from Fred Flintstone to inductive and deductive reasoning, to logarithmically processed bits of information and "distributed intelligence." (*See text, page S-3.*)

To drive home his key point—that

federal funding of scientific research should be maintained rather than cut, as the Republican Congress has proposed—Mr. Gore frequently repeated the lyric, "You can't start a fire without a spark,"

The vice president said, "I very strongly disagree with congressional leadership" that would reduce research funding by one-third by the year 2002 while increasing funds for military research. "This crowd talks like George Jetson. But they support policies more appropriate for Fred Flintstone," he said, adding that he supports military research, but not at the expense of civilian research projects or student loans.

Federal research dollars should continue to provide the spark for technologies and businesses that will "create jobs, build businesses and lift lives."

In introducing Mr. Gore, Penn President Judith Rodin cited his leadership as "one of the first in Washington to recognize the role of the information revolution." Dr. Rodin presented him with the University of Pennsylvania Medal for Distinguished Achievement.

The vice president's speech demonstrated his familiarity and comfort with the technology of the information age. He noted that humans have "low bit rates but high resolution." In referring to the Advanced Research Project Agency, he mentioned three of its most successful results: e-mail, the Internet, and Mosaic software used to surf the World Wide Web. The government, he stressed, provided the seed money that led to these developments.

He said that he uses e-mail to communicate with his own children who are away at college. And

he held up a musical Valentine card to demonstrate how far computing technology has progressed since ENIAC. The tiny microprocessor in the card, he pointed out, held about as much computing power as ENIAC had.

The vice president linked the invention of the computer in Philadelphia with the U.S. Constitution that was written across town over two centuries ago. "The Constitution created here in this city made the concept of representative democracy possible," he said, and now—since ENIAC—there has been "a quantum increase" in the ability of the average



Photographs by Tommy Leonardi

from Bruce Springsteen's "Dancing in the Dark."

The vice president used the line to illustrate the significance of ENIAC, which was developed with government funds to speed up artillery-firing calculations in the 1940s. He said, "ENIAC and the revolution it ignited ... changed our world."

"Government supplied the initial flicker," Mr. Gore said, "and individuals and companies have provided the creativity and innovation that kindled that spark into a blaze of progress and productivity that's the envy of the world."

citizen to participate in self-government. Calling the Constitution “the most brilliant piece of software,” he said that modern technology launched by ENIAC “will now empower our citizens in brand-new ways.”

Mr. Gore’s speech was not entirely high-tech and serious. As he and Dr. Rodin walked on stage, the Penn Band struck up Paul Simon’s song, “You Can Call Me Al.”

The smiling vice president waved to the band in the balcony, placed his palms together, bowed slightly and nodded a silent “thank you.” Mr. Gore began his speech with some self-mocking humor. Referring to the recent frigid weather, he said, “People who don’t know me better thought I was frozen stiff.” He then stood immobile for several moments while the audience of about 1,500 Penn students, faculty, schoolchildren and honored guests chuckled.

He also told the audience that his wife, Tipper, had surprised him upon his arriv-

al in Philadelphia that morning. Mrs. Gore, who was traveling on the West Coast, had arranged for a live Valentine, dressed in a red satin costume, to greet him at the airport.

## THE SWITCH-ON

After concluding his speech with a call to “keep the American fire of creativity blazing” by continuing to invest in research and innovation, Vice President Gore joined Dr. Rodin and Philadelphia Mayor Edward G. Rendell for a stroll across campus to the Moore Building to reboot a portion of ENIAC. On the way, they posed for a photo op in front of the Benjamin Franklin statue at College Hall.

Dignitaries, politicians and several “ENIAC pioneers” crammed a small room at the Moore Building for the switch-on. Upon instructions from Tim Rauenbusch (SEAS and Wharton

’96), Mr. Gore pushed two white buttons: one lit the number “46” when the computer added the digits that marked the years of its creation, and another, “96,” for the anniversary year.

Just before pushing the buttons, the vice president joked, “This is one small step for man ... no, no.” But he again used the occasion to bridge Philadelphia, “the birthplace of representative democracy” with Penn where ENIAC “sparked the information age.”

During the switch-on ceremony, which was simulcast to several on-campus locations, Dr. Rodin praised the vice president as “a visionary and a realist ... the kind of leader who charts a new horizon and the process that will get us there.”

She also introduced Unisys CEO James Unruh, co-chair of the ENIAC anniversary celebration, and Mayor Rendell, who pointed out

that the City of Philadelphia has joined the computer age with its own home page on the World Wide Web.

Congressman Robert Walker (R-Pa), chairman of the House Science Committee, told the group that he wanted to coin a new phrase, “Since ENIAC, there’s no turning back.” Science and technology, he pointed out, are em-



Photographs by Tommy Leonardi

*At the ENIAC switch-on: upper left, Rep. Robert Walker with Herman Goldstine and Tim Rauenbusch; lower left, Vice President Gore and P. Roy Vagelos, chair of the Penn Trustees; upper right, Unisys CEO James Unruh, co-chair of the ENIAC anniversary; lower right, Mr. Gore and President Rodin with Mr. Rauenbusch and Dr. Goldstine.*

powering people and creating power in many places, not only in government and business.

The switch-on ceremony was an occasion to recognize some of those pioneers who participated in the development of ENIAC, such as Her-

fessor Jan Van der Spiegel holding a microprocessor to demonstrate that a tiny black dot now contains the same amount of computing power as ENIAC had.

Almost 100 members of the print and broadcast media covered the ENIAC events. All had to be credentialed in

rington.

Other calls came from the BBC, Der Spiegel, a Dutch television station and several television stations in Canada. The Washington Post, The New York Times, the Los Angeles Times, Newsweek, U.S. News & World Report and "Good Morning America" reported ENIAC's anniversary.

And the worldwide attention wasn't limited to the media. Netizens from around the globe also showed interest in the event.

Thanks to the MBONE (multicast backbone), anyone with Internet access, a Unix workstation and the appropriate software was able to watch the vice president's speech in real time.

"The MBONE is a virtual network that is superimposed on top of the Internet," explained Paul T. Keener, information

systems specialist for the Department of Physics and Astronomy. "That is, it uses the Internet as its physical transport, but it uses its own routers and routing mechanism."

At any

given time, 60 to 70 people watched Mr. Gore's speech via the MBONE. As some viewers logged off, others logged on.

Approximately 100 Internauts saw part or all of the speech. These Internauts hailed from Sweden, Germany, England, Japan and across the United States.

Some members of the Penn community also used the MBONE to witness the event. MBONE networks were set up in 3401 Walnut St. and the David Rittenhouse Labs. A third MBONE network



man Goldstine, an Army technical liaison to the ENIAC project, and the widows of ENIAC creators John Mauchly and J. Presper Eckert.

At 2:15 p.m. the vice president emerged from the Moore Building and waved to a waiting crowd that applauded from the other side of the street. With a nod to Secret Service agents, Mr. Gore strode across 33rd Street to greet the crowd, many of whom were engineering students. As he made his way to the corner of Walnut Street, the vice president shook hands as several people called out "Congratulations" and "Thanks for coming." Once he entered his limousine and the crowd dispersed, one student commented to her friend, "Cool. I wish I'd brought my camera."

A Penn employee, walking back to his office, told a co-worker, "I just met what's-his-name, Al Gore."

## WORLDWIDE ATTENTION

The 50th anniversary of ENIAC drew attention from the three major networks and local stations, which broadcast segments Wednesday evening. That morning, USA Today published a page-one story with photographs of the original ENIAC and Electrical Engineering Pro-



Photographs by Addison Geary

*Upper left, Dan Norbeck, of City Web, showed Josh Marcus (SAS'98) Philadelphia's new Web site at the tech fair. Above, Mark Aseltine, GSFA computing director, Provost Stanley Chodorow and James R. O'Donnell, professor of classical studies, checked out GSFA's presentation.*

advance by the White House press office. Secret Service agents, with bomb-sniffing dogs, "swept" cameras and other equipment—including the band's instruments and cases—before the vice president's appearance.

In the week leading up to the anniversary, the University's Office of News and Public Affairs was besieged with ENIAC queries. A Johannesburg radio station wanted a live interview. The call was relayed to SEAS Dean Gregory Far-

was connected in the Moore ENIAC Museum.

## THE TECH FAIR

The ENIAC celebration was a smash, but that was a look back at what happened then. In Houston Hall's Bodek Lounge, Penn students, faculty and staff offered several hundred interested visitors a glimpse of what's happening now.

The Educational Technology Showcase featured 26 technology projects from 16 University schools and offices, plus one surprise—the brand-new Web site for the City of Philadelphia. There was something for everyone: gee-whiz digital animation from the Graduate School of Fine Arts; a restored, groundbreaking experiment in optical neurocomputing from the engineering school; self-paced course work and on-line references for School of Veterinary Medicine students; an integrated software package from Wharton Computing that answers the all-important question, "How do I get to my e-mail?"; as well as several others.

One of the most impressive projects involved some pretty heavy work: data mining. It functions much as it sounds: Computers pull chunks of information from enormous databases, process the pieces in "embarrassingly parallel" fashion, then combine the results. Particle physics experiments generate just such mountains of data, and Physics Professor Robert Hollebeek, working with counterparts at the University of Illinois at Chicago and the University of Maryland, has assembled a virtual supercomputer to

scale those mountains.

The "computer" is actually a scalable network of clusters of computers at each of the three sites, connected by ultrafast, high-capacity lines.

Users at any of the three schools can draw on as many or as few of the connected computers as they need to perform experiments, research and data analysis. The National Scalable Cluster Project, as the network is called, draws on previous work in distributed systems and networked supercom-

puting at Penn, and went live last summer. It has already caused a sensation in the supercomputing world.

## THE DINNER

To top off Wednesday's festivities, a banquet was held in ENIAC's honor. A crowd of 1,100 people from the University, the city and the region came to the Marriott Hotel to wish the first computer a happy golden anniversary.

Through speeches and multimedia dem-

onstrations, guests were shown the evolution of computers. A video demonstrated how the technology progressed over the years and included clips of the pioneers who made ENIAC possible.

One of the evening's highlights came after the first course. Amid a blast of lasers and colorful images, Loren E. Smith, chief marketing officer and senior vice president of the U.S. Postal Service, unveiled a new stamp commemorating computer technology.

For Penn, the stamp was a reward for a great deal of time and work. Several years ago, the University submitted a proposal for a stamp dedicated to the computer age. The proposal was sent to the Citizens Stamp Advisory Committee. The committee, which is independent of the U.S. Postal Service, is deluged with stamp suggestions each year. The committee accepted Penn's idea, but the stamp's design went through several creative changes. Until its unveiling Wednesday night, its final appearance was a mystery.

The chosen design depicts a brain covered with small circuit boards and binary coding. The 32-cent stamp has not yet been printed but is expected to be available later this year.

While the Postal Service marked computing's past, Dr. Stuart Zweben, president of the Association for Computing Machinery (ACM), James Unruh, of Unisys Corp., and William Wulf, chairman of the Computer Sciences and Telecommunications Board of the National Research Council spoke of computing's future. The evening



*Dr. Rodin, Vice President Gore and Mayor Rendell paused for a photographic moment beneath Ben.*



Photographs by Tommy Leonardi

*ENIAC programmer Barkley Fritz, center, and John Holberton, who supervised programmers in the 1940s, talked to Dr. Rodin.*



ended with a spectacular light show.

Organizing sponsors included Penn, the ACM, the City of Philadelphia, the Franklin Institute, the Free Library of Philadelphia, Philadelphia Convention & Visitors Bureau, Temple University, Unisys, and the U.S. Army.

## RELATED EVENTS

While the vice president's appearance dominated the ENIAC anniversary, many other events have been held and will continue to run. The papers of ENIAC co-inventor John Mauchly went on display Wednesday at the Van Pelt-Dietrich Library; the exhibit will continue through March 25. A virtual version of his papers is also available on the Internet: <http://www.library.upenn.edu/special/exh/mauchly/mauchlyintro.html>.

Celebrating a half-century of computing has not been confined to the technological, scientific scene. The computer's impact on art and culture is being acknowledged throughout the year, as computer-generated and computer-inspired works are featured on campus and across the city in connection with the ENIAC anniversary.

The Institute for Contemporary Art is featuring "Withershins," a prize-winning

interactive installation by video artist Gary Hill. As visitors wander through an aluminum maze, spoken text is triggered and translated into sign language. On March 19, ICA will present lectures and

demonstrations on "Computers and the Creative Mind." On the same day, Movement Theater International will feature movement and performances that use technology in their creation.

Art that employs the computer as both medium and studio is on display at Nexus Gallery, 137 N. Second St., through Feb. 24. Also in Olde City, Silicon Gallery, 139 N. Third St., is showing a "Digital Revision" exhibit that brings together leading computer artists. In one piece, a viewer

can look through a peephole into a blazing furnace and see a ceramic mug melt down—virtually. The gallery can also be visited on the World Wide Web: <http://www.netaxs.com/silicong/>.

For five days before the anniversary, the rotunda at One Liberty Place exhibited "You've Come a Long Way, ENIAC!" that combined computing history—beginning with the abacus—with a contemporary look at the role the computer plays in daily life. The exhibit was dismantled and moved to the Marriott for the dinner.

The American Music Theater Festival

will highlight new uses of technology in theater art from March 20-24 at the Annenberg Center. From May 7 through July 31, the Rosenbach Museum and Library will present



Photographs by Tommy Leonardi

***After his speech at Irvine, Vice President Gore took a brief stroll through campus on his way to Moore, where he rebooted ENIAC.***

an exhibition, "The Impact of Computers on the Textual

Editing of James Joyce's Ulysses."

ENIAC-related cultural events continue into the fall when the School of Arts and Science will offer an electronic music concert on Sept. 30, and the Philadelphia Orchestra will present new works for computers and orchestra by Roger Reynolds on Oct. 4-5 and 8. And next spring the University Museum of Archaeology and Anthropology will exhibit "The Virtual Dig in Archaeology and Museums," March 22, 1997.

## THE CHESS MATCH

The ENIAC may not match up against today's top-of-the-line PCs, but it does share one thing in common with all computers: It was designed to make our lives easier. And since computers can do so much for us, it's a good thing they're on our side. But are they? Not in science fiction. HAL 2000 didn't work

well with humans. The androids of "Westworld" weren't content with fulfilling human fantasies. And "The Terminator" lived up to its name.

Now science fiction has become science fact. As the world witnessed last week, the conflict between man and machine is no longer limited to books and film. From Feb. 10-17, a computer faced flesh at the Pennsylvania Convention Center.

Other than a few pawns, bishops, and knights, there were no

real casualties. Still, the six chess matches between world champion Garry Kasparov and Deep Blue, IBM's supercomputer, had a lot on the line. Humanity was watching to see if one of its own could defeat a machine capable of analyzing 50 billion moves every three minutes.

The ACM—which, like the ENIAC, is celebrating its 50th anniversary—sponsored the contest. Six-hundred chess fans, all human, came to see if gray matter could beat silicon.

*—Contributed by Martha Jablov, Jerry Janda and Sandy Smith*





# OPPORTUNITIES at PENN

Listed below are the job opportunities at the University of Pennsylvania. To apply please visit:

**University of Pennsylvania Job Application Center**  
**Funderburg Information Center, 3401 Walnut Street, Ground Floor**  
**Phone: 215-898-7285**

**Application Hours:** Monday through Friday, 9 a.m.-1 p.m.

Positions are posted on a daily basis, Monday through Friday, at the following locations:

Application Center—Funderburg Center, 3401 Walnut St. (Ground level) 9 a.m.-1 p.m.

Blockley Hall—418 Guardian Drive (1st Floor and 2nd Floor)

Dental School—40th & Spruce St. (Basement-across from B-30)

Houston Hall—34th & Spruce St. (Basement-near the elevators)

Wharton—Steinberg Hall-Dietrich Hall (next to Room 303)

**Job Opportunities and daily postings** can also be accessed through the Human Resources Home Page (<http://www.upenn.edu/hr/>). A position must be posted for seven (7) calendar days before an offer can be made. The Job Opportunities Hotline is a 24-hour interactive telephone system. By dialing 898-J-O-B-S and following the instructions, you can hear descriptions for positions posted during the last three weeks. You must, however, have a push-button phone to use this line.

The University of Pennsylvania is an equal opportunity employer and does not discriminate on the basis of race, color, sex, sexual or affectional preference, age, religion, national or ethnic origin, disability or veteran status.

WHERE THE QUALIFICATIONS FOR A POSITION ARE DESCRIBED IN TERMS OF  
 FORMAL EDUCATION OR TRAINING, PRIOR EXPERIENCE IN THE SAME FIELD MAY BE SUBSTITUTED.  
 POSITIONS WITH FULL DESCRIPTIONS ARE THOSE MOST RECENTLY POSTED.

## ARTS AND SCIENCES

*Specialist: Nancy Salvatore*

**INFO SYSTEM SPECIALIST II/III (02127NS)** UNIX system manager network six IBM/6000s and fifty DOS and Mac Clients, including perl scripting and C programming; design systems for resource sharing; supervise system programmers and operation of NIS and NFS master server and clients; install and maintain X11 window system (R5) and graphical term; plan, design and install local-area networks using NIS, NFS, TCP/IP and Novell Netware, design systems for managing 100 gigabyte data archive on UNIX system. **Qualifications:** BA/BS plus relevant experience/MS in computer science preferred; knowledge of NFS, TCP/IP, C, shell scripting especially Perl, Novell, DOS, Windows and Mac and software development; experience with end user support; excellent interpersonal/communication skills and problem solving ability. **INFO. SYS. SPEC. II:** four yrs. UNIX systems management and programming or MS with two-three yrs. system management and programming exp. **INFO. SYS. SPEC. III:** five years experience with UNIX. **Grade:** P5/P7; **Range:** \$28,800-37,600/\$35,000-43,700 2-13-95 SAS Computing

**INFO SYSTEMS SPECIALIST II/III (02128NS)** Provide computer support for the Chemistry Dept.; perform UNIX systems administration, desktop computer support, networking, system tailoring, software installation and backups and coordinate hardware repairs; supervise administration of instructional and research computer facility; coordinate ordering and installation of equipment; recommend and track software and hardware and installation of upgrades; assist faculty computer equipment purchases and technical consulting. **Qualifications:** BA/BS plus relevant exp./MS in computer science preferred; knowledge of C, DOS/Windows, MacOS and experience with end user support are required; Fortran knowledge is a plus. **INFO. SYS. SPEC. II:** minimum of four years systems management experience or MS with two-three years system management experience **INFO. SYS. SPEC. III:** five years experience with UNIX. **Grade:** P5/P7; **Range:** \$28,800-37,600/\$35,000-43,700 2-13-96 SAS Computing

## DENTAL SCHOOL

*Specialist: Clyde Peterson*

**DENTAL ASSISTANT II (40 HRS) (0182CP)** Assist chair side utilizing four handed techniques; assist with preparation of patient records; dispense and mix ma-

terials; prepare treatment areas; maintain equipment; expose, develop and mount x-rays. **Qualifications:** High school graduate; completion of accredited dental assisting program; one year direct experience may be substitute for formal education; Pennsylvania x-ray certification required. **Grade:** G8; **Range:** \$17,943-22,400 2-5-96 Dental Care Center

**RECEPTIONIST/TELEPHONE OPERATOR (02133CP)** Under general supervision, operate a multiple call console; route calls to appropriate departments and persons; provide general information to patients and visitors; assist with general office reception/clerical functions as needed; page student and faculty. **Qualifications:** High school graduate; at least six months experience in the operation of a switchboard or console system; pleasant telephone voice and the ability to speak clearly & effectively with a diverse population; some general clerical experience preferred. (Work schedule: M-F, 7:30 a.m.-3:30 p.m.) **Grade:** G7; **Range:** \$14,500-18,100 2-14-96 General Office

## ENGINEERING/APPLIED SCIENCE

*Specialist: Clyde Peterson*

**FISCAL COORDINATOR I (02122CP)** Preparation of proposal budgets and documents for transmittal to sponsor, working with PI's in determining needs and plans; assist with financial reporting of grants; monitor posting and allow ability of costs to grants; overseeing work of administrative assistant; update and reconcile personnel payroll transaction; update and reconcile SFS systems transactions; maintain transactions database and files necessary for reporting and federal regulations; oversee reconciliements. **Qualifications:** BA/BS, preferably in accounting or business or equivalent; two-three years as administrative assistant in academic business office; experience with University of Pennsylvania accounting systems, payroll systems, SFS systems preferred; experience with grant and contract accounting; experience working with research faculty; time management. **Grade:** P1; **Range:** \$19,700-25,700 2-12-96 Moore Business Office

**STAFF ASSISTANT III (02140CP)** Organize and oversee the day-to-day administrative activities of the Office of the Dean; monitor scheduling of Dean's calendar and meeting activities to ensure that appointments and commitments are effectively coordinated; monitor mail flow to ensure timely referrals and/or responses; select, train and directly supervise Dean's office support personnel; coordinate workload, del-

egate task and assign priorities; facilitate Dean's daily interaction with students, faculty, staff, alumni & other external contacts; support Dean's involvement in meetings; prepare or approve agenda & write & circulate minutes; compile & summarize data for reports; assist in the planning & preparation of grant applications & proposals; participate in meetings of Dean's staff, update them on activities & planning matters of general interest. **Qualifications:** BA/BS preferred or equivalent related experience; five-years progressively responsible administrative experience; exceptional interpersonal, organizational & time management skills; knowledge of Macintosh computer & software; excellent oral & written communication skills; broad knowledge of school & University policies & procedures preferred; ability to interact effectively with individuals at all levels; general understanding of academic issues, programs & organizations. **Grade:** P3; **Range:** \$23,900-31,000 2-15-96 Office of the Dean

**SYSTEMS PROGRAMMER I (0290CP)** Develop advanced database integration software; specifically, develop TSL as specified in research documents; collaborate on development of the CPL/Kleisli system; communicate with members of the database research group & the human genome research project at Penn. **Qualifications:** BS in computer science with mathematics background; experience with database programming; two years extensive experience with languages such as SDL, C++ & Lisp, operating systems such as UNIX, Macintosh & DOS; experience with database such as DB2 filestructures-hierarchical & relational; ability to design software. (Ongoing contingent on funding) **Grade:** P6; **Range:** \$31,900-40,600 2-13-96 CIS

## EXECUTIVE VICE PRESIDENT

*Specialist: Nancy Salvatore/Susan Curran*

**ADMINISTRATIVE ASSISTANT I (0288NS)** Provide administrative support to director; answer phones; handle inquiries and billing; coordinate staff and children's files; process deposits and purchases; coordinate newsletter; assist in classroom as needed; assist teacher in all aspects of classroom management. **Qualifications:** Associates degree in Early childhood education or equivalent with two or more years previous child care experience; two years administrative/clerical experience and ability to use personal computers, especially MAC. (Work schedule: M-F, 7:30 a.m.-3:30 p.m.) **Grade:** G9; **Range:** \$17,100-21,400 2-5-96 Penn Children's Center

## GRAD SCHOOL OF EDUCATION

*Specialist: Clyde Peterson*

**INFORMATION SYSTEMS SPECIALIST II (08266CP)** Responsible for maintenance of the Center's AppleTalk-TCP/IP network; installation, configuration and maintenance of all computers in the Center; purchase and installation of software; maintain and enhance the LTL, including Internet servers and databases; training of NCAL personnel in the use of office software and Internet information browsers; maintain and enhance the Center's financial accounting program; troubleshoot hardware and software problems; work to support federally funded projected related to technology applications to adult learning and adult literacy. **Qualifications:** BA/BS or equivalent; MS preferred, or comparable experience with computer support; experience with: Ethernet networks running both AppleTalk and TCP/IP protocols; Macintosh support and service (installation of memory, hard drives and boards); Microsoft Word, Microsoft Excel, Claris FileMaker Pro; working knowledge of computers using the DOS/Windows operating system; demonstrated ability to communicate (written and oral) effectively to management; programming experience in macro languages or programming languages preferred. (End date: Contingent on funding) **Grade:** P5; **Range:** \$28,800-37,600 2-5-96 NCAL

## MEDICAL SCHOOL

*Specialist: Ronald Story/Janet Zinser*

**BIOSTATISTICIAN (0293JZ)** Assist investigators with the development of GCRC protocol submissions; re-

# OPPORTUNITIES at PENN

view all proposals submitted to GCRC Scientific Advisory Committee; oversee statistical & data management aspects of approved studies; participate in GCRC-based curriculum for medical researchers. **Qualifications:** Masters degree in statistics or biostatistics or equivalent; four years experience with statistical consulting, clinical trials, & statistical computing or equivalent; excellent communication & computing skills; ability to support statistical packages including S-Plus, JMP, BMDP, SPSS, SAS & StatXact; familiarity with UNIX, VMS, MacOS & MS Windows. **Grade:** P8; **Range:** \$38,500-48,100 2-8-96 Clinical Research Center

**BUILDING ADMINISTRATOR (02120JZ) (02121JZ)** Handle administration & coordination of the School of Medicine's day to day facilities operations; insure optimum delivery & performance of housekeeping, maintenance, building system & utilities & minor construction services in building; serves principle liaison for daily facilities operations between the school & department; serve as follow-up contact for customers; identify capital renewal & deferred maintenance needs; assist faculty/staff in developing plans, defining the scope of work, obtaining cost estimates & managing the completion of minor renovation projects. **Qualifications:** Bachelor's degree in a facilities-related field or equivalent experience; at least three yrs. related experience; previous managerial experience preferred; demonstrated understanding of technical aspects of planning for operating & maintaining mechanical, plumbing, electrical & structural systems & housekeeping services of large & complex research laboratories; excellent oral & written communication skills; computer experience required, preferably Macintosh hardware & software including word processing, spreadsheet database, calendaring & e-mail; ability to supervise & instruct others. **Grade:** P3; **Range:** \$23,900-31,000 2-9-96 Architecture & Facilities Management

**CERTIFIED NURSE PRACTITIONER (02102RS)** Obtain health histories & perform physicals; diagnose/manage common medical conditions for acute & chronically ill clients in a drug & alcohol treatment facility; assess/manage real/potential health hazards for substance abusing clients; teach, counsel & assist clients in prevention of illness; consult/provide patient referrals; participate in research activities; provide educational conferences to clients; order supplies, perform inventory; do med counts. **Qualifications:** Licensed registered nurse by PA Board of Nursing; PA certified nurse practitioner; trained as an adult or family NP; at least one year experience in adult clinical care beyond clinical preparation; ANA Certification preferred. *(May involve early mornings & some evening work) (On-going contingent upon funding)* **Grade:** P6; **Range:** \$31,900-40,600 2-8-96 Psychiatry

**STAFF ASSISTANT II (0294JZ)** Provide support to division chief; handle secretarial duties, office organization & scheduling responsibilities; supervise four support staff positions; coordinate medical & academic appointments/reappointments, credentialing; coordinate committees the chief chairs or co-chairs; coordinate travel and necessary arrangements. **Qualifications:** BA/BS or equivalent; one-three years progressively responsible administrative experience; knowledge of University and Hospital procedures preferred; familiarity with Macintosh computer (PowerMac) and software (Word 6, System 7.0); thorough knowledge of office procedures. **Grade:** P2; **Range:** \$21,700-28,200 2-8-96 Medicine/Pulmonary

**PART-TIME (RESEARCH COORDINATOR) (20 HRS) (02114RS)** Participate in the review & preparation of protocol for original & pharmaceutical clinical trials; organize & participate in site visits & participate in budget preparation & monitoring; plan & implement patient recruitment into studies; coordinate scheduling of trial participants with study investigators; plan, direct & assess overall medical & nursing management of patient in collaboration with physician; collect & manage data in accordance with trial protocol. **Qualifications:** RN with current licensure

required; at least two yrs. research experience; Ob/Gyn experience; articulate individual with a strong counseling & teaching background in Ob/Gyn; ability to work independently & also as part of a team; demonstrates competence in assessment, treatment & care of patients. *(End date : two yrs. from start)* **Grade:** P3; **Range:** \$13,657-17,715 2-12-96 OB/GYN

**ADMIN. ASS'T III (40 HRS) (02101JZ)** Perform administrative duties for Director of Medical Physics; assist in preparation of annual budget; prepare financial & statistical reports; answer & direct telephone calls, schedule meetings & maintain calendar for director; type & proofread standard & complex materials; maintain inventory of office supplies; compose correspondence, reports and forms; handle mail; arrange events & meetings; organize & maintain office records & files. **Qualifications:** High school graduate or equivalent; some college or business school preferred; at least two years at the Administrative Assistant II level or comparable background; strong organizational, oral & communications skills; typing proficiency; detail oriented; ability to work under pressure & handle multiple tasks; knowledge of Lotus 123. **Grade:** G11; **Range:** \$22,743-28,914 2-8-96 Radiation Oncology

**ADMIN. ASS'T. III (02116JZ)** Provide administrative support to the Director of Research & Director of Dermatopathology; assist Directors in preparations of departmental training grant, NIH grants & other research related functions; coordinate all aspects for the Fellowship Training Program; assist faculty in transcription of all materials; assist in the management of the weekly Research Conference; handle Directors' academic calendar, time file, filing & related activities; assist in final preparation of manuscripts; draft, edit & compose correspondence; schedule guest speakers; prepare itineraries; assist with mailings; answer telephones; organize & maintain computer system; handle logistics for meetings, seminars, & other special events. **Qualifications:** Completion of high school curriculum & related post high school training or equivalent; two yrs. exp. at the AAI level or comparable background; thorough knowledge of office procedures, practices, & methods; proficient in Mac computer programs & applications, including Microsoft Word, Excel, FileMaker Pro, End Note; excellent oral & written communication skills; type 55 wpm. **Grade:** G11; **Range:** \$19,900-25,300 2-12-96 Dermatology

**CLINICAL RECEPTIONIST (40 HRS) (0183JZ)** Receive & schedule incoming telephone calls regarding patient appointment; obtain &/or confirm patient demographic information; enter information into computer; instruct patients regarding fee policies; schedule appointments; complete forms for special testing; mail cards for future appointments; review schedule; maintain logs; pull & file charts, number & file data in charts; assemble charts; print charts from microfilm & copy charts; provide relief coverage for switchboard operator. **Qualifications:** High school graduate or equivalent; ability to use CRT terminal & demonstrated interpersonal skills. **Grade:** G8; **Range:** \$17,943-22,400 Ophthalmology

**PSYCH TECH I (40 HRS) (02105RS)** Screen and recruit patients for entry into research studies; schedule and evaluate interviews; administer and score; conduct baseline and outcome interviews; maintain research records; verify and enter data; prepare reports; conduct library research; take vital signs on research subjects; study at several offsite clinics. **Qualifications:** BA/BS in psychology or biological sciences preferred; one-two years experience in addition related field preferred; experience interviewing adolescents preferred; car and license required. *(Ongoing contingent upon funding)* **Grade:** G10; **Range:** \$21,371-26,629 2-8-96 Psychiatry

**OFFICE ADMIN. ASS'T. I (02138JZ)** Compile & summarize data for financial records/reports; respond to standard inquiries by phone & in person; organize/maintain file systems; type & proofread materials; compose standard correspondence; maintain financial records/budgets; prepare & process purchase requisitions, C-forms, journal vouchers, budget reallocation;

follow-up on orders & payments; distribute petty cash; prepare weekly & work study payrolls. **Qualifications:** High school diploma, some college desired; two yrs. administrative clerical experience or equivalent required; data processing/bookkeeping/clerical experience desired; MAC & spreadsheet familiarity; strong organizational skills; ability to focus in a noisy environment with frequent interruptions; excellent written & oral communication skills; able to meet deadlines. **Grade:** G9; **Range:** \$17,100-21,400 2-14-96 Pharmacology

**RESEARCH LAB TECH II (40 HRS) (02104RS)** Subject recruitment in research protocols; administer interviews; score test batteries; maintain forms file and research records; collect and enter data into an established database; library research; urine collection/vital signs. **Qualifications:** Diploma with some college courses in social/biological sciences; some exposure to social science research methods preferred; interviewing skills desirable. *(Ongoing contingent upon funding)* **Grade:** G8; **Range:** \$17,943-22,400 2-8-96 Psychiatry

**RESEARCH LAB TECH II (40 HRS) (02135RS)** Will be trained to perform: SPE & TLC techniques; derivatization of reactive chemical groups; GC/MS analysis; calculate results & compile data maintain lab inventory. **Qualifications:** H.S. grad; basic understanding of chromatographic principles; some college level science courses; ability to work with good judgment under general supervision. *(Ongoing contingent pending funding)* **Grade:** G8; **Range:** \$17,943-22,400 2-1-4-96 Ctr. for Experimental Therapeutics

**RESEARCH LAB TECH II (40 HRS) (02137RS)** Assist with subject recruitment in off-site research locations; administer interviews to adolescent clients; score battery of psychological test; maintain forms file & research records; collect & enter data; collect urine/breath samples; library work; materials delivery between research sites. **Qualifications:** H.S. grad with some college level course work; at least one yr. exp. in human services pref.; must have valid driver's license & access to car; exp. interviewing adolescents pref. *(Ongoing contingent on grant funding)* **Grade:** G8; **Range:** \$17,943-22,400 2-14-96 Psychiatry

**RESEARCH LAB TECH III (02112RS)** Perform stereotaxic surgery on small animals; histological procedures, including cutting frozen sections, mounting & staining tissue & immunocytochemical procedures; data analysis using computerized image analysis system; maintain lab chemical inventory, order supplies & oversee all animal care. **Qualifications:** BA/BS; exp. with rodent surgeries & histological exp. necessary; knowledge of mammalian neuroanatomy & some darkroom exp. required. *(End date: 8/31/96)* **Grade:** G10; **Range:** \$18,700-23,300 2-12-96 Psychiatry

**RESEARCH LAB TECH III (40 HRS) (02131RS)** Maintain cell cultures for in vivo & in vitro investigations; evaluate viral vector gene therapy modalities for in vitro transduction; perform animal surgery for implantation of brain tumors & subsequent surgery for experimental therapies; processing animal tissue for histologic analysis. **Qualifications:** BS/BA in biomedical sciences; previous cell culture & animal surgery experience is essential. **Grade:** G10; **Range:** \$21,371-26,629 2-13-96 Surgery/Neurosurgery

**RESEARCH LAB TECH. III (40 HRS) (02103RS)** Perform assessment of brain damaged patients with clinical & experimental neuropsychological test; score tests, collate data, database and assist with data analysis; assist in recruiting, scheduling & screening potential research subjects; assist in library research & new test development; draft & edit manuscripts. **Qualifications:** BA/BS in Psychology or closely related field; familiarity with word processing data base and/or statistical PC programs; practical experience in clinical experimental psychology is desirable. **Grade:** G10; **Range:** \$21,371-26,629 2-14-96 Neurology

**REG. PART-TIME (21HRS) (ADMIN. CLERK) (02100JZ)** Record, monitor, and verify budget actions; prepare personnel and payroll action forms; maintain records and files; assist in responding to standard inquiries regarding personnel, purchasing, payroll and accounting procedures; type financial forms and summaries. **Qualifications:** HS graduate; three years general clerical experience including one year of senior level clerical experience; basic knowledge of standard accounting and office procedures; ability to operate office equipment. **Grade:** G8; **Range:** \$8,626 - 10,769 2-8-96 Center for Bioethics

**PART-TIME (LAB ASS'T. I)** (28 HRS) (02113RS) Perform laboratory cleaning; wash glassware, laboratory benches & special cleaning; obtain papers from library; prepare chemical solutions. **Qualifications:** High school graduate with knowledge of science, particularly chemistry & biology; familiarity with standard laboratory operating procedures; experience desirable. (End date: *Contingent on grant funding*) **Grade:** G5; **Range:** \$6,868-8,407 2-12-96 Radiology

**PART-TIME (OPHTHALMIC ASS'T/OPHTHALMIC TECH CERTIFIED)** (17.5 HRS) (02132RS) Provide technical/mechanical assistance to ophthalmologist; call/escort patients to exam rooms; document complete medical history and review of medications; perform special testing as needed (vision, treatment, lensometry, tension); explain details; answer patient questions; scribe dictated information; complete treatment slips as instructed by ophthalmologist; complete paperwork required for registering patients for surgery, refills on prescriptions, work/school excuses. **TECH:** In addition, perform highly specialized testing such as Goldman Visual Field, Octopus and refractometry. **Qualifications:** High school graduate or equivalent. **ASS'T:** completion of certified one-year ophthalmic technology course; certificate-Ophthalmic Assistant; six months-one year exp. **TECH:** Completion of two year ophthalmic technology course; certificate Ophthalmic Technician; two year ophthalmic exp.; proficiency in special testing, especially Goldman Visual Fields pref. **Grade:** G10/G11; **Range:** \$10,275-12,802/\$10,934-13,901 2-13-96 Ophthalmology

**PART-TIME (SECURITY OFFICER/SOM)** (22 HRS) (02119JZ) Perform facility security tours; greet visitors & assist; communicate by radio & telephone to field personnel, University, Physical Plant, University Police & other office personnel; maintain logbook & other records; enforce School & University policies; assist University Police & Philadelphia Fire Department in emergency situations. **Qualifications:** Completion of high school business curriculum & related post high school training or equivalent; extensive walking & stair climbing required; ability to tolerate unpleasant odors; ability to lift & carry 50 lbs.; strong interpersonal skills and customer service orientation; ability to remain alert during periods of low activity; ability to work nights & on weekends; ability to work overtime on short notice. (Position considered "essential" personnel) (Work schedule: Sat-Sun, 9 p.m.-9 a.m.) **Grade:** G8; **Range:** \$8,626-10,769 2-12-96 Arch. & Facilities Management

## NURSING

*Specialist: Ronald Story*

**DIRECTOR V** (960108RS) Supervise research & community-based staff to ensure fidelity of research implementation & coordinate multifaceted research activities; manage & supervise participant recruitment, retention, tracking procedures; develop & implement a protocol for managing intervention sessions & data collection; exercise resource stewardship; ensure compliance with related University policies & procedures. **Qualifications:** Master's degree in Nursing, Psychology, Public Health, Social Work, Business Administration or related field with five or more yrs. professional exp. working in African American communities; drivers license, access to car, & proficiency with Macintosh computers required; (ability to work on Saturdays) (Ongoing contingent upon funding) **Grade:** P8 **Range:** \$ 38,500-48,100 2-8-96 Nursing

**DIRECTOR V** (0108RS) Supervise research and community-based staff to ensure fidelity of research implementation and coordinate multifaceted research activities; manage and supervise participants recruitment, retention, tracking procedures; develop and implement a protocol for managing intervention sessions and data collection; exercise resource stewardship; ensure compliance with related University policies and procedures. **Qualifications:** Master's degree in nursing, psychology, public health, social work, business administration or related field, with five or more yrs. of professional experience working in African American communities; driver's license, access to car, ability to work on Saturday's and proficiency with Macintosh computers required. **Grade:** P8; **Range:** \$38,500-48,100 2-16-96 Nursing

**INFO. MANAGEMENT SPECIALIST II** (02134RS) Select, develop & implement academic information

systems; maintain & troubleshoot communications network; assist in budget & long-range plan preparation & the development & monitoring of practice financial models. **Qualifications:** Bachelors' degree required, MBA degree desired; at least three-five yrs. of progressively increasing responsibility in systems, finance or equivalent; experience with networks & microcomputers; ability to set-up & configure & add peripherals; knowledge of practice billing systems; Lotus 1-2-3, WordPerfect, dBase & Presentation packages. (End date: *contingent upon practice viability*) **Grade:** P6; **Range:** \$31,900-40,600 2-15-96 Practice

**PART-TIME (ADVANCE PRACTICE NURSE)** (20 HRS) (0149RS) Provide gerontologic nursing consultation to hospital and nursing staff, patient-subjects & their families; promote high quality individualized care with/without minimum usage of physical restraint; act as liaison between nursing home and hospital staff; deliver education programs to hospital staff regarding quality gerontological care. **Qualifications:** Master's degree in nursing with speciality in gerontology preferred; one yr. post-MSN degree in advanced practice role; two yrs. experience in hospital experience as nurse. (End date: 5/97) **Grade:** P9; **Range:** \$24,170-30,233 1-22-96 Nursing

**P-T (ADMIN. ASS'T. II)** (17.5 HRS) (02142RS) Coordinate clinical rotation schedules for nurses, social workers & physicians; schedule appointments, meetings, seminars & conferences; compose, type, & proof-read routine correspondence; assemble & prepare materials for mass mailings; summarize data for activity reports; answer phones & receive visitors for office; interpret standard department policies & procedures; facilitate grant proposal process; maintain office supplies; conduct library literature searches. **Qualifications:** Completion of H.S. business curriculum & post H.S. training or equiv.; minimum two yrs. exp. at AAI level or comparable background; excellent organizational & follow-up skills, thoroughness & accuracy; word processing & data base skills; prior grant proposal project exp. desired. (End date: 12/31/96) **Grade:** G10; **Range:** \$10,275-12,802 2-15-96 Nursing

## PRESIDENT

*Specialist: Susan Curran/Janet Zinser*

**ASS'T. DIRECTOR IV/ASSOC. DIRECTOR V** (12653JZ) **ASST. DIR IV:** Working with the Director, coordinate & implement fundraising activities in New England & Northeastern United States; cultivate and solicit alumni and friends for major gifts (\$25,000 or more); manage prospect pipeline; design & administer events; monitor prospect pool in regions; recruit, manage & motivate volunteers. **ASSOC. DIR V:** Manage his/her own prospect pool in regions above; work with Director to set priorities and devise cultivation and solicitation strategies. **Qualifications:** BA/BS; excellent organizational & interpersonal skills; excellent oral and written communication skills; willingness to travel frequently; valid driver's license; familiarity with University & its constituents helpful. **ASST. DIR. IV:** Three or more yrs. progressively responsible development exp. **ASSOC. DIR. V:** Five or more yrs. development exp., pref. in higher education major gifts fundraising. **Grade:** P5/P7; **Range:** \$28,800-37,600/\$35,000-43,700 2-15-96 Dev. & Alumni Relations

**DIRECTOR, WESTERN REGION** (0175JZ) Oversee major gift fundraising in the western region (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming); cultivate and solicit alumni parents and friends of the University for major gifts (\$25,000 or more.); recruit, train and staff volunteers; manage office and staff; design and conduct cultivation events and assist alumni relations activity. **Qualifications:** BA/BS; seven yrs. exp. in development, sales, marketing, public relations or related field, with at least four yrs. exp. in fundraising including direct solicitation of major gifts; understanding of higher education, especially major research universities; excellent interpersonal and communications skills, both oral and written; willingness to travel frequently; valid drivers license; experience in managing staff, volunteers and budget accountability. (Position in Los Angeles, CA) **Grade:** P10; **Range:** \$47,400-59,200 2-14-96 Dev. & Alumni Rels.

**PROGRAMMER ANALYST I** (08194JZ) Create fundraising and alumni relations reports from Ingres database using SQL and "C" language; create parameterized report programs for use of staff, using in-house report manager software, SQL, C, languages & Ingres report writer; analyze reporting needs, design, code, document, test and debug programs; write programs to extract data from mainframe; interact with staff to determine department's needs; write one-time ad hoc reports and programs as needed. **Qualifications:** BA/BS req., pref. in computer science or management information systems; one-two yrs. exp. using relational database management systems (Ingres); two yrs. exp. in designing, coding, testing, debugging and documenting structured software programs; exp. in using high level programming language req., SQL & C languages pref.; strong analytical skills; Unix exp. pref.; familiarity with desktop computing; exp. in fundraising information systems desirable; demonstrated ability to design and execute programs with minimal technical supervision; good interpersonal and communication skills. **Grade:** P4; **Range:** \$26,200-34,100 1-31-96 Dev & Alumni Relations

**SYSTEMS PROGRAMMER II** (02144JZ) Perform administration of the department's Unix-based computer systems; monitor & tune Ingres relational database system; provide support for back-up & recovery of the database; maintain & troubleshoot nightly data transfer programs; participate in development of applications using Ingres by developing design documents & coding application modules; perform Ingres DBA duties; analyze, install & modify new operating system software products; participate in development of technical standards as these relate to software development; maintain knowledge & understanding of new & emerging technologies; help other technical staff in resolving technical problems; provide input into software decisions; serve as senior technical resource person; provide support for World Wide Web applications, including maintenance of WWW server. **Qualifications:** Bachelor's, pref. in computer science, MIS or comparable exp.; three yrs. progressively responsible exp. in a complex computing environment, including one yr. in systems programming or Ingres Data Base administration; technical knowledge of Unix operating system; working knowledge of C programming language, Unix shell programming, mail handling PERL & Unix operating system utilities; understanding of TCP/IP inter-networking protocols; working knowledge of Ingres database server & its configuration & tuning; working knowledge of the Sequent multi-processing computer architecture, operations & DEC AlphaServer desirable. **Grade:** P7; **Range:** \$35,000-43,700 2-16-96 Dev. & Alumni Rels.

## PROVOST

*Specialist: Clyde Peterson*

**INFO SYSTEMS SPECIALIST I** (02123CP) Install, configure, troubleshoot computers, operating systems, peripherals & software; set up & administer NT servers; set local work groups, configure modem & other Ethernet connections in a TCP/IP environment; set up database & other applications; write BASICS programs; train Museum staff; administer database program; write documentation, troubleshoot & assist users; research new hardware & software. **Qualifications:** BA/BS or related degree; two yrs. exp. supporting end users in computing; thorough understanding of relational databases, programming & broad knowledge of Windows; exp. with Macintosh & Unix highly desirable; ability to analyze problems & understand computer systems; excellent interpersonal skills. (End date: *funding for three yrs.*) **Grade:** P3; **Range:** \$23,900-31,000 2-12-96 Museum

**ADMIN. ASS'T. I** (0297CP) Provide clerical support for animal procurement operations: check protocol/animal orders, relay orders to vendors; perform data entry; validate data & produce reports as required; print and distribute delivery schedules; maintain protocol & vendor P.O. files, type forms; transport financial documents to/from university accounting offices. **Qualifications:** HS grad. or equiv.; min. two yrs. clerical secretarial exp. in office setting; university exp. pref.; working knowledge of Lotus & WordPerfect software; demonstrated desire/ability to learn & work with other software; strong interpersonal skills req. **Grade:** G9 **Range:** \$17,100 - 21,400 2-8-96 ULAR



# OPPORTUNITIES at PENN

## VETERINARY SCHOOL

*Specialist: Nancy Salvatore*

**RESEARCH LAB TECH III** (02107NS) Perform cell culture, lab maintenance & experimental assistance; obtain tissue specimen; prepare cells for experiments; perform molecular biology experiments; keep logs. **Qualifications:** BA/BS in scientific or related field; exposure to lab work. **Grade:** G10; **Range:** \$18,700-23,300 2-9-96 Animal Bio.

**TECH, CLINICAL LAB** (02110NS) Perform variety of clinical tests, utilizing precision instruments such as microscopes & automatic analyzers; test results are used in the treatment & diagnosis of disease. **Qualifications:** H.S. grad with two yrs. post-secondary school training in clinical lab procedures & techniques or equivalent work exp.; familiarity with automated equipment pref.; computer background helpful. *(Schedule: Work every other weekend & have two days off during the week alternate week 9:30 a.m.-5:30 p.m.)* **Grade:** G10; **Range:** \$18,700-23,300 2-9-96 VHUP

**TECH, VET I/II** (40 HRS) (02108NS) Administer treatments, injections & medications as prescribed; assist with diagnostic & therapeutic procedures; monitor vital parameters; observe & record symptoms reaction of patients. **TECH VET II:** Same as above, as well as: perform diagnostics & therapeutic procedures; assist in the instructions of nursing & Veterinary students (may have direct teaching responsibility). **Qualification: TECH, VET I:** Graduate of accredited Animal Health Technology program or degree in Animal Science or three years Tech, Vet experience; Certified Animal Health Tech req. (will consider applicants with certifications pending); ability to react to stressful situations involving patient care; experience handling large animals; may require rotating shifts, on-call schedules and overtime. **TECH, VET II:** Same as above, as well as: two yrs. exp. as a Tech, Vet I or equiv. req. *(Work schedule: Rotating nights/weekends)* **Grade:** G8/G10; **Range:** \$17,943-22,400/\$21,371-26,629 2-9-96 VHUP-Wards

**TECH, VET ANESTHESIA II/III** (40 HRS) (02111NS) Prepare & administer pre-anesthetic, anesthetic & post anesthetic drugs to large animals under direct supervision; monitor patient condition; maintain records; direct & assist in moving large animal patients to & from recovery room; maintain anesthesia equipment, patient monitors, drugs & related supplies; emergency & on-call duties; record keeping & inventory control; assist in instruction of Vet. & Tech students. **Qual.:** Assoc. degree or higher in scientific discipline; Vet Tech Cert. pref.; ability to lift large animals; exp. with large animals, esp. horses, pref.; personal computer exp. desirable. **TECH, VET ANESTHESIA II:** min. three-five Vet Anesthesia exp. **TECH, VET ANESTHESIA III:** min. five yrs. Vet Anesthesia exp. *(Position in Kennett Square, PA; no public transportation)* **Grade:** G12/G13; **Range:** \$25,371-32,686/\$27,886-35,886 2-9-96 Large Animal Hospital

**TECH., VET IMAGING I/ II** (40 HRS) (02109NS) Perform variety of routine & special diagnostic imaging procedures on animals; operate routine diagnostic

imaging equipment; aware of & adhere to radiation safety standards and rules; teach student and technician; routine radiology clerical duties. **Qualifications: TECH I:** completion of H.S. and accredited/eligible for Certification as a Animal Health Technician or radiological Technician program. **TECH II:** two yrs. of animal/or medical facility exp.; one year of professional level exp. in imaging CHT/RT. *(Assigned to Emergency call evenings/weekends/holidays; may be assigned to weekends; involve work on weekends; five day work week)* **Grade:** G8/G10; **Range:** \$17,943-22,400/\$21,371-26,629 2-9-96 VHUP Radiology

## VICE PROVOST/UNIVERSITY LIFE

*Specialist: Clyde Peterson*

**BUSINESS ADMIN. III** (02126CP) Under managerial direction, perform financial & administrative duties, incl. budget preparation (restricted & unrestricted), purchasing, financial reporting, payroll & personnel records administration, office security & safety, office equip. maintenance; coordinate office work flow; oversee budgets & ensure integrity of financial transactions; oversee office internal accounting data base. **Qual.:** BA/BS, pref. in accounting or business, or equiv.; significant supervisory exp.; at least four yrs. exp. in accounting, business admin.; knowledge of & exp. with computerized accounting (for mainframe interface), microcomputers, managerial administrative software packages (spreadsheet, data bases, word processing); thorough knowledge of Penn policies & procedures pref.; excellent communication, interpersonal & organizational skills; ability to work effectively with diverse administrative & academic personnel within the U.S. & in other countries; commitment to student service; good judgment, flexibility & ability to work as a team member & under pressure; international work or study exp. an asset. **Grade:** P4; **Range:** \$26,200-34,100 2-12-96 International Programs

## WHARTON SCHOOL

*Specialist: Janet Zinser*

**COORDINATOR II** (0289JZ) Responsible for planning & logistical support for corporate exec. education progs.; work with Wharton faculty, external faculty and senior executives from client companies; provide direct contact & support to program participants; review participant & faculty feedback with Academic & Program Directors. **Qualifications:** BA/BS or equiv. req.; two-three yrs. exp. in coordinating conference, management training programs or customer service; proven ability to: integrate ideas & concepts, work on several projects at once, plan ahead & speak in front of groups; strong organizational skills & attention to detail; friendly, flexible & service-oriented manner. **Grade:** P2; **Range:** \$21,700-28,200 2-26-96 Aresty Institute

**OPERATOR, DUP MACHINE IV** (10529JZ) Perform all routine functions of the Xerox Network Publishing System including image merge, cut & paste, crop, rotate & mask images for reproduction & release network orders using Novell & Xerox servers; perform all routine & advanced functions on Xerox 5775 Network Color laser Printer; Kodak 2110 Duplicator & other bindery equipment contained within Wharton Reprographics; perform routine maintenance of DocuTech Publishing Systems. **Qualifications:** H.S. grad. or equiv.; two-four yrs. exp. operating high speed copiers/duplicators or equiv., Xerox 5390 & Kodak 2110 pref.; six months exp. with Xerox DocuTech Publishing System and successful completion of the DocuTech training program; highly proficient in Math & English; computer exp. with MS Windows 3.1 incl. DOS commands, file manager & program manager; knowledge of desktop publishing, pref. Aldus PageMaker, Photoshop or Illustrator; ability to lift up to 50 lbs. (No vacation approved during Aug., Sept., Dec. and Jan.) (Overtime is a requirement of this position) *(Schedule: 5 p.m.-1 a.m.)* **Grade:** G10; **Range:** \$18,700-23,300 01-31-96 Reprographics

## Relative Investment Performance On Tax-Deferred Annuities

The Benefits Office regularly receives inquiries on the relative performance of investment funds offered under the University's tax deferred annuity program. At right is a table which shows the performance of the various funds for the period ending 12/31/95. The first column shows an abbreviation for the investment philosophy of the fund. (Abbreviations are described below.) The second column shows the overall asset size of the fund in millions of dollars. Columns three through seven show the performance of the funds over various time horizons. Columns eight and nine show the best and worst year for the last five years.

The Benefits Office will periodically publish this information in *Almanac* to assist faculty and staff in monitoring the performance of their tax deferred annuity investments. Any faculty or staff member who would like additional information on these benefit programs may call the Benefits Office at 898-7281.

—Albert Johnson  
Acting Manager of Benefits

## PHILOSOPHY KEY

### Domestic:

D	Diversified Common Stock Fund
DI	Diversified Common Stock Fund With Somewhat Higher Income
SC	Specialty Fund With Small Company Common Stock Orientation
B	Balanced Fund
FIS	Fixed Income Fund (Short-Term Maturity)
FII	Fixed Income Fund (Intermediate-Term Maturity)
FIL	Fixed Income Fund (Long-Term Maturity)
FISG	Fixed Income Fund (Short-Term Maturity—Government Obligations)
FIIG	Fixed Income Fund (Intermediate-Term Maturity—Government Obligations)
FILG	Fixed Income Fund (Long-Term Maturity—Government Obligations)
FIM	Fixed Income Fund (Mortgage-Related Securities)
FIJ	Fixed Income Fund (Low-Rated Bonds)
MM	Money Market Fund
AA 30:40:30	Asset Allocation 30% Stocks: 40% Bonds: 30% Cash Benchmark Fund
AA 60:35:5	Asset Allocation 60% Stocks: 35% Bonds: 5% Cash Benchmark Fund

### International:

ICS International Common Stock Fund

### Global:

GCS Global Common Stock Fund

### Source:

Lipper Analytical Services and fund families.

\* Total Return: Dividend or interest plus capital appreciation or depreciation.

(1) CREF Equity Index Account was introduced on April 29, 1994.

(2) CREF Growth Account was introduced on April 29, 1994.

## Classifieds

### FOR SALE

**46th and Spruce.** Fabulous owner's unit plus 4 apartments. Quiet neighborhood close to campus; many original details. Call for more information (215) 386-3636. Prime City Properties, Inc.

**Wilmington—50 min. from Penn.** 4 BR, 3 BA colonial in quiet suburban area on 1/2 acre. \$194,000. Call 898-3632 (days), (302) 239-4742 (eves.)

### VACATION

**Pocono Chalet,** 3 bedroom, one bath. Near Jack Frost/BB. Firewood incl. \$350/weekend. (215) 573-9048.

## 403(b) Performance Update Periods Ending December 31, 1995 Total Returns

								Best & Worst Year	
		Size	Latest	1-Year	3-Year	5-Year	10-Year	For the Last	
	Philosophy	\$mm	Quarter	Avg.	Avg.	Avg.	Avg.	Five Years	
Calvert Funds:									
Social Responsibility Fund									
Social Investment Bond Portfolio	FII	66	4.0	17.4	7.4	8.9	NA	17.4	-5.3
Social Investment Equity Portfolio	D	92	1.7	20.3	2.6	7.4	NA	21.9	-12.1
Social Investment Managed Growth	B	574	4.7	25.9	8.3	10.0	10.3	25.9	-4.7
Social Investment Money Market	MM	160	1.2	5.3	3.8	4.1	5.6	5.7	2.5
CREF Funds									
CREF Bond Market	FII	833	4.4	17.8	8.0	9.4	NA	17.8	-4.0
CREF Equity Index Account (1)	D	391	5.2	36.2	NA	NA	NA	NA	NA
CREF Global Equities	GCS	3,099	2.6	20.1	17.4	NA	NA	NA	NA
CREF Growth Account (2)	D	1,156	4.4	35.2	NA	NA	NA	NA	NA
CREF Money Market Account	MM	3,147	1.4	5.9	4.3	4.6	NA	6.3	3.1
CREF Social Choice Account	D	1,164	5.4	29.5	11.8	14.2	NA	29.5	-1.3
CREF Stock Account	D	69,370	4.8	30.9	14.2	15.5	14.1	30.9	-0.1
Vanguard Funds:									
Asset Allocation Fund	AA60:35:5	1,789	6.4	35.4	14.5	15.2	NA	35.4	-2.3
Balanced Index Fund	B	590	4.7	28.6	11.7	NA	NA	NA	NA
Bond Index Total Bond Mkt Portfolio	FII	2,791	4.4	18.2	8.1	9.3	NA	18.2	-2.7
Convertible Securities Fund	DI	168	0.5	16.7	7.7	14.9	NA	34.3	-5.7
Equity Income Fund	DI	1,102	8.9	37.3	15.7	16.2	NA	37.3	-1.6
Explorer Fund	SC	1,603	2.2	26.6	13.7	21.0	10.5	55.9	0.5
Fixed Income Securities:									
GNMA Portfolio	FIM	6,881	3.7	17.0	7.1	8.9	9.2	17.0	-0.9
High-Yield Corporate Portfolio	FIJ	2,880	3.9	19.2	11.5	15.3	10.3	29.0	-1.7
Intermediate-Term U.S. Treasury	FIIG	1,190	5.1	20.4	8.7	NA	NA	NA	NA
Long-Term Corporate Portfolio	FIL	3,342	6.7	26.4	11.1	12.7	10.8	26.4	-5.3
Long-Term U.S. Treasury Portfolio	FILG	898	8.2	30.1	12.2	12.2	NA	30.1	-7.0
Short-Term Corporate Portfolio	FIS	3,726	3.0	12.7	6.4	7.9	8.3	13.1	-0.1
Short-Term Federal Portfolio	FISG	1,400	2.8	12.3	6.0	7.2	NA	12.3	-0.9
Short-Term U.S. Treasury Portfolio	FISG	863	2.7	12.1	5.9	NA	NA	NA	NA
Index Trust									
500 Portfolio	DI	17,290	6.0	37.5	15.2	16.4	14.6	37.5	1.2
Extended Market Portfolio	D	1,518	2.5	33.8	14.6	19.1	NA	41.9	-1.8
Growth Portfolio	D	267	5.7	38.1	13.0	NA	NA	NA	NA
Total Stock Market Portfolio	D	1,568	4.5	35.8	14.5	NA	NA	NA	NA
Value Portfolio	D	495	6.4	36.9	17.2	NA	NA	NA	NA
International Equity Index Funds:									
European Portfolio	ICS	1,016	3.1	22.3	17.2	11.8	NA	29.1	-3.3
Pacific Portfolio	ICS	829	4.7	2.7	16.3	7.3	NA	35.5	-18.2
International Growth Portfolio	ICS	3,664	2.1	14.9	18.8	10.6	13.6	44.8	-5.7
Money Market Reserves:									
Federal Portfolio	MM	2,617	1.4	5.8	4.3	4.5	6.0	5.9	3.0
Prime Portfolio	MM	19,374	1.4	5.8	4.3	4.5	6.1	6.1	3.0
U.S. Treasury Portfolio	MM	2,535	1.3	5.5	4.0	4.3	5.7	5.7	2.8
Morgan Growth Fund	D	1,474	2.0	36.0	12.8	15.2	13.0	36.0	-1.7
PRIMECAP Fund	D	3,230	-0.4	35.5	21.2	20.9	15.5	35.5	9.0
Quantitative Portfolios	D	908	4.5	35.9	15.4	16.5	NA	35.9	-0.6
Small Cap Stock Fund	SC	970	2.2	28.7	15.0	21.2	10.6	45.3	-0.5
STAR Fund	B	4,838	4.3	28.6	12.5	14.3	11.9	28.6	-0.2
Vanguard Funds:									
Trustees' Equity Fund:									
International Portfolio	ICS	989	3.0	9.6	14.6	8.6	14.0	30.5	-8.7
U.S. Portfolio	DI	137	2.9	33.2	14.5	15.1	12.2	33.2	-3.9
U.S. Growth Portfolio	DI	3,614	6.7	38.4	12.3	16.4	13.0	46.7	-1.4
Wellesley Income Fund	B	7,179	6.4	28.9	12.2	13.3	11.9	28.9	-4.4
Wellington Fund	B	12,661	5.9	32.9	14.5	14.9	12.8	32.9	-0.5
Windsor Fund	DI	13,665	-0.2	30.1	15.8	18.4	13.5	30.1	-0.2
Windsor II	DI	11,044	6.1	38.8	15.9	17.6	14.4	38.8	-1.2
Sector Funds:									
Energy	S	506	9.2	25.3	16.0	10.7	13.1	26.5	-1.6
Gold & Precious Metals	S	551	-2.7	-4.5	20.4	8.0	10.6	93.3	-19.4
Health Care	S	1,469	10.8	45.2	21.1	20.7	20.0	46.3	-1.6
Indexes To Compare									
Performance Against									
S&P 500			6.0	37.6	15.3	16.6	14.9	37.6	1.3
Lipper Capital Appreciation Funds Average			2.2	30.2	13.0	16.6	12.4	37.6	-3.6
Lipper Growth Funds Average			2.4	30.5	12.2	15.6	12.3	35.7	-2.2
Lipper Growth & Income Funds Average			4.5	30.6	12.9	14.9	12.3	30.6	-1.0
Salomon Bros. High-Grade Index			6.7	27.2	10.7	12.2	11.3	27.2	-5.8
Lehman Brothers Gov't/Corporate Bond Index			4.7	19.2	8.5	9.8	9.7	19.2	-3.5
Morgan Stanley Capital International-EAFE Index			4.1	11.2	16.7	9.4	13.6	32.6	-12.2
Morgan Stanley Capital International-EMF Index			-1.7	-6.9	13.3	19.9	NA	71.3	-8.7
91-Day Treasury Bills			1.4	5.8	4.5	4.5	5.7	5.8	3.1

## A-3s of the Month(s)

### In the A-3 Assembly's Recognition Program



Photographs by Dwight Luckey

### January's Dave Taylor of Housekeeping . . . February's Christine Chapman of the VHUP

January's A-3 Employee of the Month is Dave Taylor, a member of the University's housekeeping department for 27 years. Before he came to Penn, Mr. Taylor worked at a factory.

Starting as a floor man at the Law School, Mr. Taylor was transferred to several other buildings, including the Franklin Building, Nichols House, High Rise North, Dental School, Veterinary School and the Medical School. He returned to the Law School as a housekeeper three-and-a-half years ago.

According to the School's building administrator, Cass Lavan, Mr. Taylor is a dedicated worker: "no job is too small or too big for him," say his nominations. "He is always quick to help out with special projects." "He has a wonderful sense of humor which is appreciated by all." "He is a diehard Philadelphia Eagles fan." And, "Mr. Taylor is proud to be very involved in his community, offering his expertise to his neighbors and assisting with home repairs."

Christine Chapman, February's A-3 Employee of the Month, is an animal care technologist and animal health technician in University Laboratory Animal Resources at the Veterinary Hospital—already an award-winner in her post, and someone who, as her supervisor David Merrill puts it, "always puts the animals first." Ms. Chapman is ready to pick up any slack when staff are unexpectedly absent. She even volunteered to produce a ULAR newsletter to increase the level of communication among the different areas of the department.

In her capacity as the sponsor of the Morale Team, she was responsible for taking minutes of meetings and has often offered timely suggestions to benefit the ULAR staff. Recently, Ms. Chapman was honored with the title of ULAR Animal Care Technician of the Year 1995. Outside her work, she is the proud mother of two teenage sons. Her hobbies include bonsai, breeding Italian Greyhounds, and collecting pewter dragons.

— From the A-3 Assembly Employee Recognition Committee

### VISION on View

Penn is one of the eight local institutions hosting an exhibit called VISION at the Franklin Institute, where the range is from antique eyeglasses to state-of-the-art displays and hands-on activities demonstrating how vision works: how the eye focuses light, how color and motion are perceived, and how the brain processes visual information into a meaningful picture.

VISION is a traveling exhibit, stopping at the Franklin Institute through March 22 as part of a 20-city tour that will take about three years. Its originator is the National Eye Institute (the federal government's primary agency for vision research) and the occasion is the 25th anniversary of the agency. The Franklin Institute Science Museum is located at 20th and the Benjamin Franklin Parkway and is open daily 9:30 a.m. to 5 p.m. For information about Penn's role: Gweneth D. George, Vision Research Center, PennMed, 898-9695.

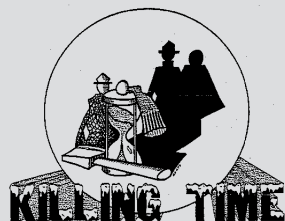


### The Arboretum in Winter

Philadelphia's record snowfalls notwithstanding, the Morris Arboretum is open for rambling seven days a week, with its winter hours (10 a.m. to 4 p.m.) and its guided tours every Saturday and Sunday at 2 p.m.

Other tours can be arranged by reservation. Admission is free to faculty, staff and students, as well as members of the Arboretum. It is located in Chestnut Hill (the public entrance is at 100 Northwestern Avenue, between Germantown and Stenton Avenues. For information, see the new homepage (<http://www.upenn.edu/morris>) or call (215) 247-5777.





The Glee Club's spring show starts this Thursday at the Annenberg Center. Details: 898-GLEE.

# Update

FEBRUARY AT PENN

## CHILDREN'S ACTIVITY

**28** *Children's Story Teller*; Ise Nii-Owoo, author of *A is for Africa: Looking at Africa Through the Alphabet*; 10:30-11:30 a.m.; Lobby, Penn Tower Hotel (Penn Tower Hotel).

## EXHIBITS

### Upcoming

**21** *First Year MFA Show*; Lower Gallery, Meyerson Hall; opening reception, February 23, 6-8 p.m. (Fine Arts). *Through March 5.*

**23** *October Gallery*; Black Art Exhibition; Black History Month celebration; 9 a.m.-6 p.m.; Lobby, Penn Tower Hotel (Penn Tower Hotel).

## FILMS

### Latin American Film Festival

Screenings at 6:30 p.m.; Room B-21, Stiteler Hall (Latin American Cultures Program). *Continues through the semester.*

**22** *Confesion a Laura*; subtitled.

**29** *Los Olvidados*; subtitled.

### SPEC Film Society

Screenings at 7 and 9:30 p.m.; Irvine Auditorium; \$3, \$2/with PennCard.

**22** *The Wild Bunch* (Peckinpah, USA, 1969)

**23** *Friday* (Gray, USA, 1995)

## TALKS

**21** *Mechanisms of Tissue Selective Actions of Estrogen*; C. Richard Lyttle, Wyeth Ayerst Labs; noon; Auditorium, Dulles Bldg. (Center for Research on Reproduction; Women's Health).

*The Effect of Unobserved Plan Attributes on the Health Plan Choices of Elderly Medicare Beneficiaries*; Katherine Harris, University of Minnesota; 12-1:30 p.m.; Boardroom, Colonial Penn Center (Health Care Systems).

**22** *Longitudinal Models for the Analyses of*

*Development Outcome in Low Birthweight Infants*; Isaac Nuamah, Cancer Center; 9-10 a.m.; Rm. 701, Blockley Hall (UPMC Clinical Epidemiology Health Services).

*School Reform as Prevention; An Ecological Approach to Risk Reduction & Developmental Enhancement*; Robert Felner, University of Illinois; 10-11 a.m., Rm. C-12, GSE (Psychology in Education).

*Imaging Electric Currents in the Body Using MRI*; Michael Joy, University of Toronto; 11 a.m.; Rm. 337, Towne Bldg. (Bioengineering; Electrical Engineering).

**26** *Maternal Support Among Pregnant and Parenting Adolescents*; G. Anne Bogat, Michigan State; 12-1 p.m., Rm. C-12, GSE (Psychology in Education).

*Nazism and Holocaust in Contemporary Discourse*; Steven Aschleim, Hebrew University, Jerusalem and Princeton; 4 p.m.; Rm. 103, Williams Hall (German; Jewish Studies).

**27** *Comprehension, Cognition, and Critical Evaluation in a Multicultural Classroom*; Angela Rickford, Stanford; 11 a.m.-12:30 p.m.; Rm. C-12, GSE (Reading/Writing/Literacy Search Committee).

**Deadlines:** The deadline for the April at Penn calendar is Monday, *March 11*. The deadline for the weekly update is on Mondays, the week before publication.

## The University of Pennsylvania Police Department Community Crime Report

**About the Crime Report:** Below are all Crimes Against Persons and Crimes Against Society listed in the campus report for **February 5, 1996 through February 11, 1996**. Also reported were **Crimes Against Property, including 37 thefts (including 3 burglaries, 2 thefts of autos, 13 thefts from autos, 4 of bicycles and parts); 8 incidents of criminal mischief and vandalism; 1 incident of trespassing and loitering; 3 incidents of forgery and fraud.** Full crime reports are in this issue of *Almanac* on the Web (<http://www.upenn.edu/almanac/v42/n21/crimes.html>).—Ed.

This summary is prepared by the Division of Public Safety and includes all criminal incidents reported and made known to the University Police department between the dates of **February 5, 1996 and February 11, 1996**. The University Police actively patrol from Market Street to Baltimore Avenue and from the Schuylkill River to 43rd Street in conjunction with the Philadelphia Police. In this effort to provide you with a thorough and accurate report on public safety concerns, we hope that your increased awareness will lessen the opportunity for crime. For any concerns or suggestions regarding this report, please call the Division of Public Safety at 898-4482.

### Crimes Against Persons

**34th to 38th/Market to Civic Center:** Robberies (& attempts)—1; Simple assaults—2; Threats & harassment—3

02/05/96	9:04 AM	Blockley Hall	Intimidating message left on voice mail
02/08/96	6:29 PM	3429 Walnut St.	Complainant harassed by manager of store
02/09/96	12:24 PM	Ward Dorm	Fire extinguisher set off in room/compl. to HUP
02/09/96	5:15 PM	SH/DH	Complainant threatened by ex-employee
02/10/96	9:36 PM	3600 Blk. Chstnt.	Compl. robbed by male with simulated weapon
02/11/96	1:43 AM	Phi Gamma Delta	Compl. assaulted by unaffiliated male at party

**38th to 41st/Market to Baltimore:** Threats & harassment—2

02/09/96	5:10 PM	3925 Walnut St.	Compl. verbally threatened by store manager
02/09/96	5:23 PM	Wayne Hall	Unwanted letters received

**41st to 43rd/Market to Baltimore:** Robberies (& attempts)—3; Threats & harassment—1

02/07/96	9:48 PM	227 S. 42nd St.	Dispute between boyfriend/girlfriend
02/08/96	7:50 PM	43rd & Pine	Compl. robbed of currency by unk. male w/gun
02/09/96	12:58 AM	4200 Blk. Walnut	Compl. robbed by male/refused to prosecute
02/10/96	8:58 PM	235 S. 42nd St.	Compl. robbed by male w/simulated weapon

**Outside 30th to 43rd/Market to Baltimore:** Robberies (& attempts)—1;

Aggravated assaults—1; Threats & harassment—1; Indecent exposure & lewdness—1			
02/05/96	9:31 PM	4400 Pine	Compl. robbed by unk. male w/simulated weapon
02/09/96	1:01 PM	325 N. 64	Harassing calls received
02/10/96	10:47 PM	215 S. 15th St.	Complainant assaulted by numerous males
02/11/96	10:24 AM	Walnut St. Bridge	Male exposed self/arrest/compl. declined prosec.

## Almanac

3601 Locust Walk Philadelphia, PA 19104-6224  
Phone: (215) 898-5274 or 5275 FAX: 898-9137  
E-Mail: [almanac@pobox.upenn.edu](mailto:almanac@pobox.upenn.edu)  
URL: <http://www.upenn.edu/almanac>

The University of Pennsylvania's journal of record, opinion and news is published Tuesdays during the academic year, and as needed during summer and holiday breaks. Its electronic editions on the Internet (accessible through the PennWeb) include HTML and Acrobat versions of the print edition, and interim information may be posted in electronic-only form. Guidelines for readers and contributors are available on request.

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## "Why Buy the Cow When You Can Get the Milk for Free?"

by Susan Cotts Watkins

On the first day of my class in *Introduction to Sociology: The Family*, I used to despair. The students and I are there for incompatible reasons. They are looking forward to the families that they want to establish, and looking backward to the families that they are leaving (usually, more than half the class are freshmen or sophomores). As if we are all in a cartoon, I fancy I can see their anxious questions in balloons over their heads: *How will I find a mate? My parents divorced—what has this done to me? How can I avoid repeating my parents' mistakes, and protect my marriage (which I want to last until death do us part)?* But I don't know how Lisa or Andrew will find a mate, or, if they do, whether their parents' history is their own destiny. I want them to take a sociological perspective and ask other questions: *What are the patterns of family formation and dissolution? How do those in the contemporary U.S. differ from those in our past, or in Kenya, where I am currently doing research on fertility change? What are the theories that help us to recognize these patterns? How do we confront our theories with empirical evidence? How do we evaluate the quality of that evidence?*

When I began teaching *The Family* at Penn in 1982, the gulf often seemed too great. After a few years I hit on an approach I think has been successful (an intuition supported by higher student evaluations). Now, on the first day of class I survey their attitudes to the family, taking some options from national surveys: *People should only get married because they are deeply in love...Marriages are better when the husband works while the wife runs the home and cares for the children...When parents divorce, children develop permanent emotional problems.* The data from the survey are entered into the computer (courtesy of Bob Douglas, director of social science computing) and by the third week of classes I can show the class where they as individuals fit into the aggregate distribution.

### "Do you expect to cohabit?"

By the time I introduce the class data, we've read the chapters in the text on the family and gender, class, and race and ethnicity, and we've read about the crystallization of 19th century U.S. family ideals (separate spheres, where the man is the breadwinner and the woman in charge of the domestic sphere). *How far have they come?* I ask them. We turn to the class data, and year after year we find that the class has abandoned the notion of separate spheres (though not the expectation that women will do most of the housework and childcare). They still believe firmly in love as a basis for a marriage that will last forever—even if most of them, it turns out, believe that when a marriage is emotionally or sexually unsatisfying, divorce is a solution, even if there are children. We begin to formulate hypotheses about patterns in the data. Do they expect that women in the class will have different attitudes toward the "Ozzie and Harriet" family? They usually say yes, and have sensible explanations (drawn more from their own intuitions than from the sociological theory of the text): the women in the class are getting an education and they expect them to want returns on this "investment in human capital." We then examine the class data, and usually find that their hypotheses are not supported: there are no significant differences by gender. I then gently lead them from aggregation at the level of the class to aggregation at the level of the nation. We talk about the representativeness of our class sample, and they don't find it hard to believe that Penn students are different from the national population: better educated, with parents likely to have higher incomes and levels of education than the national average.

It becomes easier and easier to move from their individual attitudes to the patterns in the class and to national patterns. *What about cohabitation, I ask: do you expect to cohabit?* The data show that most of them do. *Why?* They formulate hypotheses. Many of them believe that cohabitation is a prophylactic against divorce—as Michele phrases it, one can try living with a partner, with the option of abandoning ship before the vows are publicly pledged. We look at national data on reasons for cohabitation, and, lo and behold, Penn students aren't so different after all: on a national survey, getting to know a partner is the modal reason for cohabiting before marriage. *Does cohabitation protect against divorce?* We look at the

national data comparing the duration of marriage for those who have cohabited before marriage and those who have not. Alas, cohabitation is not a help. *Why not?* If I'm lucky, a bright student will point out before I do that people who choose to cohabit may be different from those who choose not to—different in ways that may also affect the probabilities of divorce. They are now well into discovering one of the major differences between social sciences and natural sciences, that social sciences can't randomly assign people to categories (*Lisa, you cohabit, Andrew, you don't*). Selection biases become intuitively clear, and the possibility that cohabitation may yet be a prophylactic against divorce revives their spirits.

By the middle of the semester, they are ready to formulate a hypothesis on their own and test it with the class data for their paper. They are, I've discovered, reluctant to examine hypotheses about race, but hypotheses about the effect of parental divorce on children's attitudes are popular. Many believe firmly that those whose parents have divorced are likely to be more cautious in their attitudes towards marriage. They can test this with a cross-tabulation of *Living together before marriage makes good sense* by *Are your parents presently married to one another?* (with the option of going on to separated/divorced/remarried/never married/deceased/other). Also popular are hypotheses having to do with female labor force participation: *Does having had a working mother make a student more likely to expect to work while her (yet unborn) children are aged 0-6? ... Are members of sororities or fraternities more "promiscuous" (their words, not mine) than non-Greeks?* They can cross-tab Greek membership by *It's o.k. to have sex on the first date.*

The paper is to be written in a standard format: the clear statement of a testable hypothesis and its theoretical justification; a discussion of the data and methods (simple cross-tabs, but some students move on to odds ratios and significance tests); results; discussion. They are to attach the computer printouts. (Before I hit on this assignment, I worried a lot about plagiarism. But the numbers change with each survey, and including the original printouts is a further protection). The TAs offer to read their hypotheses before they start testing them (invariably, some students want to test hypotheses that can't be tested with the available data, e.g. *Women at Penn will put their career before their family*). The TAs also offer extra office hours in the UDAL lab in McNeil to those who struggle with our handouts on how to use Stata, the statistical package.

### "Ask a different question..."

When a cherished hypothesis is not supported, they are downcast, despite my repeated Popper-ian points about how science marches on by disconfirmation. Popper is o.k. in the abstract, it seems, but not in practice. They come to office hours (or, now, e-mail) worried that they don't have a paper, and rephrasing Popper doesn't cheer them up much. They start to do what scientists often do, to recognize the inadequacies of the available data or the sample. Perhaps students aren't willing to admit on a survey that they believe that sex on the first date is o.k.—or perhaps some (e.g. men) are, but others (e.g. women) aren't? So they cross-tab the data by the gender of the respondent. Perhaps the age category 0-6 is too broad, and the survey should ask about expectations for working when the children are 0-2? *Ask a different question next time*, they suggest. Or they claim that Penn students are different, a better sample is required.

Some of them will go on to take more sociology courses, and a few of them become majors. Most of them disappear from my sight. No doubt they will forget many of the "facts," and perhaps they should: after all, the total fertility rate is likely to change, and one theme of the course is change in family patterns associated with changes in economic organization and in ideologies. But I'd like to think that they carry some of the sociological perspectives with them, and some of their criticisms about data. When they hear *The American family is disintegrating*, I hope that some, at least, will say *How do you measure disintegration? What are your data? How did you test that hypothesis?*

And in the meantime, some of the papers are terrific: one of my personal favorites is the one on cohabitation that provided my title.

## A University for the Information Age

*President Judith Rodin's remarks at a brunch preceding Vice President Gore's lecture  
and the rebooting of ENIAC*

Prediction is, at best, an inexact science when it comes to the impact of technology. Those who ought to know better sometimes hit very wide of the mark.

In the 15th century, for example, it is said that the faculty at Merton College, Oxford, were cautious about stocking their library with books because they were not convinced printing was here to stay. They were wrong.

In the 18th century, economists hailed the Machine Age as the ultimate in technology. They were wrong.

In 1950, an expert predicted that seven computers would serve all the nation's computing needs. He was wrong.

And today, there are those who say that universities in the 21st century will be no different than they are today. They too are wrong.

One reason has to do with ENIAC, one of Penn's proudest achievements. Unveiled 50 years ago, the world's first large-scale, general purpose, digital computer heralded a defining moment in human history. Like the invention of other intellectual tools—the alphabet, the zero, and the printing press—ENIAC changed the world—faster than any of us dreamed possible, and in ways few of us ever thought possible.

On the home front alone, there are some 65 million households with computers, many of them on-line. We have microprocessors in our automobiles and answering machines. In industry and business, it's not machine power and office space, but mind-power and cyberspace.

Computing is not just about number-crunching anymore. It's about the way we communicate, store, display, and transmit information. It's about the instantaneous and inexpensive transfer of electronic data that move at the speed of light. It's about interconnections. It's revolutionary change, it's exponential change, and it's happening now.

What does all this have to do with Penn? Everything. We now have at our disposal an enormous range of marvelous new tools—tools that are totally redefining how knowledge is produced and transmitted; tools that can transform how research is done; tools that challenge us to redefine what it means to be a university in the information age. We must realize the true enormity of what is happening, and we must be open to its enormous implications.

A century ago, when Alexander Graham Bell told the venture capitalists of his day that his invention would allow an individual in Chicago to talk with someone in New York, their reaction was: "But what, in God's name, would anyone in Chicago possibly say to someone in New York?" What indeed?

A hundred years ago, the social and economic boundaries of the world were local. Today they are global—and Penn is part of that global marketplace of ideas. Yet there are many in higher education who still believe that nothing has changed. They say that universities have been doing the same things much the same way for hundreds of years—and doing them pretty successfully. They say new technology isn't going to make that much difference.

In the late 1800s, some people said the same thing about the new-fangled "horseless carriage." Transportation meant horses and had meant

it for thousands of years—much longer than universities have been in business. Yet, by the 1920s, cars, not horses, ruled the roads.

There's a lesson here for us. Technology can change the status quo faster than we can imagine. It's happening now—and all of us must realize that it cannot be business as usual at Penn. Our economy today is a knowledge-based economy. So how we prepare tomorrow's leaders and decision-makers requires profound rethinking. It goes beyond questions of class size, budgets, and the traditional debates over the curriculum and directly to the question of how students learn.

There's no room for horse-and-buggy thinking on the information superhighway. We have an enormous opportunity at hand—the opportunity to be *the* leading university of the Information Age. And we intend to seize this opportunity deliberately, systematically, thoughtfully, and by design. In fact, we have made the creative deployment of new technologies a goal of our five-year strategic plan: *Agenda for Excellence*.

What will *not* change is our commitment to being a multi-faceted, full-service University and a human community. What *will* change—and very quickly—is how we do our business: not only how we communicate, display, and store information; but also how we teach and how we do research.

Why do we teach the way we do? It's not graven on stone "Thou shalt teach by the lecture method and gather students onto thy campus." We teach the way we do because of an important technological breakthrough—the book. For centuries, information has been stored in books; books are in libraries; and universities have been centered around libraries. This has meant that professors have had to be where the books were, and students have had to come to

them. And typically, students could only come at certain times in their lives.

Now, new technology is changing the rules at breakneck speed. Information no longer needs to be stored in books that sit on shelves. Digitized images and hypertext applications are changing the very process and products of scholarship. Suddenly, the library is everywhere, and everywhere is the library—instantly accessible from anywhere, any time.

Does this mean that our Library will disappear from College Green? Of course not. Books will still be around for a long time. They must be. And the human interactions that go into great teaching are incredibly important and not replaceable by technology.

But the University can no longer be bounded by stone and glass—not if we are to be the leading university of the Information Age. Our Library must be at the forefront in making an ever-increasing range of electronic text, images and data available to the world-wide community of scholars.

For example, when we implement the Center for Electronic Text and Imagery scholars will have immediate access to our extensive collections of original source materials that range from rare Shakespearean editions to the history of chemistry.

What does this new technology mean for faculty? It means that researchers will be looking at and talking with colleagues all over the world in real time via desktop screens—human interactions on a global scale. Some of our faculty, like Ruzena Bajcsy, professor of computer and

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*“. . . these new tools  
are making education  
more human, not less;  
more challenging,  
not less; more  
interactive,  
not less.”*

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# On ENIAC's Birthday: Looking Ahead

information science, are already leading the way. Via the keyboard, she collaborates as easily with colleagues across the world as those across the hall.

New technology also means that faculty will teach more as mentors and less as lecturers—teaching students to understand and evaluate the enormous amount of information readily available at their fingertips.

What role, then, is Penn to play in an interconnected, interactive global society? The same we have always played: generating and transmitting knowledge. With one difference: our student population need no longer be limited by location, age, and class size. As one example, some will take courses over the Internet. They will be *with* Penn, although not *at* Penn. Life-long learning is a field with enormous opportunities for an innovative university like ours.

Does this mean that our campus curriculum will one day be replaced by Internet courses? I think not. So have no fear: Penn is not about to be replaced by a stack of CD-ROMs or banks of computers. The campus-based curriculum will be with us for a long time. So will the Library. So will the football team. Why? Because education involves more, much more, than transmitting information.

The ironic aspect of the Information Revolution is that it forces us to go beyond the technology and ask what our business really is. And our business is as much about interaction as information. We claim that universities are scholarly communities where students learn by example and interaction. We claim that giving information without teaching critical thinking is not education. We claim that true learning is a human and humanizing process.

I believe we are right. Just listen to what alumni talk about when they return to campus. They talk about the professors who changed their lives. I have yet to hear that about any computer. But students will surely not learn the same way in the new Information Age.

How will they learn in the future?

Ask Alan Filreis, professor of English. He is using the Net to extend teaching in his poetry class. In his virtual classroom, students exchange their ideas directly with one another and with him—day and night, 24 hours. And last year, their parents took the course with them over the Net.

Ask James O'Donnell, professor of classical studies. His Internet course on the Augustan Age has attracted students not only from Penn, but 375 people worldwide. And he reports more student dialogue and interaction, not less, among those face-to-face on campus.

Ask Charles McMahon, professor of materials science and engineering. He and his colleagues have produced a CD-ROM that uses the bicycle and the Walkman to simulate and display information about material science in 3-D. Students are using this program to learn independently and at their own pace.

Ask any of them, and I think they will tell you that these new tools are making education *more* human, not less; *more* challenging, not less; *more* interactive, not less. Tools such as these are imperative for the university that wants to be competitive in the long run—and the long run is being measured not in decades but in years, or even shorter. We must accelerate our rate of change.

Will the new information technologies also change the way we do research? Decidedly so. A leader of a major corporation recently said, "We will get our research wherever we can. It's as easy to communicate with someone in India as in Indiana. What matters is where we can get the best work done at the best price."

To be an aggressive and ambitious institutional competitor in the marketplace of ideas, Penn must be interactive, interconnected, and international. We cannot do 21st-century research with a 20th-century information infrastructure—or with a 20th-century mind-set.

The question then is one of leadership.

To be the leading university of the Information Age, we must find innovative ways to exploit the unique capacities of the new information technologies across the entire University—from business office to admissions office, from laboratory to classroom—at the cutting edge of research and teaching. Many such initiatives are already underway.

Realizing our vision as the leading university of the 21st century will require resources, energy, some fearlessness, and a strong entrepreneurial spirit. To this end, we will seek investments by those in the private sector who recognize the critical importance of the University to the nation and to society: corporations, foundations, alumni and friends of Penn—people

who recognize the full implications of the enormous change taking place.

When Penn threw the switch on ENIAC, the Information Age was born—and with it, a multi-billion dollar industry. We, therefore, intend to form broad coalitions as a means of developing and exploiting new academic and commercial uses of technology. We will move our new discoveries quickly to the marketplace to boost the nation's competitiveness. We will take full advantage of mechanisms that connect research results with economic utility, such as technology partnerships, marketing, licensing, and patents.

This afternoon, we will reenact the historic moment in 1946 when ENIAC first stirred into life. I believe that fifty years from now those who come after us will remember 1996 as another historic moment at Penn—a time when we let go of the old and reached out for the new; a time when we wisely, creatively, and decisively said "yes" to the Information Revolution; a time when we invented the university for the Information Age.

Penn must be at the lead in this second revolution. And rightly so: After all, we did start the first one.

## From the City of Philadelphia

### The Mayor's Proclamation

A small group of patriots met in Independence Hall in Philadelphia in 1776 and created a document, the Declaration of Independence, and a country, the United States of America, that changed the world. In 1942, a small group of faculty and graduate students met at the University of Pennsylvania in Philadelphia and began to create a concept that would equally change the world. On February 14, 1946 this team of pioneers unveiled and publicly demonstrated the world's first large-scale general purpose electronic computer—ENIAC, the "Electronic Numerical Integrator and Computer"—the machine that gave birth to the Information Age.

Fifty years later, the University of Pennsylvania, the City of Philadelphia, and many of the leading figures in the industry that ENIAC launched will hold an 18-month celebration of the 50th anniversary of this machine that sparked the Information Revolution. Computing pioneers and major contributors to the industry will be honored; a major new science and technology exhibit will be opened; on-line information about Philadelphia and the region will be greatly expanded; a series of symposia will bring together scholars and experts from around the world to the University of Pennsylvania to explore and discuss the future of computing; the ACM/Association for Computing will mark its concurrent 50th anniversary with its annual conference in Philadelphia during the ENIAC anniversary week; major exhibits exploring the influence of computers on arts and science will be held at museums and art galleries across the city; and a network of interactive tourism kiosks will be installed throughout the city.

It is fitting and appropriate, therefore, that the City of Philadelphia officially recognize with this Tribute to

#### ENIAC 50th Celebration Year

for one of the most important spheres that will affect the future of this city is information technology, its multi-faceted impact on the students in its schools, the workers in its businesses and the management of governmental resources. As the birthplace of our country and the birthplace of information technology, Philadelphia continues as a global leader in this critically influential area.

Edward G. Rendell,  
Mayor  
February 14, 1996

## The Technology Challenge: How Can America Spark Private Innovation?

*The prepared text of Vice President Al Gore's lecture at the ENIAC celebration.*

This week, I am delivering three speeches about America's technology challenges. On Monday, in Baltimore, I spoke to a collection of scientists, and asked: *What is the role of science in American society?* Yesterday, in Virginia, I asked: How must we update our notions of self-government to bring them into harmony with the Information Age?

And today, Valentine's Day, here on the glorious Penn campus, I will complete this technology trilogy, and ask: How do we spark the innovation that creates jobs, builds businesses, and lifts lives?

To answer that question, I'll draw on a time-worn technique of your most annoying professors. I'll answer this question with another question.

Here it is: How did this happen? [*Vice President opens a musical valentine that plays "You Are My Sunshine."*] Now, don't laugh. I'm going to give this to my wife Tipper when I get back to Washington.

But it's special for another reason, too. Later this morning, I will walk across campus to the Moore Building and turn the key on the Electronic Numerical Integrator And Computer—the ENIAC, the world's first programmable computer, which is celebrating its 50th birthday.

That computer—which stood ten feet tall, stretched 80 feet wide, and tipped the scales at 30 tons—contains about as much computing power as my Valentine's Day card.

You know that powerful parallel computer that's playing chess\* against Garry Kasparov about 20 blocks from here? It can evaluate 40,000 chess moves in the same time it took ENIAC to add two numbers. Anybody here have a laptop computer? Your computer has more power than the *combined* power of *all* the computers in the world 50 years ago.

So again the question: How did this happen? How did the power that once spanned an entire room migrate to this tiny card you can buy for a few dollars at the stationery store?

There are several answers. The most important one perhaps is that we've got a lot of smart people in this country—a lot of people like the ones who've graduated from Penn. They've sweated long nights in the laboratory repeating experiments, testing assumptions, collecting data—and eventually they opened breathtaking avenues of possibility.

And these software writers and computer engineers joined up with the marketers and financiers to create real products that have made a difference in people's lives. Together, this duo propelled ideas out of the basement computer lab and into the living rooms and offices of America.

But there's another explanation for this extraordinary development—this explosion of computing power and its migration to all corners of our life. It's an explanation that may surprise you—an explanation not even computer science professors comprehend—an explanation some of you might never have heard before: Bruce Springsteen.

Remember that song, "Dancin' in the Dark"? There are lines in that song that contain part of the answer to the puzzle of this card. The lines go like this:

"You can't start a fire..."

"You can't start a fire without a spark."

A key explanation for this Valentine's Day card, for my cool wrist-watch, for your red-hot laptops, is that the federal government provided the initial spark that eventually flickered into these extraordinary products. Back in 1943, the federal government provided a small amount of money to some of Penn's best engineers so they could develop an electronic machine that could perform a rather narrow task: calculating firing tables for artillery weapons. That was the birth of the ENIAC.

After the ENIAC was built, it was put to use performing millions of discrete calculations that were part of top-secret research on the hydrogen bomb. The ENIAC did that well, but before long the war ended.

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\* Update 2/18/96: Kasparov won the match, 3-1 with two draws.—Ed.

At the time, there were some people who thought that the ENIAC and other computers could be used for other things—maybe even for business.

The chairman of IBM, Thomas Watson, gushed: "I think there is a world market for maybe five computers."

*Popular Mechanics*, in a 1949 issue dedicated to the inexorable march of scientific progress, made an ever bolder prediction: "Computers in the future," the magazine said, "may weigh no more than 1.5 tons."

And so it went. Talented people gradually improved on what the ENIAC began. Computers got smaller, faster, smarter. And slowly but surely, fifty years later, I can display this card on a campus where a group of undergraduates have etched the ENIAC's instructions on a tiny sliver of silicon.

In the early days of the ENIAC, nobody knew where it would all lead. But these pioneers—and this nation—were committed to an idea that transcended any single destination: knowledge matters for its own sake; pursuing knowledge is something that America must do.

They heard the music, even if they didn't know the lyrics. *You can't start a fire. You can't start a fire without a spark.*

It's a similar tale with the Internet. Look at the cover of this week's *Time* magazine. "The Golden Geeks. They invent. They start companies. And the stock market has made them instantaires."

Now, the Internet "instantaires" got where they are mainly through talent and tenacity. But it's unlikely they could have set the world ablaze had government not provided the initial spark.

In 1969, the federal government—through the Defense Department's Advanced Research Project Agency—created something called ARPANET. The Pentagon's goal was to develop a computer network that would allow military scientists and engineers to share expensive computers—and to do it on a network that could withstand a nuclear attack. E-mail was a quirky—but eventually useful—afterthought.

Over the next decade, computer scientists at universities and federal labs began connecting to the ARPANET. A few thousand more people began using this new tool, but to the larger population it remained unknown.

Then in 1986, the National Science Foundation—again, an agency of the federal government—began what was called the NSFNET to expand the ARPANET to include not simply computer nerds, but *all* researchers at American universities. That led to the National Research and Education Network, or NREN, which I helped get off the ground. And that eventually led to the Internet—the organic network of networks that today is bursting with new users, creating entirely new industries, and reshaping how we work and how we communicate.

The ARPANET creators could not have predicted what would happen to their brainchild. But, as always, they heard the music—and now we all know the lyrics. *You can't start a fire. You can't start a fire without a spark.*

One more example. *Time*'s poster boy is Marc Andreessen, a top official at Netscape. He's 24 years old. He's worth about \$130 million. Not bad. That's roughly \$14,000 for every day he's been alive.

Marc got his start just a few years ago as part of the team that developed Mosaic, the first sophisticated browser for the World Wide Web—and the breakthrough application that made the Web accessible to ordinary computer users.

Marc performed his work on Mosaic at the National Center for Supercomputing Applications at the University of Illinois, a supercomputing center funded by—yes—the National Science Foundation.

And the funding for Mosaic itself came from the High-Performance Computing and Communications Initiative, a federal research and development program I helped pass into law while I was a Senator.

Of course, I had no idea at the time that this investment would lead to

# On ENIAC's Birthday: Looking Ahead

hundreds of thousands of home pages on everything from smashing atoms to the Smashing Pumpkins—from Albert Einstein to Jennifer Aniston. Nobody had any idea this investment would uncork an amazing fizz of T-shirt-to-riches stories. But that wasn't the point.

The point, as I'm sure you're understanding by now, was this: *You can't start a fire. You can't start a fire without a spark.*

That's how it has worked in America. Government has supplied the initial flicker—and individuals and companies have provided the creativity and innovation that kindled that spark into a blaze of progress and productivity that's the envy of the world.

For much of this century, Americans have benefited from this process—this virtuous circle of science and success. As the nation generated wealth, a portion of that wealth was invested in research, science, and technology. Those investments helped solve tough problems—and eventually spawned still greater wealth, which was then invested in still more research. On and on it went. Prosperity generated investment, investment generated answers, and answers generated further prosperity.

But now there are some in Washington who seem intent on snuffing out this spark with the largest cuts in science and technology and education in a generation.

In their most recent budget, the Congressional leadership proposed reducing federal funding for science and technology by one-third by the year 2002, adjusted for inflation. And get this: several years after the Cold War ended, defense R & D is going *up*, while civilian R&D is going *down*. More for Star Wars, less for environmental research. At the very moment global economic competition and global environmental degradation demand civilian research and the technologies it often produces, this Congress is proposing the sharpest cuts in nondefense research since America was fighting World War II.

The only investment the Congress wants to increase was in health sciences. And that's great. But in almost every other realm, they're approaching technology with all the wisdom of a potted plant.

This crowd talks like George Jetson. But they support policies more appropriate for Fred Flintstone. They promise to boldly go where no Congress has gone before. But their flight plan will take us straight into the ground. They sing tunes about moving America into a sunny future. But really, they're just dancing in the dark.

We can do better than that.

We can invest in new technologies—not suffocate the fires of creativity in a crazy quilt of misguided savings.

We can invest in education technology and link our schools to the information superhighway—not pull the plug on our classrooms and disconnect them from the world.

We can invest in student loans to open the doors of college to all our young people—not shut the university gates to all but America's wealthiest families.

That's what President Clinton has been fighting for. Because he understands that the ENIAC changed not only how we send valentines, but how we think about our world.

For years, much of our thinking was shaped by the metaphor of the factory. Our elementary schools were built according to the principles of the assembly line. Government's approach to the economy was to "tinker," to "shift gears," or to "step on the gas." And most of our businesses pursued the same Holy Grail: cranking out more and more of the same thing at lower and lower costs.

But the ENIAC—and the revolution it ignited—altered that. It changed our world, and demanded a new vocabulary to describe it.

Yet years after the change began, we're still standing on the floorboards of Industrial Age metaphors that are creaking with age, groaning under the weight of a new reality.

I think there's a better metaphor—a sturdier metaphor, more appropriate to our times. It's the metaphor of distributed intelligence.

In the beginning of the mainframe computer era, computers relied

almost totally on huge central processing units surrounded by large fields of memory. The CPU would send out to the field of memory for raw information that needed to be processed, bring it back to the center, do the work, and then distribute the answer back into the field of memory. This technique performed certain tasks well—especially those that benefited from a rigid hierarchy or that depended on the outer reaches only for rote tasks.

Then along came a new architecture called massive parallelism. This broke up the processing power into lots of tiny processors that were then distributed throughout the field of memory. When a problem was presented, all of the processors would begin working simultaneously, each performing its small part of the task, and sending its portion of the answer to be collated with the rest of the work that was going on. It turns out that for most problems, this approach—the distributed intelligence approach—is more effective. But somehow this metaphor, and the idea it contains, never migrated into our public conversation or our common vocabulary—even though it's profoundly re-ordered our lives.

Distributed intelligence offers a pretty coherent explanation for why democracy triumphed over governments that depended on all-powerful central processing units. And it helps explain why American businesses are pushing power, responsibility, and information away from the center—and out to the salespeople, engineers, and suppliers who know the product best.

Here's a question that might prove my point. It's for the Penn students in the audience. How many of you, when you graduate, hope to climb the corporate ladder—rung after rung, same company—for the next 40 years? Let's see your hands. Or how many of you hope to maybe start your own business, move from project to project, or navigate whatever exciting webs of commerce present themselves? The ladder is a factory metaphor—one path, one destination, step by step. But the web is a distributed intelligence

metaphor—innumerable paths, unimaginable destinations, any route you choose.

Just look at the changes in our economy and our culture. Your parents probably read *Life* magazine. So did the rest of the country. But now almost anyone can publish a magazine, and many are. At last count, there were as many as 50,000 'zines in America. Distributed intelligence.

Investment advice used to come from the gray-suited Wall Street expert—font of all wisdom, source of all information. Now, investors are going online with services like the Motley Fool, comparing notes with thousands of other investors, building a pool of information far deeper than any experts have. And in the process, they're beating the pants off the big money crowd. Distributed intelligence.

So let me bring this full circle. Because of that clunky old machine in the Moore Building—which required more than 17,000 vacuum tubes and drained enough electricity to light three houses for an entire year—how we work has changed, how we organize ourselves has changed, how we think has changed. The ENIAC didn't accomplish that directly. And if all its inventors were here today, they would probably be astonished by what they wrought.

But the ENIAC—funded by a small investment from Washington—provided the spark, just as ARPANET helped sparked the Internet, and the High Performance Computing Initiative helped spark the World Wide Web.

Two days ago, Iowans cast their votes in party caucuses that signal the beginning of the 1996 elections. This is the last presidential election of the 20th century—and the first presidential election of the distributed intelligence era.

Our choice is pretty clear. Do we snuff the spark that helps ignite innovation, new businesses, and better jobs? Or do we keep providing that spark—and rely on the brains and sweat and vision of people like you to keep America's fires blazing?

You don't have to rely on distributed intelligence for that one, do you?

So, Happy Birthday, ENIAC. Happy Valentine's Day, Penn. Let's get to work.