

Re: Organization

A new Division and some familiar faces in new places are the results of a reorganization undertaken by Fermilab Director John Peoples.

What was previously the Computing Department of the Research Division has been spun off to create the Fermilab Computing Division. (More on this new entity in the next *FermiNews*.)

Recent appointments at the Division/Section-Head level include:

J. Donald Cossairt has been appointed Head of the Safety Section. Cossairt received his Ph.D. in 1975 from Indiana University where he studied nuclear physics. After serving as a Research Associate at the Texas A&M University Cyclotron Institute, Cossairt joined Fermilab in 1978 as an Associate Scientist in the Safety Section, working in accelerator health physics research and health physics program administration. From 1982 until 1989, Cossairt was the Senior Safety Officer in the Research Division, responsible for operational health physics and the conventional safety program in the majority of the Lab's experiments. He is currently a participant in Fermilab Experiment 704 at the Polarized Proton

Beam. Cossairt is an Associate Editor of *Health Physics* and a member of the National Council on Radiation Protection and Measurements Scientific Committee.

Peter H. Garbincius has been appointed Head of the Research Division. Garbincius received his Ph.D. in elementary particle physics from Cornell University in 1974. He was a post-doctoral Research Associate at MIT, working on Fermilab experiments using the Single-Arm Spectrometer. In 1976, he joined Fermilab as a member of the Proton Department, where he led a group in the development of low-current superconducting dipole and quadrupole magnets for secondary beamlines. He also served as liaison physicist and beamline physicist for a series of experiments in the Tagged Photon Lab, and Deputy Head of the Proton Lab. With the formation of the Experimental Areas Department in 1982, Garbincius became head of the Cryogenics Group. After a five-month sabbatical at SLAC in 1984, Garbincius served as Head of the Experimental Areas Site Department as well as Assistant Head of the Research Division, and then Dep-

uty Head before assuming his current role as Division Head. He has been involved in experiments with the Single-Arm Spectrometer, E-400 (Hadro-Production of Charm), and, since 1981, in the design and development of the Wide Band Beamline and E-687 (Photoproduction of Heavy Quarks).

E. Thomas Nash has been appointed Head of the Computing Division. Nash received his Ph.D. in 1970 from Columbia University. Between 1970 and 1972, Nash was a Research Associate at MIT working on experiments at DESY and the then National Accelerator Laboratory. Joining Fermilab in 1972, he served as Project Manager for the Tagged Photon Beam Facility until 1975. From 1976 until 1977, Nash was Head of the Internal Target Laboratory. He was Project Manager for the Tagged Photon Spectrometer and Spokesman for E-516 from 1977 until 1979, when he was named Deputy Chairman of the Fermilab Physics Department. In 1983, Nash became Head of the Advanced Computer Program. In 1988 he was named a Carnegie Sci-

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A New Parallel-Processing Machine from ACP

It wasn't quite “Mr. Watson, come here, I want you,” but it was close. At 3 o'clock on the afternoon of August 4, 1989, several members of Fermilab's Advanced Computer Program (ACP) group gathered in their lab space on the 6th floor of Wilson Hall where dialogue was flashing across a computer terminal screen in response to keyboard

entries. What they were watching was the first signs of life from a new standalone computer designed by the small band of synergists in the ACP group, headed by Tom Nash, as they quietly attacked one of the most vexing problems high-energy physics (HEP) faces in the immediate future: adequate computing capability for the analysis of

millions of particle-interaction events. The new board, known as the ACP/R3000, had accepted the UNIX operating system and was ready to receive its first commands.

In 1983, the Ballam Committee, convened by then Fermilab Director Leon M. Lederman and empowered to assess future computing needs for

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Ragtime Music Rolls into Ramsey Auditorium

“Living A Ragtime Life” is a provocative mix of music and Americana, featuring nimble-fingered, quick-witted, humorist/historian Max Morath. He lights up the stage of Fermilab’s Ramsey Auditorium with the music and song of America’s Ragtime Era at 8:00 p.m. on Saturday, December 2, 1989.

“It’s our music that labels our history more than our wars and our politicians,” claims Max Morath. Happily in tune with the music, songs, and spirit of such immortals as Scott Joplin, Irving Berlin, George M. Cohan, Bert Williams, and Eubie Blake, Max Morath weaves together musical and philosophical ideas about American popular culture “with Mark Twain’s gift of gab.” He offers a bright, affectionate look at, and a rollicking musical tour of the Gay Nineties through the Roaring Twen-



Max Morath

ties, revealing the fads and foibles of the time along the way.

Distinguished as one of our country’s foremost ragtime pianists Max Morath is also well known for his two award-winning TV series, “Ragtime Era” and “Turn of the Century,” as well as his many record albums. His research into the

folk roots of popular music spawned several theatrical endeavors off-Broadway and at the Smithsonian Museum in Washington. “Max Morath has been America’s ragtime minstrel for so many years that the latest edition of his one-man show is the nearest thing to a high-class vaudeville act that exists in this country. He’s a humorist, an entertainer, and one heck of a showman,” say members of the press.

Tickets to Max Morath’s “Living A Ragtime Life” are \$7. They’re going fast, so reserve your tickets by calling ext. ARTS weekdays between 10:00 a.m. and 12:00 noon, or 1:00 and 4:00 p.m. Phone reservations are held for five days, but due to ticket demand those not paid for within five working days will be released for sale.

- Tammey Kikta

“Wellness” Works

Leave the Pack Behind

Thursday, November 16, 1989, is the day to leave the pack behind.

That’s when the American Cancer Society will sponsor its 13th annual “Great American Smokeout,” a nationwide “holiday” from smoking. The smokeout is meant to be a good-natured effort to encourage smokers to give up cigarettes, cigars, and pipes for 24 hours.

To help smokers quit for the day, the Wellness Works Committee is planning several activities in the Atrium lobby of Wilson Hall:

• Turkey raffle: Quit for the day and trade your pack of cigarettes, cigars, or pipe tobacco for one ticket to win a free turkey.

• Free materials: Stickers, pins, quitting tips, etc., provided by the American Cancer Society will be available at the information table between 7:00 a.m. and 1:30 p.m., Thursday, November 16.

• Free pack of sugarless gum: One pack will be given to each quitter.

• Survival kits: Low-calorie nibbles will be sold at lunch-time in the cafeteria.

• “Where There’s Smoke”: This video will be on the monitor in the Atrium.

Watch for posters around the Lab announcing the “Great American Smokeout.” Quitting is easier when you have someone to help you. And on Thursday, November 16, you’ll be joined by millions of other quitters. Show yourself you can quit for the day!

- Paula Cashin



I sent my
cigarettes
packing.



• Adopt-a-Smoker Certificates: For non-smokers who want to help smokers quit for the day by providing low-calorie nibbles and non-threatening encouragement.

Number of ex-smokers in the U.S. today: **40,000,000**

- The American Cancer Society



Secretary of Energy James D. Watkins at the podium in Ramsey Auditorium on the occasion of the symposium on "Science Education for the Entire Nation." The symposium preceded formal groundbreaking ceremonies for the Science Education Center at Fermilab. Seated to the Secretary's left are Fermilab Director John Peoples; Fermilab Director Emeritus Leon M. Lederman; Lourdes Monteagudo, Deputy Mayor for Education, City of Chicago; Professor Howard S. Goldberg of the University of Illinois; Roosevelt D. Burnett, Principal, Chicago Vocational High School; and William E. West, President, Illinois Science Teachers Association and Naperville Central High School Science and Technology Chair, all of whom spoke at the symposium.



(L. to r.) Secretary Watkins, keynote speaker at the Science Education Center groundbreaking, John Peoples, Fermilab Director Emeritus Robert R. Wilson, and Leon Lederman do the ceremonial honors in front of more than 200 onlookers at the groundbreaking.

Science education took center stage on Saturday, October 7, 1989. The new Science Education Center at Fermilab was launched with a symposium on "Science Education for the Entire Nation" in Ramsey Auditorium, and a groundbreaking ceremony at the Center's site just south of inbound Pine Street.

Fermilab Director John Peoples moderated the symposium. In addition to an address by U.S. Department of Energy (DOE) Secretary James D. Watkins, the audience heard: Leon M. Lederman, Fermilab Director Emeritus and Professor, University of Chicago, speak on "Scientists and Science Education - The National View"; William E. West, President-Elect, Illinois Science Teachers Association and Science and Technology Chair, Naperville Central High School, on "Science Education: The Fermilab Experience"; Lourdes Monteagudo, Deputy Mayor for Education, City of Chicago, on "Science Education: A View from the City"; Howard S. Goldberg, Professor, University of Illinois at Chicago, on "Integrating Math and Science in the Elementary School: Problems and Prospects"; and Roosevelt D. Burnett, Principal, Chicago Vocational High School, on "High School Science Education in the City: Needs and Prospects."

A series of luminaries put their hand to turning shovels of earth at the groundbreaking. Included were Secretary Watkins; Hilary Rauch, Manager, DOE Chicago Operations Office; Fermilab Director Emeritus Robert R. Wilson; John Peoples; Leon Lederman; Stanka Jovanovic and Marjorie Bardeen of the Fermilab Education Office; and students Al'ishandrah Braneon, Samuel Byrd, Eric Dahl, Choudet Jhou, Clarissa Ramos, Clare Sammells, Aaron Smith, Laurent Stadler, and Jason Stevenson.

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high-energy physics, issued their report. It confirmed what had been suspected: The amount of computing capacity critical to future HEP experiments would far exceed the current capabilities. (That has certainly come to pass. For example, Fermilab Experiment 791 anticipates collecting 10 billion events during their next run.) Clearly, new computing strategies had to be found.

Various possible solutions were examined in light of realistic requirements such as expansibility and cost. At the urging of Nash, Lederman decided that the Laboratory would be able to design a special computer system that would go far in meeting Fermilab’s computing needs. It would be a parallel processing computer built out of the currently best available hardware components. The basic idea, in the words of Mark Fischler of the ACP, was to “build the processor as inexpensively, and as lean and mean, as possible.” That concept became the first-generation ACP parallel processor. It consisted of hardware and software combined into a rudimentary operating system, plus some user support from the ACP group. “We made that new computing power available to serious users who were willing to put up with the inevitable inconvenience of using something that is not the same as what everyone else was using,” said Fischler.

A parallel processor is a computing engine consisting of several small processing units working simultaneously on different parts of a problem. This is opposed to a typical mainframe computer which processes data in series - very quickly, but one piece at a time. Under the ACP concept, one processor is assigned the task of parceling out different parts of the problem to many other connected processors. Each processor performs its discrete task simul-

taneously with the others. As each task is completed, a new problem is passed to a waiting processor.

The first-generation ACP was, at the time, 100 times more cost effective than any commercially available device. An ACP board that cost three to five thousand dollars was delivering the power of one half to one full VAX equivalent, which then cost approximately \$250,000.

In spite of its “rudimentary” configuration, the first-generation ACP became a sought-after machine. Several experiments at Fermilab began using the ACP to analyze their events, and ACP’s were ordered by the national laboratories at Brookhaven, Los Alamos, and Oak Ridge, as well as by SIN in Switzerland, Saclay in France, and CBPF in Brazil.

Since the advent of the first-generation ACP, the computer industry has continuously introduced new, improved chips, increasing the performance of processors by a factor of two each year. But the ACP group hasn’t been idle, either.

The members of ACP set out to combine new higher performance processing units with more flexible and powerful software. The new processing unit, in the words of chief designer Hari Areti, is “a self-contained computer, incorporating the MIPS R/3000 microprocessor, the most cost effective chip currently available.” Where the first-generation ACP provided one-half to one VAX equivalents, the new processor provides 15 VAX equivalents in the same amount of space at a similar cost. Depending on the amount of memory, this represents up to a factor of 20 increase in cost effectiveness. This computer, unlike the first ACP, supports a standard operating system, thereby broadening the potential user community. ACP chose the UNIX operating system because of its wide acceptance.

As Jim Deppe of ACP explained, “A key design element of the ACP/R3000 is that the entire processor fits into a single VME slot. This means that a single crate of ACP/R3000 boards can be loaded with more processors, producing more computing power per crate.” Designing to VME slot tolerances gives the ACP/R3000 entree to widely used computing architectures. The new module consists of two boards. One, the “motherboard,” is an 8-megabyte main memory board with a VME interface. On top of the main memory board, but still within a single slot dimension, is a plug-in “daughterboard” which contains the CPU and the instruction and data cache. The motherboard can also stand alone as a standard VME memory board with no processor, or as expansion memory for a CPU. “For example,” said Deppe, “one could have a motherboard and daughterboard combination and add additional motherboards in adjacent slots, increasing the memory to 16, 24, or 32 megabytes.”

The new software, called cooperative processes software (CPS), is a set of tools which make it easier to divide up a computational task among multiple processors. “What we’ve done,” said ACP’s Joe Biel, “is considerably extend our range over the first-generation ACP.” There, the emphasis was on hardware because there was a tremendous advantage to be gained from ACP hardware versus what was available from industry. “With this second-generation ACP/R3000,” Biel continued, “we’ve done substantial software development in addition to new hardware. Unlike the old ACP software, which could only run on ACP computers, CPS is compatible with many other computers. The idea is that an experiment can mix and match - for example, buy Silicon Graphics machines and use

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THIS SYMBOL



BELONGS TO ALL OF US

The time of year has arrived when employees are asked to contribute to charities through payroll deductions or one-time contributions. Using the payroll deduction plan, an employee may choose up to three charitable organizations, including a community fund.

No pledge below \$12.00 per year for 1990 can be accepted through the payroll deduction plan. The selected charities must be among those approved by the Internal Revenue Service.

The payroll deductions an employee designates will be made every pay period, beginning January 1, 1990, and will continue throughout the year. At the end of 1990, employees taking advantage of this plan will receive a statement of their contributions for income tax purposes. Pledges for the 1989 year will end December 31 unless they are renewed.

\ To those of you who have given, to those of you who will give, thank you for making a difference in your community by improving the lives of thousands of needy individuals.

For additional information, you may contact Elvira Rodriguez at extension 4632.

YOU MAKE A DIFFERENCE!

☼ NALREC News

Thanks to Joanne Hall, who was Chairperson of the Children's Halloween Party that was held on Sunday, October 22nd with the usual scary Haunted House and special treats. A large group of children and adults attended and a wonderful time was had by all.

Our **Thanksgiving Social** will be held November 17 at the Village Barn. We are raffling 50 turkeys again this year and tickets are now on sale from your local NALREC member. Ed Justice and Mike Urso are talking about a band and some interesting food, so please watch the posters for more information.

Christmas parties are as follows: Formal party in the Atrium is scheduled for December 16 and the informal employees party in the Barn will be held December 21st. Please plan your social calendar around these events.

We are still interested in a few more members to this committee. If you are interested, please talk to your supervisor to see if you would be able to serve and give me a call (ext. 3228).

Until next time. . .

- Trudy Kramer

☼ Congratulations to:

(Ops.)

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CPS software, or use ACP/R3000 boards running CPS, or do both at the same time.”

Universities Research Association, Inc., and Fermilab have entered into a commercial licensing agreement with Omnibyte Corporation, located in West Chicago, which will produce and market the ACP/R3000. In principle, any large computer center could use crates of the second-generation boards rather than their current computers, gaining computational power without a concurrent major dollar investment. According to ACP's Irwin Gaines, “Anybody who understands computers, has the kind of computational needs that lend themselves to parallel processing, and is looking for increased computational power at less cost, can use this machine.”

- R. Fenner

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ence Fellow at the Center for International Security and Arms Control at Stanford University, returning to Fermilab to assume his present role.

Nash was named a Fellow of the American Physical Society in 1987. He is an Editorial Consultant to the *Encyclopedia of Applied Physics* and a Specialist Editor for *Computer Physics Communications*.

☼ The Film Society...

. . . presents *Down by Law*, Jim Jarmusch's tale of the lives of two born-to-lose sad sacks transformed by a quirky Italian tourist. Tonight, November 10, 1989, at 8:00 p.m. in Ramsey Auditorium. Admission is \$2 for adults, \$.50 for children under 12.

Estimated total value of the candy distributed on Halloween, 1988: **\$1,000,000,000**

☼ New Stockroom Items

Wiper, disposable, heavy duty, pop-up box, 10 x 16 in. wiper size, Scott P/N 05930. #1660-2600.

Box, junction or pull, screw cover, type SC, gray finish, steel, without knockouts, 12 in. x 12 in. x 6 in. #1125-0250.

Wire, building, 19-strand, type THHN/THWN, single copper cond., PVC insul. w/nylon jacket, 600 V., 90 deg. C., wet/dry, AWG 4/0, black, 500 ft. spool. #1170-4465.

Cleaning Kit, 8mm tape drive, video cassette, Exabyte P/N 180123. #1780-0450.

Wiper, disposable, heavy duty, pop-up box, 10 x 16 in. 400 wipers/4 pop-up boxes per case. #1660-2600.

☼ Cla\$\$ified Ad\$

FOR SALE Miscellaneous:

TRAILER, one-place tilt bed that swivels w/new 1500-lb leafs. \$150. Call Rich at 293-7215 after 5:00 p.m.

TRUCK TOOL BOX, full size, \$50. CARPET REMNANT, gray, 8 ft x 8 ft, \$20. OAK DRESSER, \$100. SKI OVERALLS, female size 12, \$35. REI PARKA, female size 10, \$35. X-COUNTRY SKIS, BOOTS, BINDINGS, & POLES, \$90. All excellent condition. Call Dennis, ext. 2550 or 406-0035.

CHESSMASTER 2000 & FERRARI GRAND PRIX GAMES for Macintosh computers. Original disks and manuals. Chessmaster: \$25, Ferrari: \$25 or best offer. Call Matt at ext. 3005 or 665-1844.

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