

SPECTRUM



A report on underrepresented minorities in astronomy

Diversifying Our Profession: The Role of Astronomy REU Programs

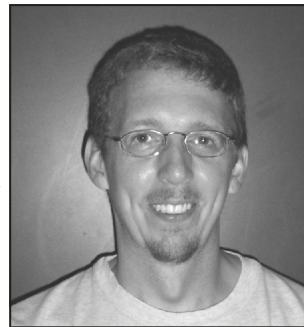
by Robert Benjamin

For over two decades, NSF-sponsored REU (Research Experiences for Undergraduates) programs have been a gateway to a career in astronomy. For some students, the experience of using world-class facilities and doing astronomy on the leading edge confirms an already existing desire to pursue a career in astronomy. But for other students, it can be a life-altering experience, transforming an interest in the cosmos into a career path. And REU students almost uniformly agree that it's a lot of fun!

Graduate admission committees, who seek students who will excel in astrophysical research, have come to appreciate the role of REU programs. Although graduate selection committees look at several factors, research experience and the potential for independent research, can play an important role in the decision. Students with REU experience can also be particularly attractive to mentors looking for already-trained assistants who can jump right into a research program.

One of the principal goals of the REU program is to provide access to students who might otherwise not have a chance to find out what astronomical research is all about. The program is intended to be strongly supportive of women and other students from groups that are under-represented in the field.

In this article, we discuss how REU programs can lead the way in increasing the racial and ethnic diversity of the astronomical community, and discuss some of the challenges to achieving this goal.



Bob Benjamin is a research scientist at the University of Wisconsin-Madison. He serves as director for UW's REU program in astrophysics.

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CSMA to Host Special Session in Seattle on Role of Minority Serving Institutions

by Keivan Guadalupe Stassun

The Committee on the Status of Minorities in Astronomy (CSMA) will host a Special Session at the Seattle AAS Meeting. The session will take place on Monday, 6 January, 2:00-3:30 pm. All AAS members in attendance are invited to participate.

This special session will highlight the important role of Minority Serving Institutions in preparing future minority astronomers. Minority Serving Institutions include Historically Black Colleges and Universities

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HIGHLIGHTS:

- Learn about the important role played by REU programs in preparing future minority physicists and astronomers.
- Read about recommendations for enhancing the diversity of astronomy faculty at colleges and universities.
- Learn about current political action being pursued by African-American physicists to rectify under-representation in the national labs.

The Top Degree Producers of Minorities in the Physical Sciences

by Keivan Guadalupe Stassun

Increasing the number of underrepresented minorities in the astronomy profession requires increasing the number of minorities earning PhDs in astronomy. But doing that means getting more minorities into our astronomy graduate programs, and that means knowing where to direct recruiting efforts for graduate admissions and for undergraduate research programs.

Here we provide a series of “top ten lists” for use by AAS members in identifying those institutions that are leaders in graduating minorities with degrees in the physical sciences.

These data were compiled by Dr. Victor M. H. Borden, Associate Vice Chancellor and Professor of Psychology at Indiana University—Purdue University Indianapolis, from information collected by the Integrated Postsecondary Education Data System (IPEDS) program conducted by the National Center for Education Statistics (NCES).

A student’s minority status is in most cases determined by a self-reported response from the student. While ethnicity categories vary from one institution to the next, each institution is required to “map” its categories to the standard federal categories: Black, non-Hispanic; American Indian or Alaskan Native; Asian or Pacific Islander; Hispanic; White, non-Hispanic; and unknown. The “minority” categories include only US citizens or permanent residents.

American Indian Baccalaureate

Rank	Institution	State	No. of Grads	% of Class
1	U. of Oklahoma, Norman	Okla.	6	6.3
2	Fort Lewis College	Colo.	5	18.5
2	U. of North Carolina at Pembroke	N.C.	5	35.7
4	U. Calif.—Los Angeles	Calif.	3	2.9
4	U. Calif.—Santa Barbara	Calif.	3	3.9
4	East Central University	Okla.	3	21.4
4	Oklahoma State Univ.	Okla.	3	15.8

African American Baccalaureate

Rank	Institution	State	No. of Grads	% of Class
1	Xavier University	La.	68	97.1
2	Southern U. and A&M College	La.	25	96.2
2	Tennessee State Univ.	Tenn.	25	86.2
4	Howard University	D.C.	21	72.2
4	Morehouse College	Ga.	21	87.5
4	Hampton University	Va.	21	100.0
7	Lincoln University	Pa.	20	90.9
8	Florida A&M University	Fla.	16	100.0
9	Georgia State University	Ga.	15	45.5
9	Grambling State Univ.	La.	15	100.0
9	Norfolk State University	Va.	15	93.8
9	Virginia Commonwealth University	Va.	15	21.7
13	Morgan State University	Md.	14	82.4
14	Tougaloo University	Miss.	13	100.0
15	Tuskegee University	Ala.	12	100.0
15	Jackson State University	Miss.	12	92.3
15	North Carolina State Central University	N.C.	12	75.0
18	Florida Atlantic Univ.	Fla.	11	19.6
18	Chicago State University	Ill.	11	84.6
20	Spelman College	Ga.	9	100.0

Explanation of Tables: The number of students that graduated from a given institution in the 2000-01 academic year. The rightmost column gives the fraction that students of a given minority group represent relative to all students graduating in physical science disciplines from that institution. Minority Serving Institutions are indicated with shading.

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CSMA Special Session at Seattle AAS Meeting (cont'd)

(Continued from page 1)

(HBCUs), Hispanic Serving Institutions (HSIs), and Tribal Colleges and Universities (TCUs). Examples include Howard University (Washington, D.C.), University of Texas at El Paso, and White Earth Tribal and Community College (Mahnomon, MN).

These institutions represent large—and largely untapped—pools of minority talent in science and engineering. Roughly one-third of bachelor's degrees in science and engineering earned by African-Americans are earned at HBCUs; the top ten pro-

ducers of Black bachelor's degree recipients in physics are all HBCUs. In addition, an often-overlooked source of minority talent in higher education is the nation's community (two-year) colleges, where roughly 50% of all minorities begin their post-secondary school careers.

This session will feature a panel of invited speakers from Minority Serving Institutions who will present viewpoints, strategies, and discussion on processes that encourage and mentor individuals who elect to pursue science-related careers including astronomy and astrophysics. The panel will also include representatives from the NSF REU (Research Experiences for Undergraduates) program.

Specific objectives for the Session include:

- Report to the AAS membership on the important role played by Minority Serving Institutions, where these institutions are, the populations they serve;
- Introduce the AAS membership to representatives from various Minority Serving Institutions, including an HBCU, an HSI, a TCU, and a community college;
- Provide an opportunity for representatives from these institutions to describe their role in preparing minority undergraduates in the sciences, how their programs bridge to PhD-granting programs in astronomy, and ways they suggest for the AAS to help enhance these bridges;
- Provide an opportunity for AAS members to dialogue with these representatives, hopefully resulting in specific "action items" that will serve to strengthen partnerships with Minority Serving Institutions.

Seeking Recent Minority PhD Recipients

The CSMA would like to hear from recent astronomy PhD recipients who are members of underrepresented groups. We want to recognize your accomplishments by highlighting your research and outreach activities in the SPECTRUM newsletter. Please contact SPECTRUM editor, Keivan Stassun, at keivan@astro.wisc.edu.

SPECTRUM

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For more information on subscribing to SPECTRUM, submitting articles, or obtaining back issues, please visit the CSMA website:
<http://www.astro.wisc.edu/csma>

FEATURE ARTICLE

Faculty Diversity: Too Little For Too Long

by Cathy A. Trower and Richard P. Chait — text and graphics reprinted with permission from the March-April 2002 issue of Harvard Magazine

When alumni, after a long absence, stroll through Harvard Yard or return to any other university campus, two questions usually come to mind: “What’s different?” and “What’s the same?”

Even a casual observer visiting alma mater for the first time in 30 years would be quick to notice that today’s students look different. This is not just a matter of fashion (though that’s surely true), but also a matter of faces. Colleges in general are now far more diverse than three decades ago. In 1971, 42 percent of undergraduates were women, versus 56 percent in 2001; 8.4 percent were African Americans, now 11 percent; and 2.8 percent were Hispanic, now 8 percent. In 1976, 1.8 percent of college enrollees were Asian Americans; now the number stands at 6 percent. Women and minority students are particularly well-represented at elite institutions.*

On the other hand, a close observer would notice that faculty members around the country seem pretty much the same. Professors do not dress all that differently these days—we seem to have wardrobes that are timelessly out-of-style—or look that different. Despite 30 years of affirmative action, and contrary to public perceptions, the American faculty profile, especially at preeminent uni-

versities, remains largely white and largely male.

Women currently represent 36 percent of full-time faculty compared to 23 percent in the early 1970s. Although this represents a very substantial gain nationwide, women constitute only 25 percent of the full-time faculty at research universities, versus 10 percent in 1970. Faculty of color remain a very small part of the professoriate. (Whites constituted 95 percent of all faculty members in 1972 and 83 percent in 1997.) Most of the growth in minority participation has been by Asian Americans, from 2.2 percent in 1975 to 4.5 percent in 1997. The percentage of African-American faculty members at all levels has been remarkably stagnant—4.4 per-

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*Charts displaying supporting data for many of the statistics included in this article can be found at www.harvard-magazine.com.

FEATURE ARTICLE

Faculty Diversity: Too Little For Too Long (cont'd)

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cent in 1975 and 5 percent in 1997—and almost half of all black faculty teach at historically black colleges. The increase in Hispanic faculty has also been slow: from 1.4 percent in 1975 to 2.8 percent in 1997.

Usually, what's different on a college campus provokes a degree of anxiety among alumni, while what remains the same offers a measure of comfort. But with respect to diversity, the opposite may be true. Substantial changes in student demography are probably a point of pride, since most Americans—more than 90 percent in a recent poll—agree that it's important to have students of different races, cultures, and backgrounds in higher education. What has barely changed, the demographics of the faculty, should be cause for concern.

Who teaches matters. In fact, the most accurate predictor of subsequent success for female undergraduates is the percentage of women among faculty members at their college. Although most women study at coeducational institutions, those who have attended women's colleges earn two to three times as many advanced degrees as those attending coed schools. For women of color, the difference is even more pronounced: among African-American women awarded doctorates in biology between 1975 and 1992, for example, 75 percent graduated from black colleges, most notably two women's colleges—Spelman and Bennett.

Why is it, especially relative to student diver-

sity, that premier universities have made so little progress over so many years with faculty diversity? What's the problem? What are the obstacles? And how might innovative measures—such as revisiting the assumptions underlying tenure, and a commitment to disclosure, publicity, and rankings of tenuring practices—swing the balance more effectively toward diversity? Finding solutions now is particularly important, when a generational wave of faculty hiring nationwide lies just ahead.

WHAT'S THE PROBLEM?

The popular explanation of the problem holds that there are insufficient numbers of women and minorities on the pathway from graduate student to

faculty member. Academics label this the “pipeline problem.” As the data that follow indicate, this is only half right: true for minorities, false for women. Indeed, if *the* problem were the pipeline, one might expect that 30 years of the “good-faith effort” required of universities by affirmative-

action regulations would have borne more fruit.

The lack of success invites another hypothesis: that the pipeline is *not* the basic problem. In fact, even if the pipeline were awash with women and minorities, a fundamental challenge would remain: the pipeline empties into territory women and faculty of color too often experience as uninviting, unaccommodating, and unappealing. For that reason,

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Faculty Roll Call

RESEARCH UNIVERSITIES, the focal point of this article, employ the largest number of full-time faculty members, conduct the most influential research, and produce the majority of doctorates. These institutions employed 32 percent of the full-time faculty in the United States in 1998, and accounted for 24 percent of all faculty members if part-timers are included. In addition, such institutions enrolled 21 percent (15 percent public, 6 percent private) of all students in 1998. Nonetheless, it's important to remember that a majority of faculty members work in other kinds of higher-education institutions.

FACULTY BY INSTITUTIONAL TYPE, 1998

	Full-Time	Part-Time	Total Faculty	% of Total
Total	560,393	416,024	976,417	100%
Public research	137,532	35,762	173,294	18%
Private research	38,953	14,769	53,722	6%
Public doctoral	58,054	25,539	83,593	9%
Private doctoral	20,655	18,017	38,672	4%
Public comprehensive	83,041	48,401	131,442	13%
Private comprehensive	37,508	36,709	74,217	8%
Private liberal arts	47,486	32,970	80,556	8%
Public two-year	102,463	170,092	272,555	28%

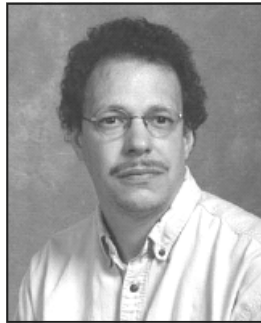
The Status of the African-American Physicist in the Department of Energy National Laboratories

By Keith H. Jackson—Reprinted with permission from APS News

The National Society of Black Physicists (NSBP) has been concerned about the small number of African-Americans with career scientific staff appointments at Department of Energy funded national laboratories. NSBP has also been frustrated with the overall lack of participation of Historically Black Colleges and Universities (HBCUs) in DOE-funded scientific user facilities such as high energy physics and nuclear facilities, Synchrotron Light Sources, and the Spallation Neutron Source. As a result of these concerns, the Technical Executive Officer of NSBP began to collect data, which were placed before the American Physical Society Committee on Minorities (COM). The American Physical Society Committee on Minorities formally took up the issue but first wanted to verify the data provided by NSBP, and to expand the study to include Hispanic physicists. COM enlisted and received the full support of both the National Society of Black Physicists and the National Society of Hispanic Physicists (NSHP).

Our data show that in general African American Ph.D. physicists are less than 0.5% of the Ph.D. physicists employed at the DOE labs. African-Americans make up nearly 2% of the physics faculties across the United States, including the faculties of HBCUs. Looking at data compiled by Professor Donna Nelson at the University of Oklahoma, we find that the percentage of African-Americans on the faculties of the top 50 physics departments in the U.S. is much smaller (N=60 or 0.6% of total).

What do these numbers mean and what is the connection between the universities and the DOE-funded national laboratories? The DOE labs are government-owned but contractor-operated (GOCO) and the contractor/operators are universities that do not have a single African-American on their physics faculties. The hiring practices and recruiting of the universities are mirrored at the labo-



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ratories which they manage. The NSBP has several hypotheses about the reasons:

- Many university faculty have joint appointments with the national laboratories and serve on the scientific staff committees responsible for hiring.
- Graduate students from the managing university, and postdocs from established collaborators, have first shot at postdocs and staff scientist positions. If you are not part of that informal network, there is precious little chance at getting any position at the laboratory.
- Many African-American physicists have a natural affinity to the idea of teaching at an HBCU. While this is undoubtedly true, this really leads to a self-fulfilling prophesy, that is in fact motivated by hiring practices at other universities and the DOE labs. That is, academic appointments are more available to African-American physicists since appointments in “top-50” departments and at the DOE labs are not available.
- The bottom line is that the labs have not been inventive and aggressive in recruiting domestic African-American and Hispanic-American scientific talent. What more important mission could there be for an organization that would claim to be a national laboratory?

Many of our colleagues would assert the “pool” or “external availability” of African-Americans with Ph.D.s in physics is small, and that they know of no African-American with a Ph.D. in physics who is unemployed. But there is, for example, a top-10 university that has graduated over 34 African-Americans with Ph.D.s in physics since 1974. This university also manages a DOE-funded laboratory. There is not a single African-American physicist on its physics or applied physics faculty. This may not be surprising, but in addition there is not a single African-American Ph.D.-level physicist on the staff of the national laboratory or on the research staff of the university period! There is a common misconception that African Americans somehow have an “affirmative action advantage” when applying for jobs at the national laboratories.

If that were true, the statistics would be much better across the labs.

NSBP has some proposals for immediate action to address the diversity problem at the national labs. The labs should become intimately involved with the NSBP and the NSHP and other minority professional societies. These organizations have annual meetings that consist of technical and business sessions. At these meetings the labs will find serious scientists with whom their scientific staff can form authentic collaborations, partnerships and student exchanges. They will also find many students looking for research opportunities and mentorship.

The national laboratories could also benefit from a site visit by a team composed of members of NSBP, to review and give serious advice on the recruitment, hiring practices, workplace environment, and quality of scientific outreach activities of DOE labs. The members that make up these professional organizations possess considerable scientific expertise, and are well informed about science resources within minority communities.

The national laboratories should aggressively seek out and form research partnerships with faculty at HBCUs, Hispanic Serving Institutions (HSIs) and Tribal Colleges. AIP statistics reveal that 44% of African American students who earn a baccalaureate degree in the sciences do so at Historically Black Colleges and Universities, and most African-American physics professors are at

HBCUs. Research partnerships between research-intensive institutions and HBCUs have historically paid great dividends in increasing the number of minority Ph.D. physicists. Each DOE lab should have active collaborations with HBCUs, HSIs and Tribal Colleges that include staff exchanges, i.e., sending lab personnel to the schools as visiting professors, and having professors at the labs as guest scientists, along with their students as fellows. More importantly, national laboratories should pursue joint appointments with HBCU researchers.

The national laboratories should ensure that minorities participate on advisory committees and on annual divisional review committees at all levels. This is particularly true of laboratory divisions that operate publicly financed national user facilities. Diversity of the division staff and facility users also should be a topic to be reviewed. It is difficult to imagine how a review panel with no African-American scientists will ever raise the issue of collaboration with minority scientists. The guidelines of the review should state explicitly that the inclusion of underrepresented minorities in the scientific program is on an equal footing with the proposed science.

Diversity efforts at the national laboratories have to include the actual stakeholders, the senior scientists with actual hiring and program leadership responsibilities. Too often too much is left to the lab diversity officer. In our survey and follow-up research we have found that this is a fundamental disconnect at the national laboratories. Diversity

officers often are not scientists and have few informal contacts among working scientists. We found that most of their job is to satisfy contractual obligations which may protect the laboratories from lawsuits but do not help to diversify the lab scientific workforce.

There is also a problem with senior lab personnel somehow equating K-12 science outreach efforts with diversity efforts. The labs will bring in high school children for a day of show and tell, but will not invite serious scientists to serve on review panels and policy boards. The idea is that exposure to science will somehow stimu-

DOE Funded Laboratory	Number of Ph.D. Physicists on the Scientific Staff	Number of African-American Physicists on Scientific Staff
Argonne Natl Lab	223	0
Brookhaven Natl Lab	335	1
Fermilab	472	1
Idaho Natl Engineering Lab	27	0
Jefferson Lab	79	0
Lawrence Berkeley Natl Lab	187	2
Lawrence Livermore Natl Lab	642	5
Los Alamos Natl Lab	686	2
Oak Ridge Natl Lab	182	0
Pacific Northwest Lab	66	0
Princeton Plasma Physics Lab	94	0
Sandia Natl Lab	264	0
Stanford Linear Accelerator Lab	115	0
Total	3372	11

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FEATURE ARTICLE

Faculty Diversity: Too Little For Too Long (cont'd)

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many otherwise qualified candidates forgo graduate school altogether, others withdraw midstream, and still others—doctorate in hand—opt for alternative careers. In short, the pipeline leaks.

Before considering the barriers that women and minorities confront en route to academic appointments and cherished tenured posts, a few more data on the current composition and distribution of faculty at American colleges and universities can help flesh out the current, generally bleak picture:

- 94 percent of full professors in science and engineering are white; 90 percent are male.
- 91 percent of the full professors at research universities are white; 75 percent are male.
- 87 percent of the full-time faculty members in the US are white; 64 percent are male.
- Only 5 percent of the full professors in the US are Black, Hispanic, or Native American.
- The gap between the percentage of tenured men and the percentage of tenured women has not changed in 30 years.

Women in the Academy

In 2000, women earned more than half of the bachelor's (56 percent) and master's degrees (57 percent) and 44 percent of the doctoral degrees awarded nationwide. The percentage of women with advanced degrees has increased steadily for 30 years. The trouble for women is not the lack of numbers in the pipeline; the problem is that their status, once in the academy, is low.

Women are more likely than men to hold lower academic ranks and work at less prestigious institutions. Even though the proportion of men decreased across all ranks from 1980 to 2000, men still occupy the majority of positions at senior ranks (especially full professor and associate professor). The disparities between men and women become more pronounced as one ascends the academic career ladder. And although the percentage of female full professors has increased substantially, women still hold only 16 percent of full professorships at doctoral institutions, compared to 40 percent at two-year colleges. The more prestigious the institution, the higher the proportion of male faculty overall, and, of course, the reverse is true for women. In

fact, the gap between males and females by rank is much the widest at the most esteemed institutions (i.e., nearly one-half of male faculty members at doctoral institutions are full professors—*five times* the representation of women; at two-year colleges, one-third of male faculty members are professors, while one-quarter of women faculty members have attained that rank.)

Nor have women reached parity with men in terms of tenure. As if set in concrete, the proportion of women with tenure lags the rate for men by 20 to 27 percentage points across all types of institutions, with the greatest imbalance at universities.

A study by the Commission on Professionals in Science and Technology revealed that among those in academe with doctorates in science and engineering, only one-quarter of women had been awarded tenure, compared to one-half of men. The share of faculty positions in science and engineering with tenure has been quite constant for both men (80 percent) and women (56 to 60 percent) between 1975 and 1995. In the humanities, in 1995 women made up one-third of the faculty, with 49 percent tenured versus 71 percent for men; in the social sciences, women constituted 29 percent of the faculty, of whom just one-fifth had tenure. Eighteen percent of women, versus 10 percent of men, are employed at institutions without tenure, and 37 percent of women, versus 24 percent of men, are employed in non-tenure-track positions. And as is the case with academic rank and institutional prestige, the percentage of tenured women at elite institutions generally falls below overall national averages.

Closely related to tenured status is the nature of the faculty members' employment. The science and technology commission's study showed that four

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	Men		Women	
	1980	1998	1980	1998
Professor	90%	76%	10%	24%
Associate Professor	79%	61%	21%	39%
Assistant Professor	66%	55%	34%	45%
Instructor	57%	41%	48%	59%
Lecturer	57%	45%	43%	55%

FEATURE ARTICLE

Faculty Diversity: Too Little For Too Long (cont'd)

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times as many men as women with doctorates in those fields held full-time faculty positions. Women were less likely than men to be employed full-time: 75 percent of men, 60 percent of women. Overall, women in the academy are more likely than men to be employed part-time (45 percent vs. 34 percent); in fact, women constituted a larger portion of the part-time than the full-time faculty in 1999.

TENURED WOMEN FACULTY MEMBERS AT SELECT ELITE INSTITUTIONS, 1999

Institution	Percent of Tenured Women
Harvard	13%
Princeton	15%
Yale	15%
Dartmouth	21%
Williams	25%
Amherst	33%

the 2000-2001 academic year, females, on average, earned \$10,301 less than men at public institutions and \$12,895 less at private institutions—and during that period, that wage disparity widened almost 3% from the prior year.

Minorities in the Academy

In the case of faculty members of color, the academy does have a stubborn supply-side problem. On the other hand, minorities in professorial careers, like women, are concentrated in lower-status positions.

Minorities earned 16 percent of the master's degrees and 18.6 percent of the doctorates in 2000. Whites accounted for 79.3 percent of all earned doctorates in 2000, followed by Asians at 7.8 percent; other minority groups combined accounted for 10.8 percent. Blacks were most represented in education (12.4 percent)—and were underrepresented in most arts and sciences fields—while Asians earned 17.5 percent of engineering doctorates.

Still, the relative scarcity of persons of color with doctorates does not entirely explain the lack of

At all ranks—across disciplines and institutional types—female faculty members earn lower salaries than men do. Furthermore, the inequities are progressive: that is, the disparity widens from assistant to full professor. In

progress for minority faculty. The *number* of minority faculty increased considerably between 1983 and 1993—by 44 percent. But the *percentage increase* was much less dramatic—from 9.3 percent to 12.2 percent, mostly attributable to gains by Asian Americans. The proportion of black faculty at predominantly white colleges and universities today—2.3 percent—is virtually the same as in 1979. Even in fields with a relatively ample supply of minority scholars, such as education and psychology, the proportion of black and Hispanic faculty positions at predominantly white institutions barely approximates the percentages of nonwhites who hold doctorates or professional degrees in those fields.

Minority men and women also hold lower academic ranks than whites. The representation of faculty of color, though low at each rank, has increased overall from 1989 to 1997. Still, minorities accounted for only 11 percent of the full professors in 1997. Women of color made greater progress than men of color in attaining full-professor status (23.2 percent of women faculty members, versus 9 percent of men), yet such women hold only 2.5 percent of full professorships nationwide and men of color constitute only 8 percent of that population; of the remainder, 17 percent are white women, and 72 percent are white men.

Members of all minority groups, men and women, are less likely to be tenured than whites. With the exception of Native Americans, however, the percentage-point difference is not as great between tenured minority men and women as between all men and women (consistently 20 or more percentage points). The proportion of tenured faculty of color increased 3 percentage points from

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	Faculty of Color		White Faculty	
	1989	1997	1989	1997
Professor	8%	11%	92%	89%
Associate Professor	10%	13%	90%	87%
Assistant Professor	14%	17%	86%	83%
Instructor	13%	15%	87%	85%
Lecturer	14%	14%	86%	86%

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Faculty Diversity: Too Little For Too Long (cont'd)

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1989 to 1997, but the increase was entirely for minority males; the proportion of minority females actually dropped 1 percentage point.

Minorities, meanwhile, are more likely than whites to work at less prestigious institutions. The highest percentages of black faculty members are found at public comprehensive universities (9.1 percent) and public two-year colleges (6.2 percent). Asian Americans make up 9 percent of the full-time faculty at private research universities and 7.1 percent at private doctoral universities.

THE OBSTACLE: AN UNACCOMMODATING CULTURE

Like other professions, such as medicine, law, or architecture, academe has a strong culture—a set of beliefs and assumptions, often unspoken and unwritten, that guides individual and collective behavior and shapes the way institutions do business. Strong cultures are not easily changed—which can be very advantageous to an organization, unless and until the culture becomes ill-suited to new external conditions and priorities.

From the start of graduate school and on through the probationary period, new generations of academics are socialized both discreetly and directly by senior scholars to adapt to the dominant norms of the academy. These values include, among others, collegiality, allegiance to disciplines, respect for faculty autonomy, and the sanctity of academic freedom. But there are subtler norms that undercut efforts at diversity: hierarchies of disciplines; gender- or race-based stereotypes; single-minded devotion to professional pursuits; and the relative value assigned to various elements of faculty work (for example, teaching versus research), to various forms of research (pure versus applied, quantitative versus qualitative), and to various outlets for research (refereed versus non-refereed, print versus electronic).

People in powerful positions—professors, department chairs, faculty senate officers, deans, provosts, and presidents—are well-situated to articulate and perpetuate a university's prevalent culture. After all, these individuals, almost by definition,

have been well-served by the prevalent norms. Women and minorities, on the other hand, are both under-represented in leadership roles and lack a critical mass—circumstances that afford them little leverage to reduce or eliminate cultural barriers to change. To compound the problem, some members of the majority, for reasons of self-interest or self-defined notions of “quality,” are reluctant to grant newcomers a toehold. As a result, the status quo proves to be a formidable and intractable force.

So despite earning doctorates in ever-increasing numbers, many women and persons of color are eschewing academic careers altogether or exiting the academy prior to the tenure decision because both groups experience social isolation, a chilly environment, bias, and hostility. Their common concerns include their limited opportunities to participate in departmental and institutional decision-making; excessive and “token” committee assignments; infrequent occasions to assume leadership positions or achieve an institutional presence; research that's trivialized and discounted; lack of mentors; and little guidance about the academic workplace or the tenure process. As a result, women doctoral students are less likely than men to want to be faculty members, and persons of color are less likely than whites to desire an academic career. Not surprisingly, both groups are less satisfied in the academic workplace than white males. More women and minorities than white men leave the academy in the course of the typically seven-year probationary period.

Young scholars of all races, men and women alike, are not opposed to tenure *per se*. Most appreciate and seek the value of economic security and academic freedom, as well as the status, represented by a tenured appointment. On the other hand, junior faculty are more apt than senior faculty to regard tenure as “an outmoded concept.” Among untenured faculty, just under half viewed tenure as outdated in 1998, compared to about one-quarter of faculty with tenure. Most of the objections concern tenure in practice, not in principle. In fact, one recent study by Ann Austin (of Michigan State University) and R. Eugene Rice (of the American Association for Higher Education) reported that early-

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career and aspiring faculty were “close to unanimous in their belief that the current tenure process must change” because it does not contribute to an “environment that optimally facilitates [good] work.”

Once an almost routine rite of passage, tenure has become increasingly difficult to achieve at the foremost colleges and universities. The hurdles are higher and so are the stakes because, unlike the boom years of the late 1960s and early '70s when positions were plentiful even for faculty members who had been denied tenure, today a negative decision may signal the early death of an academic career. The sources of frustration and dissatisfaction with the tenure process (described by one candidate as “archery in the dark”), are well-documented: ambiguous standards; contradictory priorities and expectations; professional isolation; erratic feedback and inconsistent and incomplete performance reviews; ideological and methodological biases; and the multiple demands of teaching, research, and service. To make matters worse, the tenure timeline, almost cruelly, coincides with the pressures associated with starting a family and establishing financial stability. Small wonder, then, that so many probationary faculty members, most notably women and minorities, dislike the tenure process, or that a substantial subset leave the professoriate.

BEYOND THE FAILURE OF SELF-REFORM

After decades of scholarly research, hundreds of campus committee reports, and scores of disciplinary and professional commissions on faculty diversity, the needle has scarcely moved and the numbers have hardly changed. The history of the academy on the matter of faculty diversity strongly suggests that self-reform has not worked—and probably will not work.

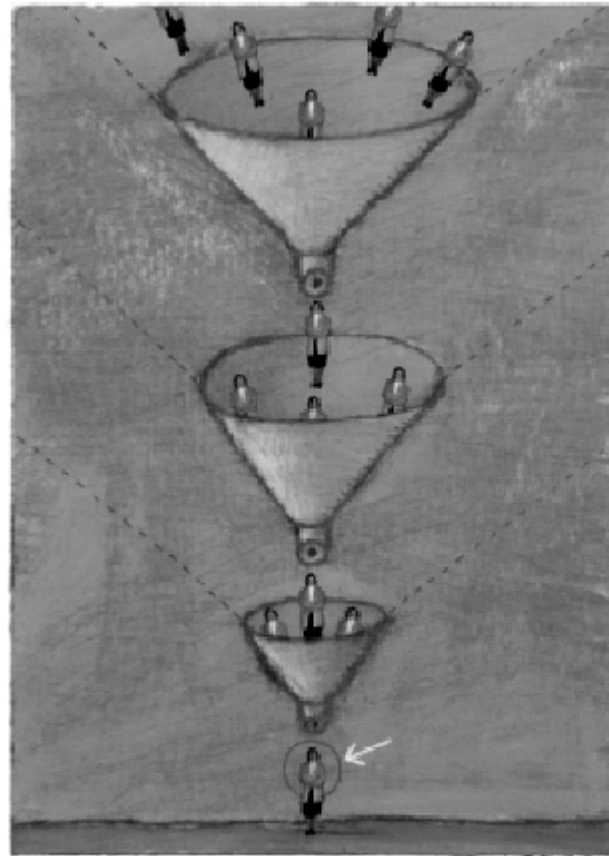
So what are the alternatives? We propose two, both intended to provide greater voice to newcomers to the profession, both intended to exert constructive pressure. The first concerns policy changes, the second concerns tangible results.

The basic document that undergirds academic employment, the “Statement on Tenure and Aca-

ademic Freedom” published by the American Association of University Professors, dates to 1940—a time when women and minorities were even less prevalent in the academy and when the respective roles of men and women in society were more narrowly defined. Times change, and so do beliefs, values, and priorities. As discussed earlier, newer faculty generally, and women and minorities more particularly, have different preferences based on different assumptions.

We do not contend that the abolition of tenure will somehow solve the problem of faculty diversity. The issue is less one of tenure as an *institution* and more one of tenure in its *implementation*. That is, do the policies and practices of yesteryear best serve contemporary faculty? The proposition might be posed as follows: If a representative random sample of faculty, *selected to mirror the diversity the academy presumably desires*, were to assemble as a “constitutional convention” to rethink tenure

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policy, would the document that emerged essentially paraphrase or materially depart from the 1940 AAUP statement? We do not know. We think, however, that the idea merits philanthropic support and deserves to be tested.

Based on research we and several colleagues have contributed to *The Questions of Tenure* (just published by Harvard University Press), we would anticipate popular support at such a convention for these propositions related to tenure policy in practice:

- The candidate's dossier, as well as the portfolio of peers, should be open to inspection by the candidate.
- Promotion and tenure committees should reflect a commitment to diversity.
- The scholarship of discovery (e.g., conventional research) should not outweigh the scholarship of teaching and service.
- Collaborative research should be valued as much as independent research.
- Interdisciplinary research should be prized as much as disciplinary research.
- Probationary periods should either be eliminated or tailored to the candidate's circumstances and discipline, and adaptable to family responsibilities.
- Tenure-track faculty should be provided clear expectations, unambiguous standards, and consistent counsel.

These operational changes are motivated by deeper suppositions—sometimes explicit, sometimes tacit—which challenge, or at the very least complicate, the “assumptive world” of orthodox tenure. The differences are not about right or wrong, or necessarily even about males and females, or minority and majority. But while there are many exceptions, academics at the dawn of their careers, as a rule, do think differently than colleagues in the twilight of their careers. The key differences in assumptions—again based on research we and colleagues have recently conducted—are these (see table).

“Who should make the rules? and “Who should

NEW VIEW	OLD VIEW
Transparency of the review process assures equity.	Secrecy assures quality.
Merit is a socially constructed, subjective concept.	Merit is an empirically determined, objective concept.
Cooperation is better than competition.	Competition improves performance.
Research should be organized around problems.	Research should be organized around disciplines.
Excellent teaching and advising should pay off.	Research is the coin of the realm.
Personal life matters, balance is important.	Separate work and family.
Faculty have a collective responsibility.	Faculty thrive on autonomy.

make the decisions?”—two pointed questions nominally about policy and practice—lie just below the surface. In order to make the academic environment more attractive to larger numbers of women and minorities (as well as to many white males), faculties will have to confront these questions and discuss the underlying assumptions.

The second proposal focuses not on conversation, but on visible actions and measurable results. In the next year, with anticipated support from two foundations, we plan to create and conduct a junior-faculty survey that gauges their satisfaction level across a spectrum of top-ranked research universities and liberal-arts colleges. The survey, to be conducted every three or four years, will assess professional factors that enable productive, successful, and satisfying careers.

The academy rests on the idea of empirical research and disclosure of results. We will apply these principles to a project with two aims: to make the academy a more equitable and appealing place for all junior faculty to work in; and to increase the recruitment, retention, and satisfaction of women and minority faculty more specifically.

Surveys on “best places to work” are routine in the corporate sector. In fact, Harvard recently engaged Great Places to Work Institute Inc. to do a study of employee satisfaction. The results of such surveys are published in periodicals like *Fortune*, *Working Mother*, and *American Lawyer*. In the academy, by contrast, a typical candidate for an

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Hampton University Wins NASA SMEX Mission; Historically Black Schools Compete for NASA Institute

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Hampton University's Aeronomy of Ice in the Mesosphere (AIM) mission has been selected for satellite flight as one of NASA's Small Explorer (SMEX) programs.

Hampton's mission was one of only two SMEX missions selected from among 43 proposals submitted by universities and research centers in the US. Hampton was selected based on the merits of its scientific, technical, management and cost plans.

The mission is dedicated to the study of noctilucent, or night shining, clouds (NLCs). NLCs form 50 miles above the Earth's surface usually in regions poleward of 55 degrees latitude during the summer. The main focus of AIM is to answer the question, "Why do NLCs form and vary?" The question has existed since 1885 when NLCs were first observed from the ground by the amateur astronomer Robert Leslie who reported his sighting in a "Letter to the Editor" to *Nature*.

Hampton University is the first historically Black college or university (HBCU) ever to be selected to be solely responsible for a major NASA satellite mission. The \$80-million mission includes hardware, software, flight operations, science team leadership, science data collection, reporting, data archival for use by the scientific community, and education and public outreach.

"To win a satellite mission like this doesn't happen very often," says James M. Russell, AIM principal investigator and Hampton University's co-director of the Center for Atmospheric Sciences. "The competition was fierce, and we are extremely pleased to be selected. This mission will enhance the research environment at HU and it will also provide the opportunity for significant HU student training in carrying out satellite missions."

Students will assist a team of experts in a variety of efforts including the design and implementation of the science data system, information retrieval from remote sensing instruments, instrument test data evaluation and instrument in-orbit performance trending studies. They will also assist with the operation of the AIM Project Data Center at Hampton University and implementing the public outreach program.

A project to build a multi-million dollar aerospace research center in the Hampton Roads region of Virginia could yield a major leadership and scientific role for two of Virginia's historically Black universities.

Historically Black Hampton and Norfolk State Universities, in association with Old Dominion University (ODU) in Norfolk, are working together to win NASA approval to lead the National Institute of Aerospace (NIA), to be established near the NASA Langley Research Center in Hampton.

Hampton and Old Dominion would manage the NIA with partner institutions that include the University of Illinois, the California Institute of Technology, the University of Michigan, Princeton University and Cornell University, according to news reports. Norfolk State also would be part of the consortium managing the NIA.

Last year, NASA launched a national search for university and nonprofit partners to run the high-profile venture at NASA Langley Research Center. Universities seeking the institute would benefit by attracting world-class researchers, faculty and top graduate students. It would enable the schools to expand their course offerings and establish cutting-edge aerospace research programs. The NIA could employ as many as 250 scientists, professional researchers, graduate students and faculty.

NASA is pledging up to \$25 million in annual financing for the NIA during its first five years, including \$1.5 million in 2002 to get the center in operation by January 2003. As the institute grows, according to officials, it would sustain itself with research grants and major industry contracts.

Bill Thomas, director of Hampton University's office of governmental relations, says becoming a lead institution to manage the NIA would enable the university to build its research and teaching capacities over time to the level of the nation's leading scientific and technology research institutions.

"It's an opportunity for Hampton to step up to the next level. It would give us the resources to break through the glass ceiling and eventually join the ranks of the country's top 100 research universities," Thomas says.

The Status of the African-American Physicist in the Department of Energy National Laboratories (cont'd)

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late these students to major in science when they enter college. However, a student of color might quickly come to the conclusion, seeing no people of color in scientific leadership roles, that there are in fact no opportunities to take advantage of and that science is not a viable career path. A student will see it is not a pipeline issue but more of a spigot issue. The lab won't open the spigot to hire a person of color.

The national laboratories need to be committed to programs to improve the distribution of scientific knowledge and high-level scientific and technical skills not only of professors and students from HBCUs, HSIs, or Tribal Colleges, but of all US students of science. In many instances the hire of a foreign national in a scientific position at a laboratory is justified on the basis of that foreign national possessing some "special" skill. The national user facilities managed by DOE should play a leading role in providing US citizens with the special skills

necessary to compete in the scientific workforce, for example a major investment in summer schools and workshops to train US undergraduate and graduate students in the science and technology embodied in major user facilities such as the national ignition facility, supercomputing, synchrotron light sources, neutron sources, and high energy physics and nuclear facilities. Why do we invest public money in these facilities if we are not going to invest an equal amount in training the next generation of US scientists and engineers in their use?

An example of best practices is the DOE office of Nuclear Engineering. Faced with declining enrollment of US citizens in nuclear engineering programs, the DOE Office of Nuclear Engineering, Science and Technology moved some of its budget resources to support visiting professorships at HBCUs. This was a quiet effort, and this office should not be confused with the Office of Science, but it provides an example of best practices and education programs appropriate to DOE's mission.



Representatives David Wu, Lynn Woolsey, Dr. Keith Jackson, and Representative Michael Honda. Hidden from view behind Dr. Jackson is Representative Eddie Bernice Johnson. Over the past few years NSBP along with the National Society of Hispanic Physicists and the American Physical Society have been surveying the recruiting, hiring, promotion and compensation practices of the DOE national labs. At the same time the General Accounting Office (GAO) at the behest of several members of Congress began its own similar study. On May 21st the GAO report was released and Representatives Eddie Bernice Johnson, Michael Honda, David Wu and Lynn Woolsey held a press conference discussing the results. NSBP was specifically asked to participate and Dr. Keith Jackson, President of NSBP, talked about the NSBP study and recommendations. According to Representative Johnson the next step is a formal hearing on the issue. Photo courtesy Keith Jackson and NSBP.

Finally, the Congress must exercise some oversight muscle here. The fact is that the contractors, e.g., University of California, University of Chicago, University of Tennessee, know that they are not about to lose the contract over diversity, and in fact these are sole source contracts which are not competitively bid in the first place. Given the non-competitiveness of these contracts it is very hypocritical of these institutions to talk about so-called preferences in hiring of African-Americans. The diversity of the core scientific staff and scientific activity is not a major component of the management contracts. Congress must make sure that diversity performance is strongly and explicitly put into the management contracts, and oversee that performance as only Congress can.

We are dealing with very small numbers that perhaps defy rigorous

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Faculty Diversity: Too Little For Too Long (cont'd)

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entry-level position as an instructor or assistant professor lacks important information about how junior faculty at a given institution assess the quality of work, the quality of life, the likelihood of success, and overall satisfaction they have found there. These data can affect decisions about whether to even apply for a vacancy; shape the questions candidates ask (for example, “Why have minority women fared so poorly here?” or “Why does the university lack a formal mentor program?”); and influence candidates to seek certain information (salaries or tenure-success rates by race and gender, policies that govern the promotion and tenure process, or the availability of stop-the-clock provisions to suspend the probationary period during pregnancies or paternal care).

Furthermore, dissemination of the survey results should foster a constructive competition among leading colleges and universities to earn reputations as “the best place for junior faculty (or women, or minorities) to work.” Institutions with a validated record as “great places to work” will enjoy a comparative advantage in faculty recruitment, and enlightened self-interest will impel the others to change. The most distinguished universities already compete intensely with each other for faculty members; the survey data have the potential to alter the basis of that competition so as to emphasize more the professional and personal considerations

vitaly important to new faculty hires.

Although we might all wish that substantial progress toward diversity could be accomplished entirely through discourse and goodwill, the history and demography of the academy suggest otherwise. The time has arrived to chart a different course toward faculty diversity, an essential goal that has eluded too many universities for too long.

The next decade offers an especially propitious opportunity to diversify the academy, because record numbers of new faculty members will be required to accommodate enrollment growth and wholesale retirements (more than one-third of full-time faculty are 55 or older). The University of California system alone needs to hire more ladder-rank faculty in the next 12 years than the 10 campuses currently employ. If the profession does not act now, faculty diversity may be stalled for another 30 years—which would not serve the interests of the academy or society at large.

*This article reprinted with permission from the authors and Harvard Magazine. Cathy A. Trower is senior research associate of, and Richard P. Chait is director of, the Project on Faculty Appointments at the Harvard Graduate School of Education (www.gse.harvard.edu/~hpfa). Chait, professor of higher education, is also editor of *The Questions of Tenure*, to which he and Trower contributed several chapters.*

We are grateful to David Lesh (www.davidlesh.com) for permission to use the illustrations in this article.

The Status of the African-American Physicist in the Department of Energy National Laboratories (cont'd)

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statistical analysis and control grouping. The DOE laboratories and the academic departments managed by the universities studied by NSBP know what they are doing, or not doing. NSBP calls for congressional action because we are frustrated by commissions, reports, diversity plans and high-level statements. It is time to move directly to things we know will yield results. The Congress ultimately has the oversight responsibility for the national laboratories and we request Congress to turn its attention to this national problem.

Editor's note: The full text of the General Accounting Office's report investigating the representation of minorities in DOE labs can be downloaded from the NSBP website at: www.nsbp.org. The NSBP website also has a link to streaming video of the Congressional press conference at which the GAO and NSBP reports were released.

Keith H. Jackson, a physicist at Lawrence Berkeley National Laboratory, is President of the National Society of Black Physicists. This article reprinted with permission from the May 2002 issue of APS News.

The Top Degree Producers of Minorities in the Physical Sciences (cont'd)

(Continued from page 2)

Hispanic Baccalaureate

Rank	Institution	State	No. of Grads	% of Class
1	Florida International Univ	Fla.	21	56.8
2	Texas A&M University	Texas	17	16.3
3	St. Mary's University	Texas	16	76.2
4	Univ. Texas at Austin	Texas	15	12.4
5	Univ. Calif.—San Diego	Calif.	12	8.5
5	Univ. Texas—Pan American	Texas	12	92.3
7	Mass. Inst. of Technology	Mass.	11	12.4
8	Univ. Calif.—Davis	Calif.	10	12.3
9	Cal. State Sacramento	Calif.	9	17.3
9	Univ. Calif.—Los Angeles	Calif.	9	8.8
9	Univ. Calif.—Santa Cruz	Calif.	9	10.6
9	Univ. Texas at El Paso	Texas	9	81.8
13	Calif. State Polytechnic Univ.—Pomona	Calif.	8	25.0
13	Cal. State Fullerton	Calif.	8	22.9
13	Univ. Calif.—Berkeley	Calif.	8	5.9
13	Univ. Illinois at Urbana-Champaign	Ill.	8	7.6
13	Univ. New Mexico—Main Campus	N.M.	8	22.2

African American Master's

Rank	Institution	State	No. of Grads	% of Class
1	Univ. of New Orleans	La.	7	30.4
2	Delaware State University	Del.	6	66.7
2	Clark Atlanta University	Ga.	6	100.0
2	Fisk University	Tenn.	6	100.0
5	Georgia Inst. of Tech.—Main Campus	Ga.	5	15.2
5	Johns Hopkins University	Md.	5	4.5
7	Howard University	D.C.	4	100.0
7	North Carolina Central Univ.	N.C.	4	100.0
7	Hampton University	Va.	4	80.0

Hispanic Master's

Rank	Institution	State	No. of Grads	% of Class
1	Univ. Calif.—Berkeley	Calif.	4	8.7
1	Ohio State Univ. (multiple campuses)	Ohio	4	7.8
3	Univ. Arizona—Tucson	Ariz.	3	3.9
3	Univ. Calif.—Los Angeles	Calif.	3	5.4
3	Univ. Illinois at Urbana-Champaign	Ill.	3	4.6
3	SUNY at Stony Brook	N.Y.	3	5.7
3	Univ. of Houston	Texas	3	18.8
3	Univ. Texas at Austin	Texas	3	7.0

The lack of tables for American Indian Master's and Doctorate physical science degrees indicates that no such degrees were reported in the NCES "reporting universe" for 2000-01.

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*(Continued from page 16)***African American Doctorate**

Rank	Institution	State	No. of Grads	% of Class
1	Louisiana State Univ. and A&M and Laws Ctr.	La.	10	19.2
2	Howard University	D.C.	5	62.5
2	Hampton University	Va.	5	83.3
4	Alabama A&M Univ.	Ala.	3	50.0
4	Georgia Inst. Of Tech.—Main Campus	Ga.	3	11.5
4	Univ. North Carolina at Chapel Hill	N.C.	3	6.7

Hispanic Doctorate

Rank	Institution	State	No. of Grads	% of Class
1	Univ. Connecticut (multiple campuses)	Conn.	8	33.3
2	Univ. Arizona—Tucson	Ariz.	4	7.8
2	Univ. Calif.—Berkeley	Calif.	4	3.8
2	Univ. Texas at Austin	Texas	4	5.2
5	U. Calif.—Santa Barbara	Calif.	3	8.1
5	Univ. Calif.—Santa Cruz	Calif.	3	9.1
5	University of Florida	Fla.	3	5.8
5	Mass. Inst. Technology	Mass.	3	3.7
5	Univ. Washington—Seattle	Wash.	3	4.5
5	Purdue University	Ind.	3	5.0

Diversifying Our Profession: The Role of Astronomy REU Programs (cont'd)

(Continued from page 1)

In particular, we talk about the program underway at the University of Wisconsin—Madison, which hosted its first astronomy and physics REU students this past summer, and then discuss the efforts that are underway nation-wide.

THE WISCONSIN EFFORT

The University of Wisconsin-Madison is the site of a new astronomy summer REU site (see <http://wisp.physics.wisc.edu/reu>). Led by Prof. Linda Sparke, Chair of the Department of Astronomy, astrophysicists in both the Astronomy and Physics departments have committed to advising approximately eight REU students each summer. In Madison, students experience the world-class facilities that the two departments have to offer, including access to data from several space-based observatories, the WIYN 3.5m telescope at Kitt Peak, and AMANDA/IceCube, a novel neutrino telescope beneath the Antarctic ice at the South Pole.

The summer experience includes a directed research project, lectures on the cutting-edge problems of astrophysics, several field trips, preparation and advice for applying to astronomy graduate school, and one home-cooked dinner by the project director (me).

One of the priorities of our program is to increase the participation of undergraduates from minority groups. This initiative is strongly supported by the university administration, which helps to coordinate summer programs in several different fields (see <http://info.gradsch.wisc.edu/mp/sumprog.html>). Every summer there are over a hundred summer research students working on projects ranging from liberal arts to engineering to microbiology, and now astrophysics. All of these students are housed together in a lakeshore dormitory. As a result, they frequently end up learning about research in other disciplines. These other programs

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Diversifying Our Profession: The Role of Astronomy REU Programs (cont'd)

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have been remarkably successful in increasing the diversity of researchers in their disciplines; several of them are available only for students from underrepresented minorities. Moreover, a student who participates in a Wisconsin research program the summer before their senior year and then attends graduate school at UW-Madison is guaranteed the financial support of a year-long research assistantship. This is at University, not department, expense.

The hard part is finding a diverse cohort of students. REU programs can turn students on to astronomy, but it requires undergraduates who have already taken a major leap: the decision to major in physics or astronomy. (An engineering or computer science major will suffice for some projects.) A second important factor is that many of the smaller colleges with significant numbers of minority students—particularly Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs) and Tribal Colleges—do not offer astronomy courses. This makes students far less likely to consider doing summer research in astronomy, even if their physics background is sound. A third factor is that students who do express interest in summer research are heavily recruited elsewhere, particularly by industry, which can generally offer much higher summer stipends.

What is necessary is faculty and staff who are energized to seek out these students, to promote astronomy, answer questions, and develop the connections and contacts so that faculty at smaller schools can encourage their students to get involved in summer research. At Wisconsin, we have benefited from the efforts of Prof. Eric Wilcots and Dr. Keivan Stassun, who both have made the extra efforts to get the word out about the astronomy REU program while attending meetings of the National Society of Black Physicists and the National Society of Hispanic Physicists.

These efforts paid off in the first summer. Three of the nine participants in Wisconsin's first

REU were minorities, and all three gave their summer experience rave reviews.

"It fortified my interest in astronomy," said Kurt Soto, a Hispanic student from Ventura Community College in southern California, who was recruited by Keivan Stassun. After completing the program, he transferred to UC Berkeley, where he is declaring a major in astrophysics.

"This REU program has been a great learning experience. Now I know that astronomy is something I want to do for graduate school," wrote Fana Mulu from Alabama A&M University (an HBCU that recently added a space science concentration to their physics program). When asked for the high-

light of the program, Patricia Mutunga of Bethune-Cookman College said, "The whole program, basically!"

As much as these students benefited from their summer experience, the overall REU program benefited even more from their drive and enthusiasm. One of the central goals of the REU program is to tap into the energy, intelligence, and diversity of experience in students like these, and direct it into astronomy.

"One of the priorities of our program is to increase the participation of undergraduates from minority groups."

AROUND THE COUNTRY

There are 17 REU programs in Astronomy (see <http://www.nsf.gov/home/crssprgm/reu/start.htm>), in addition to several Physics REU sites that include astrophysical projects. Prompted by Dr. Kathy Eastwood, the Astronomy NSF Program Director for Education and Special Programs, the directors of the NSF Astronomy REU programs assembled in Bloomington, Indiana, this past summer to discuss several issues in common to all the programs. Chief among these was the goal of increasing minority participation in REU programs.

Although many minority students have gone through astronomy REU programs, it was frequently at the student's initiative. Indeed, sometimes the program didn't even know that they were accepting a minority student until they arrived for

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the summer. While it is encouraging that minority students can and do enter REU programs without special efforts, clearly more can be done to actively recruit these students.

Previous attempts to recruit students have met with mixed success. While the Wisconsin effort to recruit students through the National Society of Black Physicists and a California community college proved successful, another director who spoke about astronomy REU programs at three HBCUs during the school year reported a disappointingly small number of applicants. This was despite the fact that he was warmly welcomed and encouraged by his hosts. But despite this disappointment, the REU directors agreed that it was important to develop the personal contacts between REU programs and faculty members at minority-serving institutions. These efforts are underway.

We are clearly still learning about the most effective ways to identify and encourage students to consider trying an astronomy REU, but one of the most important results of the Bloomington meeting is that REU directors are working together, sharing experiences and resources, and taking turns attending minority Internship Fairs and meetings of national organizations for minorities in science. For example, Dr. Christine Jones (Smithsonian Astrophysical Observatory REU) and Dr. Bob Phillips (MIT-Haystack Observatory REU) recently reported back from an Excellence Through Diversity Internship Fair sponsored by the New England Board of Higher Education Science Network:

“The students we spoke to all seemed delightfully motivated and very receptive to astronomy internship opportunities. When we pointed out that we did not pay as well as industry internships, a number of students reacted in surprise that these were paid astronomy research positions. This reaction was the biggest anomaly that I noted all day, and shows the value of face-to-face contact in recruiting and the value of engaging the students with direct contact. We communicated information that students, bombarded with brochures and

bulletin boards of listings, might have missed or tossed into recycling.”

Keivan Stassun made a similar observation after a recruiting trip to the meeting of the National Society of Hispanic Physicists in Texas. “While many of the students I spoke to knew about the existence of REU programs, they often had no idea that these positions pay, and pretty well at that!”

Although finding and recruiting minority students for astronomy REU programs may be challenging, we need only look to the history of the REU program for encouragement. The NSF-sponsored REU program has played a significant role in increasing the participation of women and small-college students in astronomy. By giving students research experience, they not only gain the motivation to succeed, but they become much more attractive candidates for graduate school. We look forward to the day when the REU programs have helped the diversity in the astronomy population resemble the diversity in the country as a whole.



Students from the first astrophysics REU program at the University of Wisconsin—Madison. From left to right: Larry Isenhower (Abilene Christian University), Bob Benjamin (program director), Travis Laurance (Middle Tennessee State), Ben Willett (University of Wisconsin), Fana Mulu (Alabama A&M University), Genevieve de Messieres (Swarthmore College), Karen Bland (James Madison University), Patricia Mutunga (Bethune-Cookman College), Ben Ziemer (University of Wisconsin), Kurt Soto (Ventura Community College). Photo courtesy Bob Benjamin.

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forum for discussion of issues relevant to the representation of
minorities in the astronomy profession.*