OPENING DOORS FOR SCIENTISTS WITH DISABILITIES

Several programs are aiming to increase the number of individuals with disabilities in science and technology careers by removing barriers and changing attitudes. **By Laura Bonetta**

Chad Cheetham is pursuing a Ph.D. in neuroscience at the University of Alabama in Birmingham. He is one of six students at his institute to have received a coveted Howard Hughes Medical Institute scholarship for his graduate work. **Megan Nix,** an electrical engineering graduate of the University of California, Riverside is looking for a full-time position, probably at the Jet Propulsion Laboratory (JPL) where she interned in the spring of 2005. She received first place in a competition from the Institute for Electrical and Electronics Engineers for her project at JPL.

These are typical success stories of students pursuing careers in scientific fields, except that the students happen to have a disability. Cheetham has no left visual cortex, which means he lacks the right visual field and depth perception, while Nix has fibromyalgia, a chronic condition that causes widespread pain in the body and exhaustion.

In many cases, disabilities are not barriers in science and technology fields, where mental capacity and creativity are keys to success. Nonetheless, individuals with disabilities face unique challenges as they transition from high school to college and from college to employment.

They might need software or other technologies to help them follow along in classes, face problems finding adequate living arrangements close to their university, or come up against faculty or employers who are fearful of dealing with a person with a disability. A number of programs and resources are helping to alleviate such challenges.

The Voice of Experience

Ted Conway did not divulge to prospective employers that he had cerebral palsy. When invited for an in-person interview, he would explain he had a loss of muscle action caused by a lack of oxygen during birth to the part of the brain that controls muscle movement. "I always describe what the disability does rather than calling it by its name," says Conway. "If people hear cerebral palsy, or muscular dystrophy, or cancer, they always think the worst."

A professor and associate dean at Virginia Commonwealth University, Conway has, for the past 21 years, been going up the academic ladder in the fields of mechanical, aerospace, and, more recently, biomedical engineering. He has held jobs in industry, government, academia, and as a consultant. "The only challenges that I have faced have been overcoming other people's predetermined ideas about what a person with a disability could do," he says.

An effective way for attitudes to change is for more people to see individuals with disabilities in established positions. "Role models serve as examples, but also act as mentors for people who want to acquire that position," says Conway. "Someone has to blaze that trail and then the next person who comes along can ask 'What do I have to do to get there?'"

Increasing Numbers

A handful of programs are trying to increase the numbers of individuals with disabilities in science, technology, engineering and math (STEM) fields. Eleven years ago, the American Association for the Advancement of Science (AAAS), publisher of the journal *Science,* established EntryPoint! The program provides internship opportunities to students with disabilities at IBM, Merck & Co., the National Oceanic and Atmospheric Administration (NOAA), the National Institute of Standards and Technology (NIST), Lockheed Martin, CVS, NAVAIR, and NASA.

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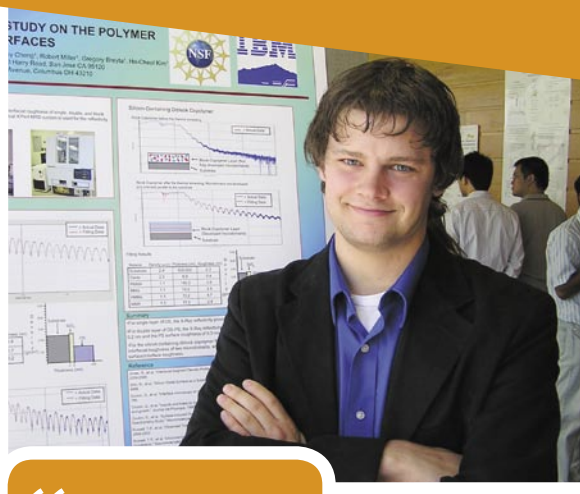

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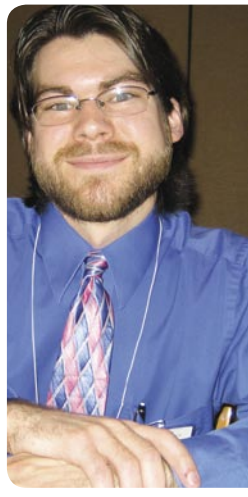

From top: Intern **Matthew Maleski** in front of his poster at the Stanford/CPIMA/IBM program; **Chad Cheetham,** a neuroscience student at the University of Alabama, Birmingham; intern **Brittany Toffinchio; Aubrie Abbott** with Incight Scholar **Alison Ecker** at her summer 2007 internship site.

CREDIT: (TOP) CPIMA; (BOTTOM RIGHT) KEITH OZOLS

UPCOMING FEATURES

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Faculty Positions — January 25

EntryPoint! alumni: Royce James (left) interned at NASA Goddard and NSF. He is completing his physics Ph.D. and is the first African American tenured faculty at the US Coast Guard Academy. Jason Grieves interned at IBM and will graduate in 2008 from Virginia Tech.

"A persistent student can get an undergraduate degree. There are barriers, but if you want to do it, you can do it. It may be harder at the graduate level. But it is harder still to get employment in your field," says EntryPoint! Director **Virginia Stern.** "The internship is critical. The employer gets to know you and what you can do. And you find out what you want to do."

To participate in EntryPoint! a student with a disability not only has to be interested in STEM careers but also have a 3.0 or above grade point average. "The organizations we work with want the diversity, but they need competitive students," says Stern. "We do the talent search."

Cheetham spent a summer at Merck & Co. where he was in charge of developing an assay to screen compounds related to obesity. "EntryPoint! does not lower expectations. They only take the best," says Cheetham. "They are advocates for people with disabilities, but they want really qualified students. It's not 'Poor me give me an internship because you feel sorry for me.' It's 'Give me an internship because I am really good!'"

Successful work experiences are not only critical to opening career doors; they also change the attitudes of employers who may be wary of hiring individuals with disabilities. "We make sure that the employer has a positive experience," says **Sheryl Burgstahler,** director of the Disabilities, Opportunities, Internetworking and Technology (DO-IT) program at the University of Washington. "If there is a problem we intervene, and most of the time it is not a disability-related issue. That is what we help the employer see."

DO-IT, a multifaceted program to help people with disabilities succeed in college and the work force, includes an online mentoring network and an internship program that are part of the program entitled Access to Science Technology, Engineering and Mathematics (AccessSTEM). It provides about 50 internship placements a year in the states of Oregon, Washington, Alaska, and Idaho.

Enabling Technologies

Established in 1992, AccessSTEM makes extensive use of computers, assistive technologies, and the Internet to help students with disabilities become more independent in their academic and career activities. "An employer might say 'How can you have a blind person do programming?' But it is not hard. You need a standard computer with a refreshable braille display and a braille printer," explains Burgstahler. "We want to show that with the right technology people with disabilities can succeed."

Help obtaining those technologies can be a boon to students. "Most assistive technology is overpriced and yet may be a student's sole means of communication or may give someone the ability to use a computer," says **Chris Schlechty,** a senior at the University of Washington studying computer science.

Schlechty has limb girdle muscular dystrophy and uses a power wheelchair to get around. "I need an accessible workstation, which consists of a certain keyboard and mouse set, a height adjustable desk, and an alternate headset or handset for the phone as I cannot lift up the receiver," he explains.

Schlechty interned at Microsoft through the DO-IT program. After graduating in June 2008, he hopes to obtain employment at Microsoft or one of the other major software companies in the area. "A student should not prematurely label classes or careers as inaccessible. By working with the professors and using a bit of creativity, we were always able to make accommodations that worked, and I have been able to successfully complete all of my courses, including those that seemed to require a fair amount of physical activity," says Schlechty.

The National Science Foundation has supported DO-IT's AccessSTEM and other similar programs through its Research in Disabilities Education (RDE) program. Other RDE awards include projects that develop new assistive technologies for people with disabilities. One example, developed by a team at Pennsylvania State University, University Park, is a hand-held submersible audible light sensor that fits in a test tube and converts the light intensity to an audible signal to help blind scientists conduct chemistry experiments.

STEM Careers Make Sense

Individuals with disabilities are generally underrepresented in science and engineering professions. Nevertheless the employment rate for scientists and engineers with disabilities is 83 percent, much better than the estimated 26 percent for the overall US population with disabilities. These statistics suggest that the engineering and science fields provide careers in which individuals continued »

DO-IT (Disabilities, Opportunities, Internetworking, and Technology) www.washington.edu/doit

EntryPoint! www.ehrweb.aaas.org/entrypoint

IBM www.ibm.com

Incight www.incight.org

Jet Propulsion Laboratory (JPL) www.jpl.nasa.gov

Lockheed Martin www.lockheedmartin.com

Merck & Co. www.merck.com

National Institute of Standards and Technology (NIST) www.nist.gov

NOAA (National Oceanic and Atmospheric Administration) www.noaa.gov

NSF's Research in Disabilities Education www.nsf.gov/pubs/2007/nsf07511/nsf07511.htm

Pennsylvania State University www.psu.edu

Stanford University's Center on Polymer Interfaces and Macromolecular Assemblies (CPIMA) www.stanford.edu/group/cpima/

University of Alabama www.ua.edu

University of California, Riverside www.ucr.edu

University of Oregon www.uoregon.edu

Virginia Commonwealth University www.vcu.edu

Additional Online Resources

Eastern Alliance in Science, Technology, Engineering & Mathematics research.usm.maine.edu/East

Midwest Alliance in Science, Technology, Engineering & Mathematics www.stemmidwest.org

Regional Alliance for Science, Engineering & Mathematics rasem.nmsu.edu

"The response has been favorable. A number of interns have been repeat interns and a couple will be picked as permanent employees."
–Julie Peddy

with disabilities can find success.

"I actually think those fields are good ones for students with disabilities to get into, because there are just so many opportunities available to help get women, minorities, and now people with disabilities involved, since they are so underrepresented," says **Alison Ecker,** a junior at the University of Oregon majoring in comparative literature.

Ecker, who is hard of hearing, completed a DO-IT internship in viticulture, an area outside her field of study. Because of the internship, she would now consider a career in scientific research. "I would highly recommend having an internship, possibly even before deciding a major, as it allows you to get real-life experience, to see if it's a career that you might actually be interested in," she says.

Why are STEM careers a good match for individuals with disabilities who have an interest in these fields? "It is a combination of things. There tends to be an increased use of technology in those fields which makes it easier to integrate assistive technologies," says Burgstahler. "STEM jobs are often not physically demanding jobs. You are using your head, not your muscle."

The Employers' Perspective

And if STEM careers make sense for people with disabilities, it also makes sense for employers to hire them. "We are competing with countries that have plenty of individuals with technical expertise. We cannot afford to leave any talented people out of the work force," says **Ted Childs,** former vice president of global diversity at IBM.

Like IBM, the Center on Polymer Interfaces and Macromolecular Assemblies, an NSF-sponsored center and a joint effort between Stanford University and IBM Almaden Research Center, has had students with disabilities as summer interns for the past six years.

These internships required making some changes in the buildings, such as adding touch plates to doors, and making other accommodations, including hiring sign language interpreters during meetings and seminars as well as purchasing some special software. "It is a combination of changes in the buildings and working with the students to find out what they need," says center director **Curtis Frank,** who had two students with disabilities in his own lab.

But Frank sees many advantages to these internships. "For the other group members, it gives them an example of what can be accomplished. My group already has a good collegial working relationship. But having someone with special needs helps bring the group even closer together," says Frank. "It requires more folks to pay attention to what is happening in the lab."

Julie Peddy, program manager at NOAA's Northwest Fisheries Science Center and EntryPoint! coordinator for NOAA, has also had good experiences hosting students with disabilities as summer interns. "Some employers are worried about what the cost will be, but for the most part it is not costly to provide some accommodations for a person with a disability," she says. "The response has been very favorable. A number of interns have been repeat interns and a couple will be picked up as permanent employees."

Changing Attitudes

Many scientists with a disability, particularly one that is apparent, say it is important to discuss the disability with teachers and prospective employers and advocate for whatever accommodations are needed to succeed. "As a student you have to make sure that you are not excluded from obtaining the same skills, or equivalent skills, as everyone else in the class," says **Imke Durre,** a physical scientist at NOAA. "Part of that responsibility falls on the teacher, but it is also up to the student to say, 'This is how I could do it.'"

After completing her Ph.D. in atmospheric science from the University of Washington, Durre applied for a fellowship from the National Research Council. Durre, who is blind from birth, added a "personal statement" in her application explaining what accommodations she uses. "I wrote 'This is how I handle graphics. This is how I read print documents,' and so on," she explains. "The approach worked for me."

She landed a postdoctoral position at NOAA's National Climatic Data Center, which later converted to a staff position in the Climate Analysis Branch. Durre got hooked on climate science as a child, when her mother would read her the newspaper's weather page. It never occurred to her that this was something she could not do. "I did encounter a teacher in junior high school who did not think I could do higher-level math, but I did not pay much attention," she says. "I figured she did not know me."

Incight, a not-for-profit organization based in Portland, Oregon, works with high school and college students with disabilities to help them overcome their own fears and become better advocates for themselves. "When we hear 'I would like to do this but I don't think I can do it,' that is when we get really motivated," says Incight's **Aubrie Abbott.** "We work with them and say 'Well, actually, we think you can. Let's figure out the steps you need to get there.'"

Incight works closely with a set of college students from all over the country, providing them with scholarships, mentors, and assistance in finding internships. This year the scholarship program, which started only four years ago, received 800 applications for 70 spots. In addition, Incight helps prepare Oregon high school students for life after graduation, through training and mentoring. "By the time they get to college they are better at being their own advocates," says Abbott.

Programs like EntryPoint!, DO-IT, Incight, and many others are working to change the face of research by providing tools and advice to talented students who have disabilities. They are also creating networks of students and professionals with disabilities who can serve as role models for others to follow. "Eventually we would like to put ourselves out of business," laughs Abbott. "In a perfect world you would not need us. We are trying to develop leaders who can remove barriers and pave the way."

Laura Bonetta is a scientist turned freelance writer based in the Washington, D.C., area.

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