



WORKSHOP ON EXCELLENCE EMPOWERED BY A DIVERSE ACADEMIC WORKFORCE

*Chemists, Chemical Engineers and Materials
Scientists with Disabilities*

February 2009 • Arlington, Virginia





Workshop Co-chairs:

Kristin Bowman-James, University of Kansas

David Benson, University of Kansas

Tom Mallouk, Pennsylvania State University

The Workshop on Excellence Empowered by a Diverse Academic Workforce focusing on chemists, chemical engineers, and materials scientists with disabilities is the third in a series of workshops on underrepresented minorities in the sciences (following race- and gender-focused efforts).

The attendees included scientists with disabilities, people who work with them, and administrators who have to help accommodate them. Representatives of 33 federal agencies and more than 40 science department chairs were there, among others.



Goals of Workshop

- Raise awareness of the issues facing people with disabilities in the scientific workplace
- Demonstrate the ways in which individuals with disabilities benefit the scientific community as a whole
- Foster sensitivity for people with disabilities
- Educate the attendees of the challenges of studying and accommodating people with disabilities in the sciences
- Provide an overview of applicable federal regulations
- Create strategies for increasing the number of people with disabilities in the sciences
- Present and discuss the latest advances in education and assistive technologies
- Provide tools and tangible steps for everyone in the scientific community

DISABILITY

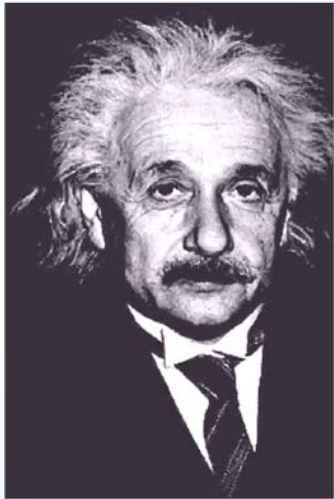
A physical or mental impairment that substantially limits one or more of the major life activities

Major Life Activities Include:

- Seeing
- Hearing
- Speaking
- Walking
- Breathing
- Performing manual tasks
- Learning
- Sitting
- Standing
- Lifting
- Mental and emotional processes
 - Thinking
 - Concentrating
 - Interacting with others

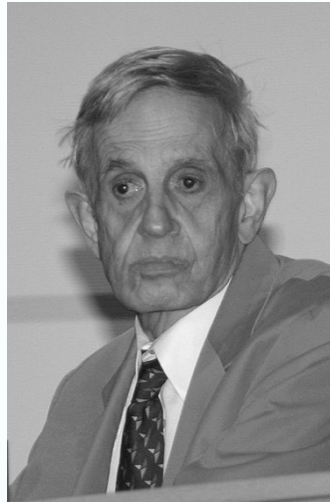


Abilities with Disabilities



Echolalia

Albert Einstein



Schizophrenia

John Nash



Autism

Temple Grandin



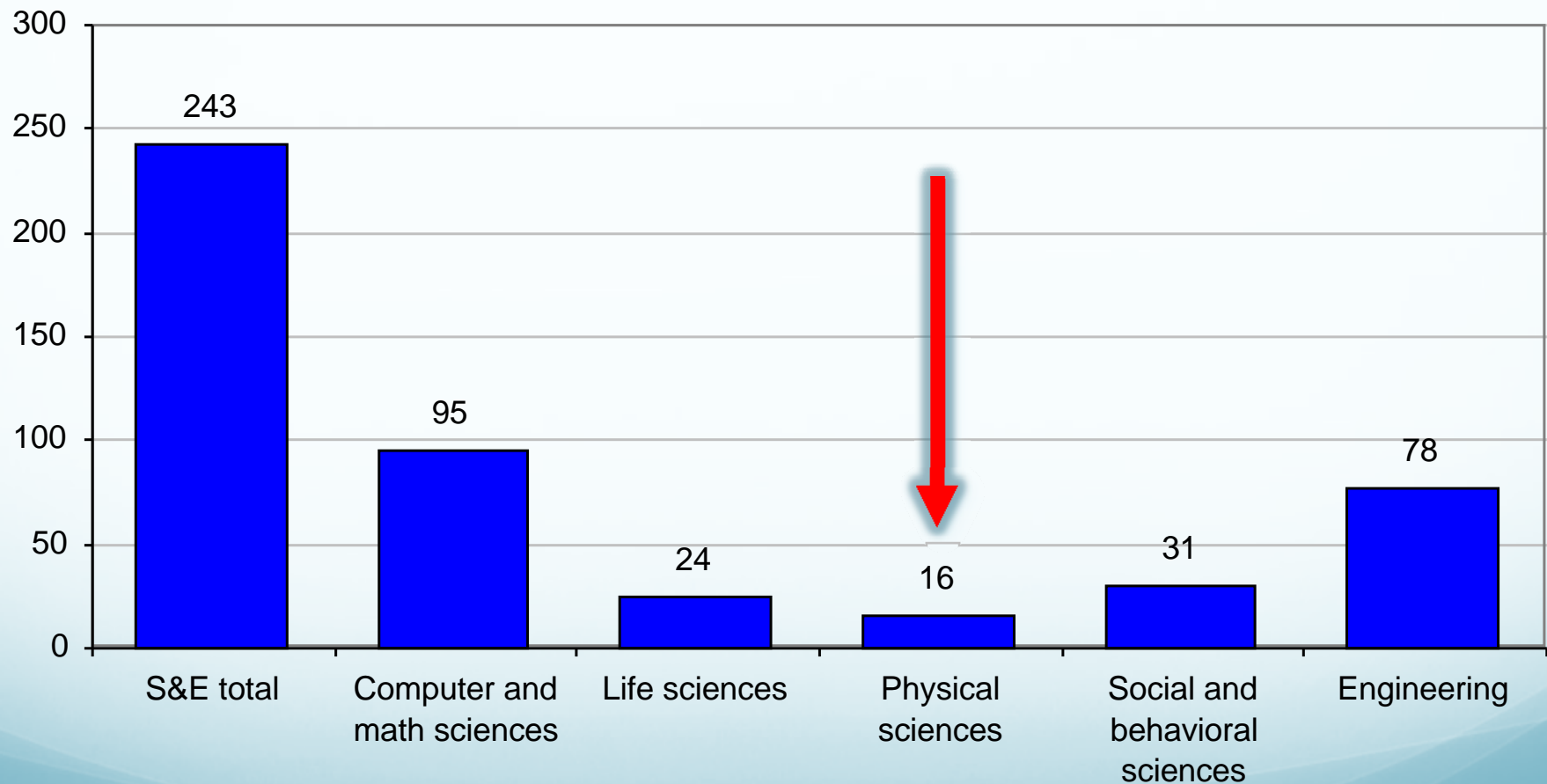
ALS

Stephen Hawking

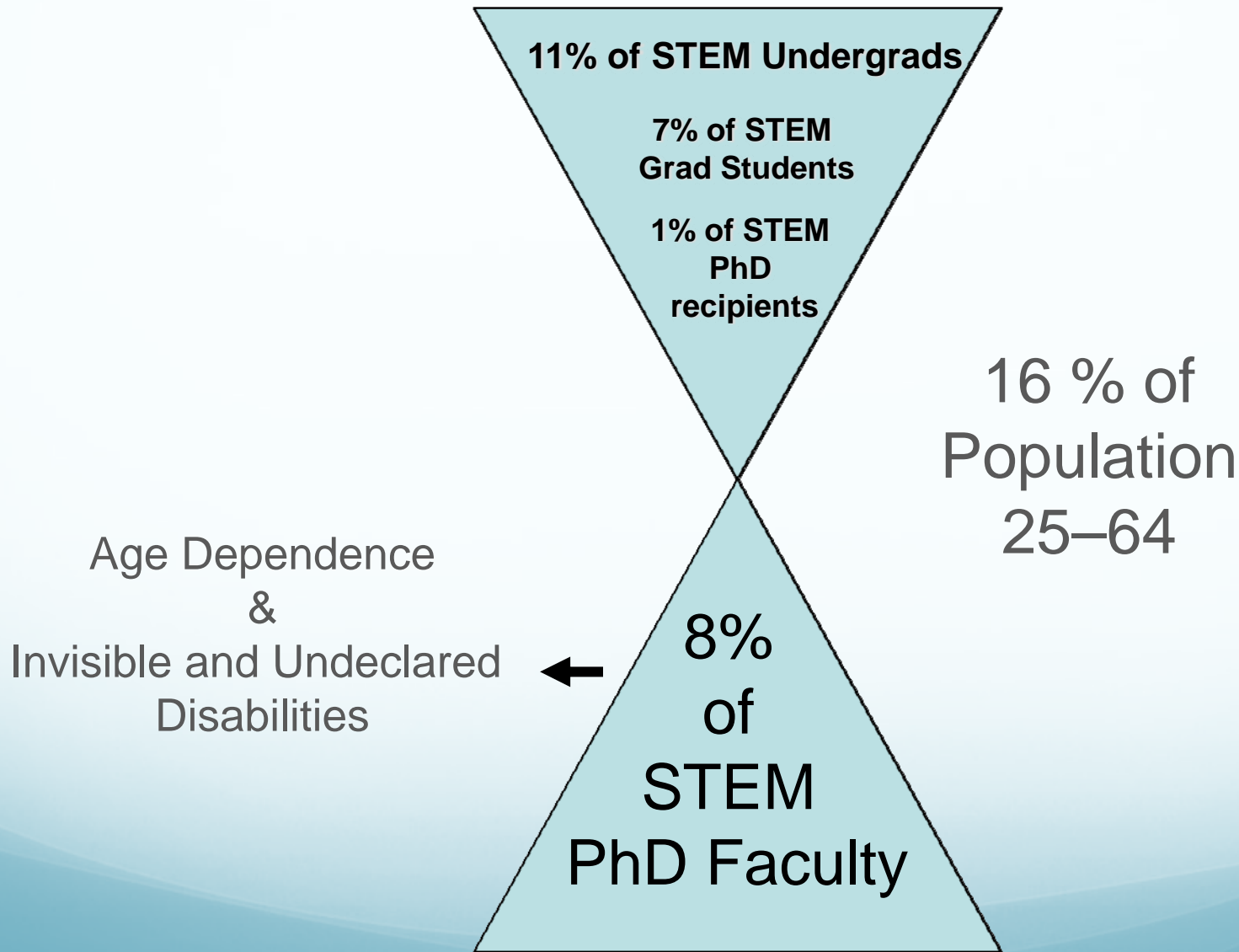


Employed Scientists and Engineers with Disabilities by Area (7–10% of Fields)

Number (in thousands)

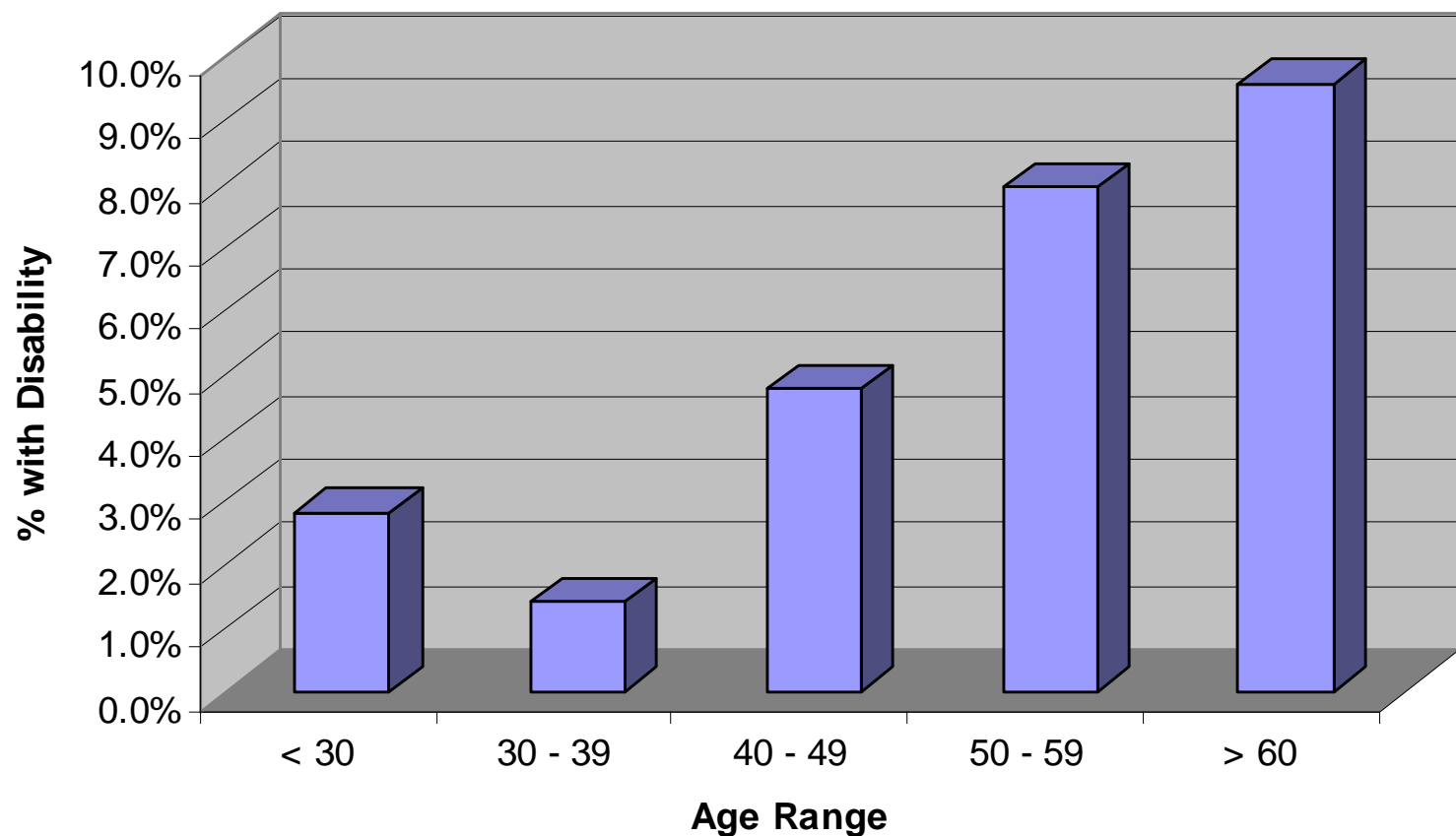


Disability Hourglass





Disability Status of Employed Chemists, Chemical Engineers & Materials Scientists in 2003



Statistics



Joan Burrelli, senior analyst for the NSF Science and Engineering Indicators program

“If the incomplete available statistics can be trusted, there are proportionally fewer professors with disabilities in academic departments than persons with disabilities in the general workforce.”



The Data Problem: Recommendation

The data sets that exist are fragmentary, flawed, and unreliable.

They come from multiple sources, are incomplete, and often are not possible to compare.

But they are, for the moment, all we have.



Leaky Pipeline in College

- 18% of persons with disabilities declare STEM major
 - Same as non-disabled population
 - Includes 2-year and 4-year colleges
 - Two-year colleges: 55% with disabilities v. 38% non-disabled
- Fewer finish STEM undergrad degree
 - If start at four-year college, 40% with disability v 60% non-disabled
- 9% go to graduate school v. 13% non-disabled



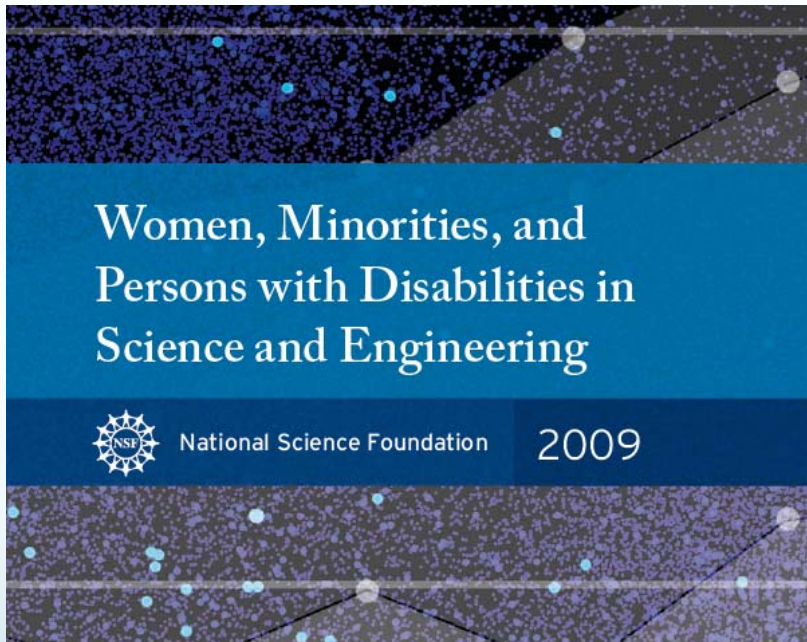
Ph.D.s in Chemistry, Chemical Engineering or Materials Science

- So few, NSF had to aggregate 10 years to get meaningful numbers
- 0.7% between 1998 and 2007
- 238 Ph.D. total - ~24 per year
 - 67 with physical or mobility disabilities
 - 55 with learning disabilities
 - 29 with visual impairments or blindness
 - 21 with hearing-impairments or deafness
 - 13 with vocal or speech disabilities
 - 53 disabilities or multiple disabilities



NSF 09-305

- Not published at time of workshop
- Undergrad: full year, full time
 - w/o disability 41.8%
 - w/ disability 36.6%
- Graduate: US citizen on RA
 - w/o disability 24.4%
 - w/ disability 16.4%



Top undergraduates come from many schools...

TABLE F-14. Top baccalaureate institutions of S&E doctorate recipients, by disability status: 2002–06

Academic institution	Doctoral degrees	Academic institution	Doctoral degrees
No disability, all institutions	132,466	With disabilities, all institutions	1,541
Foreign	45,546	Foreign	173
Unknown	12,299	Unknown	49
Top 40 U.S.	24,043	Top 40 U.S.	423
University of California-Berkeley	1,428	University of California-Berkeley	25
Cornell University	1,135	Cornell University	23
University of Michigan-Ann Arbor	918	University of Minnesota-Twin Cities	17
University of Illinois-Urbana Champaign	893	University of Michigan-Ann Arbor	16
Massachusetts Institute of Technology	867	University of Florida	15
Harvard University	851	University of Maryland-College Park	14
Pennsylvania State University, main campus	806	Pennsylvania State University, main campus	13
University of California-Los Angeles	797	Brigham Young University	12
University of Texas-Austin	781	University of California-Santa Barbara	12
Brigham Young University	698	University of Virginia, main campus	12
University of Wisconsin-Madison	698	Oberlin College	11
University of California-San Diego	680	University of Arizona	11
University of Florida	669	University of California-Davis	11
University of California-Davis	657	University of California-Los Angeles	11
Stanford University	596	University of New Mexico, main campus	11
Texas A&M University	589	University of Pennsylvania	11
Rutgers University-New Brunswick/Piscataway	580	University of Washington-Seattle	11

27.6% of domestic S&E w/o disabilities come from 40 Universities

30.9% of domestic S&E w/ disabilities come from 40 Universities

... But receive doctoral degrees from relatively few

TABLE F-22. S&E doctoral degrees awarded by leading institutions to persons with disabilities: 2002–06

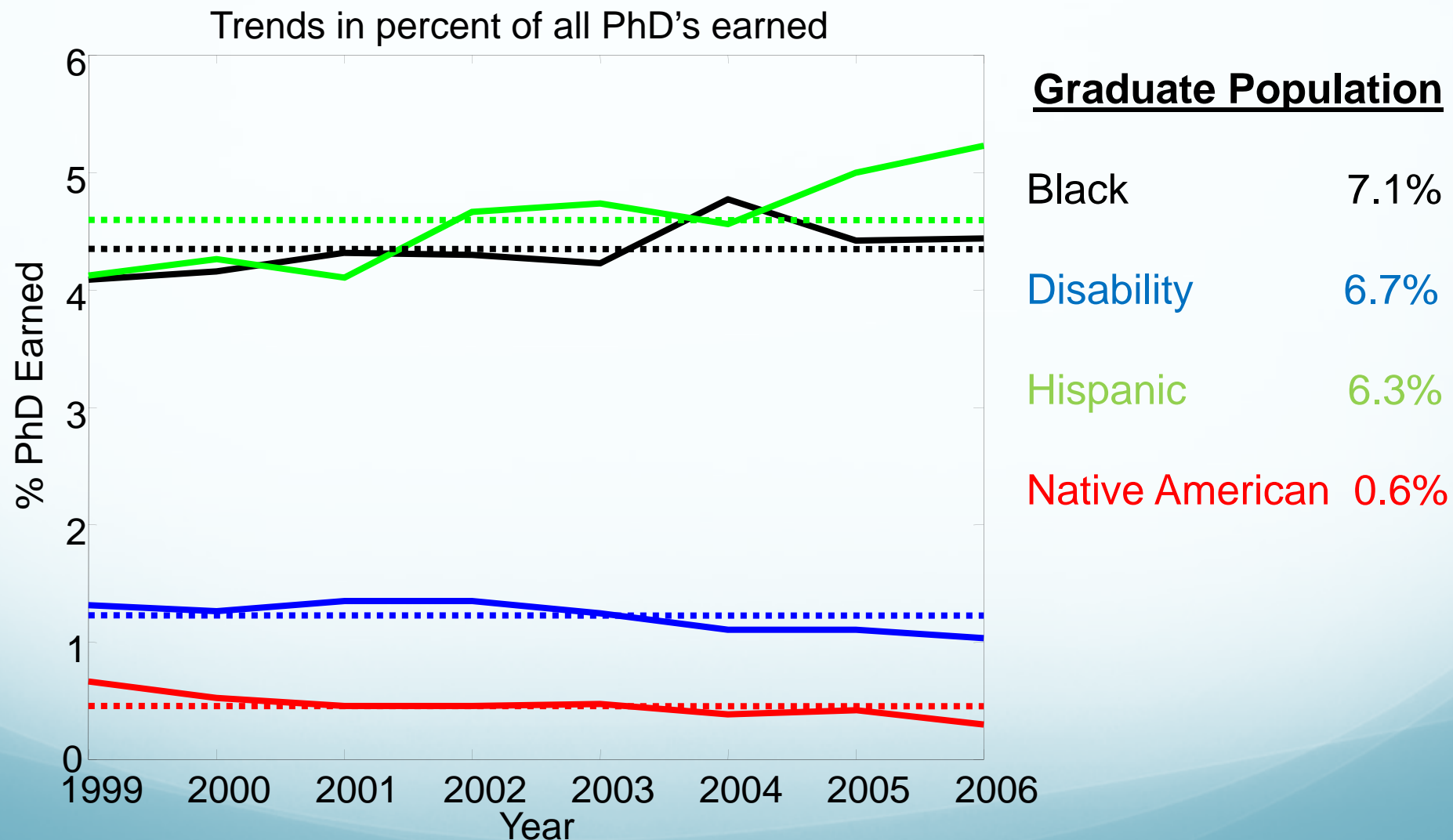
Academic institution	Doctoral degrees	Academic institution	Doctoral degrees
No disability		With disabilities	
All institutions	132,466	All institutions	1,541
Top 48 institutions	69,924	Top 48 institutions	785
University of California-Berkeley	2,804	University of California-Berkeley	39
Massachusetts Institute of Technology	2,384	University of Texas-Austin	31
Stanford University	2,370	University of Florida	25
University of Michigan-Ann Arbor	2,342	University of Wisconsin-Madison	25
University of Illinois-Urbana Champaign	2,236	University of Michigan-Ann Arbor	24
University of Wisconsin-Madison	2,170	University of California-Davis	22
University of California-Los Angeles	2,079	Harvard University	21
University of Texas-Austin	2,065	Pennsylvania State University, main campus	21
Pennsylvania State University, main campus	2,015	Texas A&M University	21
University of Minnesota-Twin Cities	1,896	University of California-Los Angeles	21
Ohio State University, main campus	1,888	University of Illinois-Urbana Champaign	20
University of Florida	1,884	University of Washington-Seattle	20
Texas A&M University	1,866	University of Maryland-College Park	19
Purdue University, main campus	1,848	Virginia Polytechnic Institute and State University	19
Cornell University	1,770	Stanford University	18

52.8% of S&E w/o disabilities come from 48 Universities

50.9% of S&E w/ disabilities come from 48 Universities



We can make a difference



The Americans with Disabilities Act (ADA)

Seeks to provide disabled individuals with the opportunity to fully participate in the workplace.

Those with disabilities who apply for a job must be able to perform the essential functions of that job.

On the other hand, the employer must make reasonable accommodations, if requested, for applicants or employees who have a disability.

ADA: What you need to know



Steve Ramirez, equal opportunity specialist, University of Kansas

“You can probably find as many different definitions of ‘reasonable’ as there are people in this room.”



May an employer inquire as to whether a prospective employee is disabled?

- An employer may not make a pre-employment inquiry on an application form or in an interview as to whether, or to what extent, an individual is disabled.
- The employer may ask a job applicant whether he or she can perform particular job functions.



Must the employee request an accommodation to get one?

Yes.

If the individual does not request an accommodation, the employer is not obligated to provide one.

If a disabled person requests, but cannot suggest, an appropriate accommodation, the employer and the individual should work together to identify one.

Recommendations

- NSF should add information to the FastLane front page for researchers to request accommodations when they submit grant proposals.
- Department chairs should team with ADA experts to assess the accessibility of labs, and add at least one universally accessible workstation.
- Department chairs should recommend that university-level strategic plans account for people with disabilities
- Recruitment literature should include language that encourages people with disabilities to apply for positions.



What to do when an employee shows the effects of an unreported disability

One example of this discussed at the workshop was what to do when an employee shows the effects of an unreported disability—such as regularly showing up late because of a psychiatric or emotional disturbance—on the job.

They are, after all, expected to be held to the same standards as other employees.

Ramirez recommended an indirect approach that protects the employee's privacy, perhaps by offering help at first and then insisting on it (without mentioning a specific suspected diagnosis).

Mental Health (Anxiety & Depression)



Victor Day, Director of the Small Molecule X-ray Crystallography and Protein Structure Laboratories, University of Kansas.

“If you do have a disability, you shouldn’t keep it quiet. Think of some of your colleagues. There are a lot of people that have these types of disabilities—who go through cycles—and they probably aren’t even aware of it.”



Mental Health Summary

Significant numbers of Americans of working age suffer from mental disorders.

Anxiety and depression disorders, which can greatly diminish productivity and quality of life, are particularly prevalent.

The workplace should provide a supportive environment for individuals with mental disabilities as well as those with physical disabilities.

Mental Health Recommendation

It is essential for department chairs to create an environment where disabilities of various kinds are recognized and addressed in a variety of ways, thereby leading students, faculty and staff to feel comfortable in declaring the need for accommodations related to disability.

Accommodation

Tailored Accommodations



Virginia Reilly, Director of University of ADA Services at Virginia Tech University

“You might think that people who have the same disability would require the same accommodation, but that’s not always true.”



Accommodation

Tailored Accommodations

One way in which institutions meet the requirements of the ADA is through tailored accommodations. These are determined and implemented by request and on a case-by-case basis.

There are as many different specific accommodations and approaches as there are degrees and types of disability.

Two primary means of accommodating people with disabilities are through accessibility changes and assistive technology.



Devices: Examples of Tailored Accommodations



David Wohlers, professor of chemistry, Truman State University

“For you to read, you just have to move your eyeballs. For me to read, I have to move my hands. So there’s a lot more time and energy involved in being blind as apposed to being sighted. So when we ask for more time taking a test, it ought to be just a dope slap—it just takes more time.”

Accommodations for the visually impaired science professor can be provided through a variety of assistive technology devices, as well as adjustments in the physical environment and additional human assistance.

PlexTalk Digital Recorder



Perkins Brailier



Accommodation: Universal Design

An alternative to creating new accommodations for people with disabilities on a case-by-case basis is to avoid needing most accommodations at all.



Accommodations & Universal Design



Sheryl Burgstahler, Access Technology Center, University of Washington

“When it’s reasonable, do as much as you can on the universal design side, and then it will minimize the accommodations you need to provide and also create a more welcoming and inclusive environment for everyone.”

The Center for Universal Design
www.design.ncsu.edu/cud



Examples of Universal Design

- **Career/Employment Services:** job postings in formats accessible to people with a broad range of abilities, disabilities, ages, & racial/ethnic backgrounds; notice to applicants about how to request accommodations.
- **Science lab:** an adjustable table and flexible work area that is usable by students who are right– or left–handed and have a wide range of physical abilities.
- Controls on equipment that can be operated from different heights and that are levers rather than knobs
- Adaptable lab/instructional products (braille/tactile ruler, video camera connected to microscope)
- Clear, high-contrast, large-print signs



Universal Design Summary

Any relatively low-cost, no-regrets universal design choices should be made, and universal options should be considered, when making other accommodation decisions. This policy must be coupled with a system that guarantees timely action on further requests.



Physically Accessible Chemistry

Bill McCarthy, professor of civil engineering, New Mexico State University

“When I was injured in my automobile accident 43 years ago, I was happy they were willing to take a table, prop it up and keep the chemicals in front of me. That was a very good concession then. Today, we should expect a lot more.”





Physically Accessible Chemistry

- There are a wide range of mobility disabilities. Each individual faces unique challenges
- Many accommodations are simple, cost effective and will help 80–90% of students
- The remaining 10–20% of students may require very specific accommodations
- Two-way communication with students is critical to finding workable solutions/accommodations in the Chemistry Laboratory
- Creativity in developing solutions may be very helpful
- If you have the budget, many high tech solutions may be available to you



Physically Accessible Chemistry: Recommendation

Departments, schools or college should appoint a contact person to be a liaison with campus offices knowledgeable about access issues and solutions.

The process of choosing and implementing accommodations should involve input from a variety of experts, from ADA specialists to accessibility counselors, to assistive technology staff, and of course individuals with disabilities.



American Chemical Society: Fostering Ability



Joseph S. Francisco, President,
American Chemical Society

“Chemists and scientists with disabilities are people. They are people who like to go out and fish. They are people who like to run marathons. They are people who like to spend time mentoring young people.”



Committee on Chemists with Disabilities

OBJECTIVE: Ensure that all ACS–sponsored services and programs promote and advance the full participation of students with disabilities

Strategy: Promote educational and outreach opportunities for students with disabilities that encourage those individuals to further explore opportunities within chemistry by collaborating with those ACS entities that conduct public outreach programs and hands-on activities and offering to review and make suggestions regarding accessibility and inclusiveness.

Strategy: Collect and disseminate information on instruction of students with disabilities.



Committee on Chemists with Disabilities

OBJECTIVE: Serve as a resource to the chemistry community as a whole with reference to issues concerning the education and employment of individuals with disabilities.

Strategy: Target the Chemistry Community as a whole with information for and about individuals with disabilities, by enhancing and expanding the ACS Committee for Chemists with Disabilities web site to make it a first site resource for those seeking information about the full participation of people with disabilities in chemistry and allied fields.



Ian Shipsey, Department of Physics, Purdue University

“There’s a real fear among students that somehow, on the transcript, there will be an asterisk [that] will say, ‘This Ph.D. was achieved with accommodations.’”

Summary: Profound hearing loss is an example of an “invisible” disability for which there may be a low rate of self-disclosure among students or faculty. No matter what their specific issues, individuals with disabilities need support from those around them, access to assistive technology, and role models.

Recommendation: Effort should be made to create and manage a mentoring network for science students and academic scientists with disabilities.

Summary/Overriding Goal

Mechanisms that could be used as part of a support system: consistent encouragement, faculty role models and mentoring, and increased networking opportunities—all attributes of a welcoming, positive academic atmosphere that puts its students and faculty in a position to succeed, regardless of disability status.

Breakout Sessions

Accessibility

- To communicate best practices and provide a model for future planning, the practices and facilities of schools that are most welcoming to students with disabilities should be compiled and distributed in a database.
- A menu of low-cost accommodations or universal design choices, and available subsidies for them, should be compiled.

Breakout Sessions

Non-visible Disabilities

- NSF and ACS should take responsibility for refining the definition of non-visible disabilities and acquiring statistics on disability by type.
- Faculty should meet to discuss the ADA and to learn from someone, such as an ADA expert or staff support counselor, about the resources and options available to those with non-visible disabilities. Universal design principles should be applied wherever possible.

Breakout Sessions

Instructional Tools

- Available options for students of faculty requesting assistive technology must be presented to students in regular classroom visits from an accessibility counselor and to faculty through liaison with an ADA or support office.
- NSF should provide funding for basic forms of assistive technology, such as text-to-speech (and vice-versa) software and a funding mechanism for other, more specialized forms.

Breakout Sessions

Access to Information

- A national organization or federal agency should build and maintain web resources for community-building and mentoring, both faculty-to-faculty and faculty-to-student, for those with disabilities.
- Department chairs should seek training about disabilities and help educate faculty to prevent unconscious bias.
- Departments should publicize, in their recruitment literature, the existence and capabilities of university offices that support students, faculty, and staff with disabilities.



Breakout Sessions

Agencies & Professional Societies

- Funding agencies should streamline the proposal preparation process in ways that focus on the core of the research.
- The NSF and NIH should consider designing targeted funding programs for people with disabilities.
- Professional societies should structure benefit packages friendly to people with disabilities and ensure their meetings, conferences, events, publications, and websites are universally accessible.

Breakout Sessions

Internal Assessment

- Universities should review their strategic hiring plans, offer departmental incentives with an eye toward including people with disabilities, expand services for students and faculty with disabilities, and include sections on accommodation in faculty handbooks.



Breakout Sessions

Faculty Development

- If mentors for new faculty with disabilities cannot be found in a home department, then applicable mentors can be drawn from other departments.
- National organizations such as AAAS and ACS should establish a further mentoring network to match junior and senior faculty members with comparable disability status.



Breakout Sessions

Mid-career Disabilities

- A campus ADA coordinator or support staff member should be notified of any change in disability status
- The departmental chairs should encourage communication about disabilities and be alert to changes that might indicate an emerging disability
- The university should allow the tenure clock to be temporarily stopped and grant flexible sabbaticals in the case of short-term disability