

COURTESY OF B. J. FUNDARO, SONOMA STATE UNIVERSITY



## APPROACHING A WORKPLACE FOR ALL

Chemists with disabilities profit from a mix of pragmatism and assertiveness on the job

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**P**EOPLE WITH DISABILITIES can and do enjoy successful, productive careers in the sciences when they're given the opportunity to follow their interests and talents," says Dorothy L. Miner, an associate specialist in water quality with North Carolina State University's Cooperative Extension Service. Famous examples include the Nobel Laureate chemist Sir John W. Cornforth, who is deaf, and the preeminent physicist Stephen W. Hawking, who has Lou Gehrig's disease.

Society has made significant strides in leveling the playing field for scientists with disabilities and for students who are considering a science-related career. Assistive technology and civil rights legislation have proven to be "enormous advantages toward getting an education," according to Virginia W. Stern, director of the Project on Science, Technology & Disability in the Directorate for Education & Human Resources Programs at the American Association for the Advancement of Science

(AAAS). Internships and other programs for college students with disabilities smooth the transition to full employment, she adds. And the increased accessibility of scientific meetings, including those hosted by the American Chemical Society and AAAS, enables scientists with disabilities to gather professional information and stay current through continuing education.

Generally speaking, industry, government, and academia are evolving into more welcoming environments. At Dow, for instance, "we work hard to maintain our facilities in a way that is inclusive of everybody," says David G. Wilkins, director of global diversity. "Hopefully, we're learning what respect for one another means in the workplace, and we're also doing everything we can to make each of our employees as productive as they can be. If there are barriers to achieving that level of productivity or contribution, we want to tear them down."

A physical barrier for a wheelchair user is "pretty obvious, and we've done a good

**BUILT TO SPEC** While dean of the School of Natural Sciences at Sonoma State, Swanson used an elevated platform with steps to give lectures or perform lab work.

job of auditing the physical environment," Wilkins says. "I'm equally concerned that there are sociopsychological barriers that often manifest themselves in how we act or fail to act toward people who are different, whether they are people who are differently abled, or people of color, or people who speak a language different than the prominent language in whatever [geographic area] we happen to be working in."

Todd A. Blumenkopf, a principal analyst for strategic alliances at Pfizer Global Research & Development who uses a wheelchair, acknowledges that some people may feel "uncomfortable working with people with disabilities if they haven't had that experience before" and that sensation can affect the outcome of a hunt for a job. "People have a tendency to look more favorably on job applicants who are like themselves, and a person with a disability is not necessarily like the person making the hiring decision," he says.

**"WHEN SOMEONE** sees a wheelchair user come into a job interview, they may immediately dismiss the candidate because they just don't want to deal with it," Miner says. "They're instantly afraid that this is going to be too much trouble."

Nevertheless, one in five people will become disabled at some point during their lives, says Blumenkopf, who has spina bifida and is paraplegic. "That's a huge percentage of people." At the same time, he says, "we have low unemployment in chemistry. You don't want to devalue a job applicant who is exceptionally qualified because they happen to have a disability and may need a work accommodation. And you can't afford to lose skilled, experienced people because they are involved in a car accident and come to work in a wheelchair or they have an allergic reaction to something that causes them to lose their hearing. So having a workplace environment that is more accommodating to people of all levels of physical ability and limitations improves retention as much as it helps with recruitment of new employees."

Miner, who was disabled in a car accident in 1991 just as she was starting graduate school, notes that "disability hits fairly randomly. That means that some of the best and brightest are going to have disabilities, and we can't just not include them simply because we don't want to."

Miner wears a neck brace and an electronic pain-control device. She is vulnerable to migraines and severe pain if she carries heavy objects or uses her arms too much. After her accident, she was surprised to discover “how ignorant I was about disability, even though I thought that I was fairly aware. But I didn’t have an appreciation for how positive it could be, and how much of disability is a social construct.

“Our culture takes away so much self-determination because we don’t allow for this range of differences in people,” Miner says. Chemists who lose the use of their legs and need to use a wheelchair “would still be just as interested in chemistry. They would still have the same knowledge. The only difference is that they need an accessible environment. People with disabilities are looked at as medical patients, and in fact a person can be totally healthy and not be able to hear or see. I didn’t realize how much society and the workplace impose the handicap.

“I’ve learned to appreciate the skills that people with disabilities have,” she adds. “This is part of what makes them an asset as scientists, because they have negotiated an environment that’s fairly hostile. They are experts at novel problem solving and finding out-of-the-box solutions.”

**OF COURSE**, many people don’t have a negative mind-set but are simply unaccustomed to working with scientists with disabilities. Those without disabilities may be anxious about unintentionally offending someone with disabilities. Miner suggests that they talk to chemists with disabilities “in the same way that you would talk to any other person in that context. If you’re meeting them at an ACS meeting, talk to them with the same respect that you would speak to any other colleague, not down to them. People still yell at people in wheelchairs as if they were deaf.” Miner also warns about the tendency of some people to address the companion of a person with disabilities rather than addressing the person directly.

Anne B. Swanson, dean emeritus at Sonoma State University and a biochemist, says the bottom line should be mutual respect. “A well-meaning desire to help can

unintentionally cause difficulties if the disabled person’s expertise, judgment, and decision-making are not respected,” says Swanson, who has osteogenesis imperfecta, a condition that results in short stature and vulnerability to broken bones.

“What I have found most useful in my own experience is for someone to say to

suggestions on how to include a student.

The instructor might say, “I’ve never had a deaf student in my classroom before. How do I handle this?” explains committee Chair Miner. “They might not realize that if they dim the room lights for a slide presentation, they have to have enough light on the sign language interpreter so that the deaf person can see.”

**THE COMMITTEE** will soon begin offering travel grants to students who are presenting research papers at ACS national meetings. “Students often stay four to a room in a remote hotel” during these meetings, Miner says. “But a student with a disability may not be able to do that.” Without the travel grant, she says, the extra expense the students would incur might be enough to keep them from coming to the meeting.

The committee has published two books. “Working Chemists with Disabilities: Expanding Opportunities in Science” profiles 17 chemists—including those in this article. They work in government, industry, and academia and have disabilities that include deafness,

blindness, and short-term memory loss, among others. And the revised edition of “Teaching Chemistry to Students with Disabilities” will be released by the end of the year.

Students, parents, and teachers can also turn to the website for Barrier Free Education, whose goal is to increase access for students with disabilities to science and math education.

That might not be as easy as it should be, according to a AAAS study, “Talking about Disability: The Education and Work Experience of Graduates and Undergraduates with Disabilities in Science, Mathematics and Engineering Majors.” An executive summary that Stern coedited with Shirley Malcom, head of the AAAS Directorate for Education & Human Resources Programs, notes that faculty responses to students’ requests for accommodations included “discounting the need for accommodation; refusing the accommodation as a way to ‘prepare’ the student for ‘real-world’ competition; lowering grades for work done under accommodated conditions; and encouraging students to drop the class or change majors.”



COURTESY OF SHERI THOMAS, NORTH CAROLINA STATE UNIVERSITY

**KEEPING IT CLEAN** Miner shows North Carolina State University Cooperative Extension Associate Grace R. Lawrence the effects of different soil layers on wastewater.

me: ‘I’m happy to help you in any way I can. Just let me know if and when you would like some assistance, and how I can help,’” she says. That sort of offer would be welcome at the start of a new job, for example. This type of approach “puts the ball in my court,” Swanson says. “The other person is not laboring under the illusion that he or she knows best and should take control of my life.”

Dow’s Wilkins recommends that managers and colleagues educate themselves. That education is often readily available from the person who has a disability, he says. “If we listen, we will pretty quickly come to understand what the person needs to be fulfilled, to fully contribute. All too often we get busy, or we think we know, and we’re wrong.”

For more extensive guidance, students and scientists with disabilities and those who work with them can turn to a number of resources. ACS’s Committee on Chemists with Disabilities, for instance, fields questions from students, educators, and employers. A student who is told that he or she can’t take a lab class might call for help, or an instructor might call for

**“Our culture takes away so much self-determination because we don’t allow for this range of differences in people.”**

Finances also proved an obstacle, because financial aid generally requires students to take a full class load and some students with disabilities may be unable to do so.

One-third of the undergraduates with disabilities who were in the study considered leaving their major or the institution, in part because of such discrimination.

Indeed, Miner sees many parallels between issues confronted by those with disabilities and issues that were addressed by the civil rights and women's movements. "We're fighting some of the same battles," she says, mentioning impediments running the gamut from lack of full access in education to derogatory comments.

**TO COUNTER** this kind of negativism, Miner encourages people with disabilities to rack up positives—and to start as early as possible—in order to become more competitive. "It's important for students with disabilities to accumulate advantages," she says. An interviewer who is inclined to pass over a candidate with a disability will find that harder to do if the person has strong qualifications, Miner explains. She urges students to take on in-

ternships, poster presentations, and other broadening experiences as undergraduates.

One mechanism for students to prove they can succeed in a technical field is AAAS's Entry Point! program. Science and engineering students with disabilities who are earning at least a B average can apply for the program's paid R&D internships in industry and government facilities. Partners include the National Science Foundation, the National Aeronautics & Space Administration, and IBM, which has taken on a number of chemical engineering students.

Swanson says Entry Point! helps students with disabilities "gain experience in the workplace, gain self-confidence and communication skills, develop valuable skills in working as part of a team, and demonstrate in their résumés that they can in fact work in chemistry and related sciences. In addition, internships and other work experiences assist students with disabilities in exploring the types of accommodations that will be most useful to them in the future, for example in laboratory work, in graduate programs, and in jobs."

Stern adds that the program "addresses

the transition from higher education into employment," and has "resulted in lots of hires" for permanent positions after the students graduate.

**PERSONAL CONTACTS** in academia can also help. In his own transition from undergraduate to graduate student, Blumenkopf benefited from the advocacy of University of California, Los Angeles, chemistry professor Michael E. Jung, for whom he worked when he was a college junior and senior in the late 1970s. "He gave me the same responsibilities and had the same expectations of me that he had of anyone else in that group," Blumenkopf says. "I made presentations at group meetings. We published a paper. And when it came time for me to go on to graduate school, he spoke to professors in the departments where I was applying and said, 'This guy can do it.'" Blumenkopf went on to earn his Ph.D. at UC Berkeley and was a National Institutes of Health postdoctoral fellow at UC Irvine.

Interviewing for a job may be trickier because candidates may need to be their own advocate. Here it's best to take a pragmatic approach. "Realize that the interviewer may wonder how a chemist with a disability can perform the work productively, but for legal and other reasons usually does not ask questions to find out," Swanson says. "The chemist can take the initiative during the interview and say, for example, 'You might be wondering how I perform laboratory work. I'd like to tell you about the accommodations I have used which enabled me to perform successfully and achieve the accomplishments listed in my résumé.'"

Blumenkopf notes that candidates should be aware of their body language during the interview. He was recently startled by feedback from a management workshop at which colleagues told him that his posture "was sending the message that I was aloof and uninterested in the discussion. That was clearly not the message I had intended to send, but it was the message that was received." The same lesson applies in a job interview. "One has a very short time to make a good impression, and using body language to send the right message can help ease the discomforts of an interviewer not experienced in speaking with candidates who have disabilities," he says.

One issue that comes up for a disabled job applicant, Blumenkopf says, is the assumption that "it's unsafe for someone with a disability to be in the lab. Studies show that that's not true and that people

## THE LAW

# What 'The Americans With Disabilities Act' Really Says

**M**any misconceptions surround the provisions of the Americans with Disabilities Act (ADA). The Equal Employment Opportunity Commission [<http://www.eeoc.gov>, (800) 669-4000] provides extensive information on its website about the act (<http://www.eeoc.gov/qs-employees.html>), including the following edited excerpts:

■ Private employers, state and local governments, employment agencies, and labor unions must not discriminate against qualified individuals with disabilities in job application procedures, hiring, firing, advancement, compensation, and job training.

■ ADA defines an individual as having a disability in three different ways. The person may have a physical or mental impairment such as epilepsy or paralysis or a learning disability that substantially limits a major life activity despite the use of a mitigating measure. Major life activities include hearing, breathing, performing manual tasks, or working. Or the individual may have a history of such an impairment, for instance, if they have cancer that is in remission or a history of mental illness. Or the person may be regarded or

treated as having such an impairment, even if they don't. This provision protects a severely disfigured but qualified individual from being denied employment because of fears of negative reactions.

■ Individuals with a disability are considered qualified if they can perform the essential functions of the job with or without reasonable accommodation. That accommodation might include making a facility accessible, modifying work schedules, acquiring devices, providing a sign language interpreter, or reassigning an employee to a vacant position. An employer must make an accommodation if it would not impose undue hardship on the employer's operation.

■ Employers may not ask job applicants about the existence, nature, or severity of a disability or require them to take a medical exam before a job offer is made. But applicants may be asked to describe or demonstrate their ability to perform specific job functions and whether an accommodation would be needed. A job offer may be conditional on the results of a medical exam, provided that the exam is required for all entering employees in the same job category.

with disabilities have a better safety record overall in the workplace and in technical environments.”

Although Blumenkopf says job applicants aren't legally required to disclose a disability when applying for a job, he suggests that those with a visible disability casually drop it into conversation. If someone phones to invite him in for an interview, for instance, he might say, “By the way, I'm a wheelchair user. Is the office accessible?” Without that heads-up, he says, “if I roll into that office for an interview in a wheelchair, their immediate reaction is likely to be that I hid something from them—and to wonder what else I'm hiding.”

This may be a practical strategy if the disability is obvious. But Stern notes that “an applicant with an invisible disability may not wish to disclose it during the interview.” For example, candidates may be reluctant to discuss a learning disability, epilepsy, or the fact that they're recovering from cancer.

**ONCE A CANDIDATE** gets a job, the new hire and their employer can address any necessary accommodations. Blumenkopf notes that the process of optimizing a workspace for its occupant must be tailored to that particular person. “There is no quick fix that meets the needs of all individuals with disabilities,” he says.

The employee's company may not have the expertise to do this, since “there aren't

## BY THE NUMBERS

## NSF Stats Shed Light On Working Scientists With Disabilities

The National Science Foundation provides an overview of employment and education conditions in “Women, Minorities, and Persons with Disabilities in Science & Engineering: 2000” (<http://www.nsf.gov/sbe/srs/nsf00327/start.htm>). The report defines scientists and engineers broadly, including those who are employed in or have earned a degree in such fields. It should also be noted that the report's definition of disability excludes some conditions such as learning disabilities. The report drew much of the data below from the agency's Scientists & Engineers Statistical Data System survey of 1997. In that year

- 6% of the 3.4 million scientists and engineers in the labor force had disabilities; 5% of the 122,000 chemists in the labor force had disabilities.

- 55% of scientists and engineers with disabilities who were in the labor force became disabled at age 30 or older; 37% became disabled between birth and age 29; 8% had been disabled since birth.

- 67% of scientists and engineers with disabilities were employed and 25% were retired; 88% of scientists and engineers without disabili-

ties were employed and 7% were retired.

- 11% of employed scientists and engineers with disabilities worked part time; 8% of scientists and engineers without disabilities worked part time.

- Of the 6,200 chemists with disabilities who were in the labor force, 4,000 attained a bachelor's degree as their highest degree, 1,000 had master's degrees, and 1,200 had doctorates.

- Of the scientists and engineers employed full time at four-year colleges or universities and who received their doctorates between 20 and 29 years ago, 90% of those with disabilities and 85% of those without disabilities were tenured.

- 5% of the 2.3 million scientists and engineers employed in business or industry had disabilities; just over half of those with disabilities said R&D was a primary or secondary job function.

- Of the 285,000 scientists and engineers employed in the physical and related sciences, 6% had disabilities; among the largest sectors, two-year colleges and a category combining four-year, medical, and university research institutions had the largest number of employees with disabilities versus total employees.

that many disabled chemists.” So Blumenkopf urges companies to include the employee in the decision-making process as a lab or office is set up “to make sure that whatever they do is appropriately tailored for the individual's needs.” Blumenkopf says Pfizer's ergonomist consulted with him about the layout of his office but had less input on the lab arrangements. “I have 24 years of experience working in a lab. I know what's available. I have the experience to be able to say what needs to be done. They brought in the vendors and engineers to work with me on how to put those ideas in place.”

Blumenkopf switched jobs at Pfizer in September. He is now a principal analyst for strategic alliances, following 24 years of laboratory research, including 16 years as a medicinal chemist in the pharmaceutical industry. He now spends most of the day on the computer working to identify potential collaborators and resources for Pfizer to hook up with.

For his previous job in pharmaceutical

research, Pfizer put in a fume hood designed for a wheelchair user. Such hoods can be installed at just about any height, he says, and the cabinet below the hood can be removed so “someone in a wheelchair can push their chair under that space and work facing the hood instead of working sideways as I used to have to.” The hood also had a trough in front to catch spills, and its storage cabinets had sliding trays for ease of access.

Blumenkopf also wore a rubber apron for protection from spills. Pfizer lowered the lab's sink and put in a retractable hose ending in a double nozzle that Blumenkopf could pull toward himself and use for an eyewash or to wash spills off his lap. The company also extended the pull chain in the emergency shower so that Blumenkopf could get out of his chair to get away from a spill but still reach the pull chain from the floor.

Pfizer lowered the white board in Blumenkopf's former office and changed the hinges on his door so it swung out instead



### VOICE OF EXPERIENCE

Blumenkopf, shown with his lab associates Michael Hines (left) and Chelvanaya Gabriel (center), advised Pfizer on lab modifications to accommodate his wheelchair.

of into the room. That “made it easier to maneuver if I had a guest in the office and I wanted to close the door.”

In Miner’s case, her office desktop has been tilted and her computer monitor has been elevated so she doesn’t have to bend her neck to use them. She works a flexible schedule on a part-time basis. “I try to avoid projects with short-term deadlines,” she says. “I do a lot of writing so I can remain flexible, and I work from home a lot.” NC State also provides someone to load the van in which Miner travels the state doing water quality screening.

Prior to her retirement in June 2000, Swanson was dean of the School of Natural Sciences at Sonoma State. She says the campus had numerous accommodations in place before she arrived, including ramps

at building entrances and electric scooters to loan to students, faculty, or staff with disabilities. When teaching, Swanson used an elevated platform with steps that was built for her by campus carpenters. She used similar platforms in the lab.

A chemist without the wealth of knowledge and experience possessed by Blumenkopf, Miner, and Swanson can look to the ACS Committee on Chemists with Disabilities for guidance and also refer to its book, “Working Chemists with Disabilities,” for examples of workplace adaptations. Another resource is the Job Accommodation Network based at West Virginia University. The free service provides employees and employers with suggestions on job accommodations and information about the employability of

people with disabilities. Stern’s office at AAAS can also provide assistance.

In academia, financial help is also available. For instance, NSF offers “facilitation awards” to provide equipment or services for students or principal investigators on NSF-supported research and education projects. The funds are intended for equipment or services required specifically for a project, such as a prosthetic device to manipulate a particular apparatus, equipment to convert sound to visual signals for an experiment, or a reader with technical competence related to the project.

NIH provides “research supplements” to principal investigators holding NIH grants. The supplements are intended for the support and recruitment of students and scientists with disabilities into biomedical research careers. Funds are also available for established investigators who become disabled.

## ACCESSING INFORMATION

# Resources On Science And Disability Abound

Scientists and students with disabilities and those who work with them can obtain guidance on legal issues, suggested accommodations, grants, and other topics from several sources. They include the following:

- The American Chemical Society’s Committee on Chemists with Disabilities (<http://membership.acs.org/c/cwd>). The committee can field questions and has published two books: “Working Chemists with Disabilities: Expanding Opportunities in Science” (<http://membership.acs.org/c/cwd/workchem/start.htm>) and “Teaching Chemistry to Students with Disabilities” (<http://membership.acs.org/c/cwd/teaching/start.htm>).

- Barrier Free Education’s (<http://barrier-free.arch.gatech.edu>) goal is to increase access for students with disabilities to science and math education.

- Science and engineering students with disabilities who are earning at least a B average can apply for paid R&D internships in industry and government via the American Association for the Advancement of Science’s Entry Point! program (<http://www.entrypoint.org>, [202] 326-6630). The program is managed by the association’s Directorate for Education & Human Resources Programs (<http://ehrweb.aaas.org/ehr>).

- The Job Accommodation Network, based at West Virginia University, provides suggestions on job accommodations and information about the employability of

people with disabilities [<http://janweb.icdi.wvu.edu>, (800) 526-7234].

- NSF offers facilitation awards to provide equipment or services for students or principal investigators with disabilities who are involved in NSF-supported projects in science and engineering research and education (<http://www.nsf.gov/pubs/stis1994/nsf9154/nsf9154.txt>).

- The National Institutes of Health provides research supplements to principal investigators holding NIH grants. The supplements are intended for the support and recruitment of students and scientists with disabilities into biomedical research careers (<http://grants.nih.gov/grants/guide/pa-files/PA-01-080.html>). Funds are also available for established investigators who become disabled.

- The Center for Universal Design [<http://www.design.ncsu.edu:8120/cud>, (800) 647-6777] promotes the development of products and environments that are “usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.”

- Some sites focus on particular disabilities, including Access for All: Program on Employment & Disability [<http://www.ilr.cornell.edu/ped/accessforall>, (607) 255-7727], which concentrates on those with hearing- and vision-related disabilities, and the Learning Disabilities Association of America [<http://www.ldanatl.org>, (412) 341-1515].

**THE ACCOMMODATIONS** made for those with disabilities may end up being “good for everyone,” Miner says, and that’s the concept behind “universal design.” NC State’s Center for Universal Design states on its website that the idea is to “design products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.”

Universal design is “easy for everyone to use,” Miner says. “It’s not right-handed or left-handed, it’s fairly intuitive, it doesn’t depend on being tall or having a lot of hand strength.” One example she cites is curb cuts. When they first came into vogue, she recalls, people complained about the expense, given that the number of wheelchair users was small. “But now everyone pulls their wheeled carry-on bags through airports,” she says. “And everyone who does a presentation has their projector on a cart and assumes they’re going to be able to roll that cart through a building and into the room they need to get into.”

Doors that were developed for wheelchair users to open at the press of a button can also benefit others. “If you’re carrying a big flask with two hands, it’s much easier to have a door that opens automatically,” she says. Likewise, a fume hood that can be lowered for a wheelchair user can also be adjusted up or down for an especially tall or short standing chemist. “So a lot of the design that started out for people with disabilities turns out to just be good design,” Miner concludes. And the same could be said for the policies of inclusiveness that protect those with disabilities but benefit their colleagues as well. ■