
GLOBAL ELECTRONICS

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WOMEN IN COMPUTER SCIENCE

Women are overrepresented on the production lines of the computer industry, but they are severely underrepresented at the top. Not only are there few women managers in the computer industry, but there are remarkably few women computer scientists. While there are a large number of women professionals in the computer business—programmers, technical writers, etc.—not many attain advanced degrees in computer science or engineering. In 1990, less than eight percent of all computer science professors in the U.S. were women. The same year, only thirteen percent of U.S. computer science doctorates were awarded to females.

MIT computer scientist Ellen Spertus, decided to ask why. Her report, *Why Are There So Few Female Computer Scientists?* catalogs the obstacles that make it difficult for women to achieve, or even aspire, in computer science. Unless changes are made, she suggests, conditions will not improve. She notes, "the percentage of female computer science students appears to be increasing at a slow rate or even decreasing."

Spertus' chief conclusion is that subconscious behavior, not over discrimination, is the primary reason why so few women become computer scientists. But the line between direct bias and lowered expectation is by no means sharp. While Spertus makes a number of well considered recommendations to reduce the obstacles.

Still, perhaps the biggest difficulty is to win recognition that eliminating the obstacles is an important goal. Beyond the issue of fairness, Spertus argues, "the demographics of the country are such that the United States will not have enough engineers and scientists unless underrepresented groups increase their participation.

She devotes several sections to society-wide sex-stereotyping, from children's games to humor to gender-based pronouns. She discusses on-the-job sexual harassment and the use of locker-room humor on the lecture hall. These are strong sections. Such stereotyping may be the heart of the problem. However, the material is available elsewhere.

More important, therefore, Spertus recounts the particular sex-stereotyping that surrounds computer science, engineering, and the physical sciences. Women are discouraged from entering those fields. At least upon introduction, male technicians are treated with more deference than female professionals. The "romance-the-computer" ideology of hackers tends to exclude women.

Spertus offers a number of policy recommendations designed to make it easier to become computer scientists, but she makes it clear that changing the way people view and treat women computer scientists is the most challenging task.

She concludes, "For the most part, people are not consciously trying to discourage women from science and engineering. Instead, people's behavior is often subconsciously influenced by stereotypes that they may not even realize they have.... While perhaps it is comforting to know that no conspiracy exists against female computer scientists, it also means that the problem is harder to fight. The negative influences described in this report are so varied and decentralized that there is no simple way to level the playing field."

Perhaps the only weak spot in Spertus' analysis is the lack of comparative data or analysis. Why is it that women are more accepted in the biological sciences or social sciences? Why are women better represented as programmers than as engineers? Are these successes recent and replicable, or are they built into tradition?

Does the shortage of women computer scientists imply a dead-end in the computer industry? The notion that programming is a "verbal" skill—supposedly more suitable for women than math—may mean, despite the prejudices, that there is a future for women in the industry as the focus of technology and value added moves from hardware to software.

(*Why Are There So Few Women Computer Scientists?* is MIT Artificial Intelligence Laboratory Technical Report No. 1315. For ordering information, call 617/253-6773 or write MIT Artificial Intelligence Laboratory, 545 Technology Square, Cambridge, MA, 02139.)

APPLE JANITORS' VICTORY

Service Employees International Union (SEIU) Local 1877 now represents the employees of Shine Building Maintenance, the company that cleans Apple Computer's Silicon Valley offices. Shine owner Helder Pereira recently accepted a mediator-supervised count of union membership cards. (*San Jose Mercury News*, March 3, 1992)

The janitors' victory climaxed a yearlong campaign, in which the SEIU combined grassroots community organizing with a nationwide public relations campaign, directed not just at Shine, but at Apple. (See *Global Electronics* No. 112.) The victory is a testimony not only to the value of such tactics in the labor climate of the 1990's, but to the rewards awaiting unions, such as the SEIU, that are willing to risk some of their capital in good old-fashioned organizing.

Shine says it capitulated because resisting the union was too costly. The *Mercury News* reports, "The firm has paid more than \$160,000 in legal fees in conjunction with the union drive and lost almost half of its revenues because of contracts lost after the union pressured several clients. Over the past year, Shine confirmed that it has lost accounts with Spectra-Physics Inc., Memorex, Solectron Corp., and the cities of Milpitas and Santa Clara. It's workforce has declined from 250 to about 130 employees."

LOCKHEED DISCRIMINATION

Charges of race and gender discrimination at Lockheed Missiles and Space Company have festered for twenty years. Now they've hit the front page. For decades the largest employer in Silicon Valley, Lockheed produces guided missiles and space vehicles, primarily for the military and NASA, and it operates the Air Force's "Blue Cube" Satellite Control Facility there.

Lockheed's workforce differs from that of Silicon Valley's typical commercial manufacturers, for it has no low-pay, low-skill mass production workforce. Furthermore, security rules restrict the employment of non-citizens. Thus Lockheed's 1990 workforce is only 22.3% non-white. Women make up only 25.5% of its staff.

As a Federal contractor, Lockheed's employee relations are supposed to meet a high standard. However, oversight agencies such as the Office of Federal Contract Compliance Programs (OFCCP) appear to have been asleep on the job. Many workers have reported on-the-job harassment and discrimination.

At an employer which through the 1980's had more than 20,000 employees in Sunnyvale, alone, one might expect a number of complaints. In fact, this is the company's defense: "Lockheed is like a city, with all the problems." However, workers who complained—or defended those who complained—were routinely demoted or dismissed, while those they complained about managed to advance their careers.

Today, however, a small group of Lockheed workers, the Minority and Female Coalition, is turning things around. Last August, one of the Coalition's members won a jury verdict against the company. Originally a satellite controller at the Blue Cube, he was awarded \$925,000 after being demoted for complaining about on-the-job racism.

Now there are at least 17 race and sex discrimination cases pending against Lockheed. In addition, thirty-nine Coalition members filed a class action complaint with the OFCCP in December. The OFCCP had rated the Lockheed Blue Cube branch as "excellent" in 1990.

When the OFCCP refused to hear the Lockheed employees' charges, they organized demonstrations at the Lockheed main gate and at the nearby office of Congressman Tom Campbell, who is currently seeking a Republican nomination for the U.S. Senate. In January, Campbell wrote Labor Secretary Lynn Martin seeking a full OFCCP investigation, and in late February Martin ordered the OFCCP to look seriously at the complaint.

The employees are still skeptical, and they would like to see a Congressional investigation. But they've made it clear to Lockheed that they, at least, will not be compliant until Lockheed is. (*San Jose Mercury News*, March 3 & 15, 1992)

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C.R.T. MEETS IN D.C.: Defines Legislative Program

The Campaign for Responsible Technology has taken its innovative ideas on U.S. technology policy to the nation's capital. Fifty leaders and activists from grassroots community, environmental, and labor organizations met in Washington on February 2-3 to propose revisions to sections of the National Defense Authorization Act governing Sematech. They presented the proposed new language to legislative aides and Science, Space, and Technology committee staff on February 4.

The participants in the Campaign for Responsible Technology (CRT) have called upon Sematech to develop environmentally benign production processes, enhance the quality of work in the semiconductor industry, and promote peaceful uses of high technology. The CRT amendments seek a revised mission statement, expanded oversight, technical assistance grants to local communities, and clarification of Sematech's obligation to comply with Right-to-Know laws.

CRT proposed "that not less than 10 percent of the funds made available to Sematech by Federal government agencies for any fiscal year shall be available only for research and development on toxic use reduction in the manufacture of semiconductors." It also asked that Sematech's fiscal year 1993 subsidy be restored to \$100 million, its previous level.

The revised Sematech mission statement would include CRT's concerns regarding the quality of jobs and the environment. In addition to earmarking funds for toxics use reduction, Sematech would be required to provide small technical assistance grants to help the public better understand the impact of semiconductor manufacturing on workers and neighboring communities.

The Advisory Council on Federal Participation in Sematech would be expanded to include representatives from the Environmental Protection Agency (EPA), the National Institute for Occupational Safety and Health (NIOSH), and the National Institute for Environmental Health Services (NIEHS), as well as Congressionally appointed representatives from the fields of environmental protection, labor relations, occupational safety and health, and new technology workplace design. The Advisory Council would also include representatives from the community where Sematech is located.

Commenting on CRT's new language for the Defense Authorization Act, Morton Bahr, President of the Communications Workers of America, ap-

plauded the proposed attention to the impact of new technology on work in Sematech's mission. "With this focus, workers and unions can better anticipate the impact of technological change and help to design higher paid, more satisfying jobs in the semiconductor industry."

In a meeting with members of Campaign, the Reverend Jesse Jackson expressed his support for the overall initiative. He emphasized the need for a broadly conceived industrial policy. Rev. Jackson supported the CRT goals of expanded oversight and the need for community technical assistance. "We need to ensure that government programs serve more than just the interests of large corporations and the technological elite. All of the people—communities, workers, environmentalists and small businesses—must play an integral role in determining America's technological future."

CRT participants are now organizing home-district meetings with key Congressional representatives to advance the legislative agenda established in February.

NEW SCREEN TECHNOLOGY

Computer companies and U.S.-based producers of flat panel displays continue to fight over trade policy (see *Global Electronics* No. 110-112), but there is a chance that new display technologies will before long render the current debate moot. In particular, *Business Week* (February 3, 1992) identifies "field emission" as a potential leapfrog display technology for both flat televisions and portable computers.

Field emitter displays are essentially arrays of microscopic cathode rays, more than 10 million per square inch. "As a result, a panel three millimeters thick can produce a picture as sharp as a CRT [cathode ray tube, the display of conventional televisions and monitors]."

One of the leading developers of field emission is Silicon Valley-based Coloray Display, formed to commercialize thirty years of research at nearby SRI International. Idaho-based chipmaker Micron Technology, which could eventually mass produce the panels, has recently invested in Coloray. Other firms, such as NEC, Fujitsu, and Raytheon are also exploring the technology.

It's too early to know whether Coloray or its competitors can come up with a superior product, but today's best technology, active-matrix LCD's, doesn't quite do the job.

Business Week thinks field emission might prove better: "The technology may even be better
(continued on page 4)

than the current contender for the flat panel of the future, active-matrix liquid crystal displays. Japanese companies have invested billions of dollars in high-tech factories to make these devices, already used in notebook computers. But active-matrix pictures are hard to see from an angle and are still very costly."

THAIS TAKE ON SEAGATE

Thai assembly workers employed by Seagate Technology, the disk drive maker based just outside Silicon Valley, have organized a union. They signed upon 15% of the firm's workers and last August they rallied 1,500 workers in front of the plant, but the company refused to recognize the union.

Instead, it fired 80 suspected leaders and later fired a total of 620 employees. In October, the Thai Interior Minister tried to mediate the dispute, which by then had become a full-scale strike. In November, the strike reportedly escalated into violence outside the company's plant in Samut Prakaru province. (We have received no more recent reports on the strike.)

Workers appear primarily concerned about health and safety problems at the plant, ranging from eye-weakening microscope work to lead poisoning. A doctor from the Thai National Office of Occupational and Environmental Medicine examined nearly 1,200 workers and found that lead levels in the blood of plant workers are five times

greater than those of Bangkok policemen.

U.S. AFL-CIO leader Lane Kirkland wrote Seagate Chief Executive Alan Shugart to criticize company policy: "These actions by Seagate Thailand constitute not only a flouting of Thai law, but a flagrant violation of the internationally recognized right of freedom of association." He called upon Seagate to reinstate all unfairly dismissed employees, end the systematic harassment of workers, and allow an impartial expert on lead poisoning to inspect Seagate worksites in Thailand. (*AFL-CIO Bulletin*, January, 1992, and *Asian Labour Update*, January, 1992.)

PICO KOREA WORKERS LOSE

In December, a U.S. District judge in New York ruled that a parent company—in this case Pico-U.S.A.—is not generally liable for the sins of its subsidiaries—in this case Pico-Korea. He rejected the claim filed by Pico-Korea's workers for back wages and other compensation. (See *Global Electronics* No. 111)

The Center for Constitutional Rights (CCR), which represented the Pico Korea Labor Union, announced plans to appeal. CCR attorney Frank Deale said, "[The judge] agreed the contract had been breached and the workers had not been paid. But he held that Pico Products was not the liable party. We think they are." (*Korea Update*, January, 1992)

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