

SPECTRUM



A report on underrepresented minorities in astronomy

Introducing the CSMA Website: Diversity Resources for the Astronomy Community

by Keivan Guadalupe Stassun

The CSMA is pleased to announce the launch of its new website as a resource for AAS members. The purpose of the website is to provide AAS members with online and other resources related to issues of diversity, and to give mem-

bers ready access to information about the CSMA and its activities.

AAS members are invited to use the CSMA website to locate resources and to become involved in

(Continued on page 2)

INSIDE THIS ISSUE:

Introducing the CSMA Website	1
CSMA Holds Special Session at January 2002 AAS Meeting	1
CSMA: Looking Back, Looking Ahead	3
<i>Feature article:</i> How to Diversify the Faculty	4
Numbers and Trends: Underrepresented Minorities in Astronomy	6
Strategies for Creating an Inclusive Outreach Program	7
How to Diversify the Faculty: Resources from the CSMA	10
A Multicultural Approach to Astronomy Teaching	11

American Astronomical Society
Committee on the Status of Minorities in Astronomy

The Committee on the Status of Minorities in Astronomy (CSMA) is a standing committee of the American Astronomical Society. The mission of the CSMA is to enhance the participation of underrepresented minorities in astronomy at all levels of experience. Learn more about the CSMA, who we are, what we do, and how to get involved.

minority resources
minority issues
minority AAS members
minority speakers list
meet CSMA members
CSMA activities
get involved

SPECTRUM newsletter online

representation diversity

MINORITIES

The CSMA website is located at www.astro.wisc.edu/csma

Everyone's Invited: Special Session at January 2002 AAS Meeting in Washington

by Keivan Guadalupe Stassun

The CSMA will host a special session at the 199th Meeting of the AAS in Washington, DC. The session will be held at 10:30 a.m. on Tuesday, January 8. All AAS members in attendance are invited and encouraged to attend.

The primary purpose of this session is to enhance the visibility of, and participation in, the CSMA by informing the Society's members about the CSMA's goals and activities. This will also serve as an oppor-

(Continued on page 2)

HIGHLIGHTS:

- Learn about the CSMA, its mission, its members, its activities.
- Read about recommendations for enhancing the diversity of astronomy faculty at colleges and universities.
- Find statistics on the astronomy PhD production rate among underrepresented minorities.
- Learn about teaching approaches incorporating material that is culturally relevant to minorities.

Introducing the CSMA Website (cont'd)

(Continued from page 1)

the CSMA's activities and initiatives.

The website currently features seven key areas:

1. **Minority resources:** Links to programs, organizations, funding opportunities, reports, and other online resources of interest to minority AAS members. Other AAS members may also find this list of value for learning about what others are doing to address issues of minority representation in science, and for learning about opportunities for minorities.
2. **Minority Issues:** A central part of the CSMA's mission is to help raise awareness of, and to help AAS members become more active in, issues of equity, diversity, and representation in the sciences. In this section members will find background information on these issues (such as affirmative action), relevant links, and any recommended actions from the CSMA.
3. **Minority AAS members:** A goal of the CSMA is to increase the visibility of minorities already in the astronomy profession. The CSMA maintains a voluntary listing of AAS members who have identified themselves as members of underrepresented ethnic minority groups. Looking to hire a new postdoc or faculty member? This is a good place to look!
4. **Minority Speakers List:** To facilitate astronomy departments, groups, or programs that wish to increase the diversity of their visiting speakers, the CSMA has compiled a voluntary list of minority AAS members and topics on which they are available to give talks.
5. **Meet the CSMA:** Information about the CSMA, its history, members, mission, goals.
6. **CSMA activities:** Info about CSMA activities and initiatives, as well as about upcoming CSMA "special sessions" at AAS meetings.
7. **SPECTRUM:** Access to this newsletter online. AAS members can subscribe to SPECTRUM to receive it in hardcopy semi-annually.
8. **Get Involved:** AAS members interested in being a part of the CSMA's efforts will find information here on various ways to participate.

CSMA Special Session (cont'd)

(Continued from page 1)

tunity to outline the CSMA's short- and long-term agenda, and to solicit ideas from the Society's members on (a) relevant issues, (b) effective methods and strategies for achieving the CSMA's mission, and (c) effective methods and strategies for engaging the broader AAS membership.

This special session will be an important opportunity for members to learn about and contribute to the CSMA. Everyone's invited.

The objectives of the session are to:

- Introduce the CSMA, its charge, current members, and current and planned activities;
- Present basic information on the current representation of under-represented minorities at all levels in astronomy;
- Present the CSMA website, highlighting its key areas, and solicit contributions and volunteers;

- Provide an opportunity for open exchange of ideas, questions, and concerns

The agenda includes:

1. Introduction of CSMA charge and members
2. Brief statement from AAS Council
3. Presentation of statistics on minority representation in astronomy
4. Presentation and overview of CSMA website and features
5. Discussion and "open mic" time for feedback, questions, and concerns from AAS members

The CSMA plans to make special sessions such as this one a regular installment at AAS meetings. Over time, the CSMA hopes to use these forums as a means of disseminating information, offering informative and thought-provoking guest presentations, recognizing the accomplishments of minorities within the Society, and giving voice to the concerns of minority astronomers.

CSMA: Looking Back, Looking Ahead

by Keivan Guadalupe Stassun

Committee background

The Committee on the Status of Minorities in Astronomy (CSMA) was founded in 1997 by action of the AAS Council. The Committee's formal mission reads:

To enhance the participation of underrepresented minorities in Astronomy and Astrophysics at all levels of experience.

To this end, the CSMA established an initial set of goals:

- Provide an overview of the status of minorities in astronomy, including identifying areas of concerns and opportunities.
- Advise the AAS about these and formulate policies for the society to consider.
- Establish and maintain a statistical base on the participation of minorities in astronomy over time.
- Act as a facilitator in the communication between minorities themselves, and the programs and jobs which might interest them. This includes putting students in contact with more advanced students or professionals, fostering "mentoring," and "networking" in aid of moving people into programs or jobs.
- Act as central contact point to other societies or institutions with useful relation to the mission.

Under the leadership of Committee Chair Gibor Basri (UC Berkeley), the CSMA conducted a survey of the AAS membership to determine the percentage of minorities in the field and to establish a statistical baseline against which future statistical measures could be compared. The results of that survey are currently being examined.

Meet the members

The current members of the CSMA are, well, a diverse bunch. The Committee is representative with respect to ethnicity, gender, and geography. Allow us to introduce ourselves!

Charles Woodward, Chair

Charles "Chick" Woodward was appointed Chair of the CSMA at the June 2001 meeting. Chick is presently an assistant professor at the University of Minnesota.



Gibor Basri

Gibor Basri served as Chair of the CSMA for the period 1997-2001. He is a professor at the University of California at Berkeley.

(Continued on page 13)

SPECTRUM

Edited by
Keivan G. Stassun
University of Wisconsin—Madison
keivan@astro.wisc.edu

Published by
The American Astronomical Society
2000 Florida Avenue, NW, Suite 400
Washington, DC 20009
© 2001 AAS
All rights reserved.

SPECTRUM is produced at the
University of Wisconsin—Madison
Astronomy Department
475 North Charter Street
Madison, WI 53706

Copyrights for contributed or reproduced material may rest with the author. These articles reflect the opinions of the authors, which are not necessarily those of the editor, UW—Madison, or the AAS. SPECTRUM is published for the personal use of AAS members.

The SPECTRUM newsletter is distributed to AAS members at the January and June meetings and sent to home institutions of subscribers during the week of the meeting. Contributed articles are encouraged.

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: How to Diversify the Faculty

by Daryl G. Smith — reprinted from *American Association of University Professors newsletter*

Editor's note—The recommendations of this article suggest strategies that can be adopted to enhance diversity among astronomy faculty. On p. 10 we present a follow-up article, where we discuss how the CSMA is responding, and present resources that AAS members may find useful for responding to these "action items" as well.

We've all heard the refrain that most colleges and universities fail to diversify their faculties because so few scholars of color earn doctorates. A parallel claim is that members of underrepresented minority groups who seek academic posts are in such great demand that they can pick and choose among multiple offers.

Many people also believe that the academy's commitment to diversity, combined with a limited supply of minority-group scholars, has created a bidding war that favors faculty of color over white men. Non-elite institutions that accept this argument think they are not rich, well-located, or prestigious enough to attract the few candidates who are in such high demand. "Although a concerted effort has been made," explains one prestigious research institution in a typical complaint, "small candidate pools and intense competition between top universities has made growth in [minority] faculty numbers extremely difficult."

And yet many faculty of color do not see themselves as the beneficiaries of bidding wars. On the contrary, they say, minority scholars have trouble landing tenure-track jobs; like their white colleagues, faculty of color suffer not only from the poor academic labor market, but also from the traditional hiring practices of most institutions.

It should be clear by now that a schizoid condition characterizes the current discourse about diversity. Each side supports its position with competing anecdotes. To supply some empirical evidence, a research team at the Claremont Graduate University decided in 1996 to study how the job market treats potential faculty members—especially the minority-group scholars among them. I was a member of that team.

We wanted the study to include the most desirable job candidates, so we invited all the recipients of the prestigious Ford, Mellon, and Spencer Fellowships who had completed their Ph.D.'s from

1989 to 1995 to participate. We interviewed 299 of the 393 scholars, or 78 percent. African Americans accounted for 26 percent of the sample, Asian Pacific Islanders for 4 percent, European Americans for 35 percent, Latinos for 32 percent, and Native Americans for 3 percent. This sample, half of whom were women, included scientists from underrepresented minority groups.

It was an elite cohort. Ninety-three percent of the participants had doctorates from research institutions, mainly from the most prestigious universities; a third of the sample had degrees from Ivy League schools. Seventy percent of the sample held faculty appointments, 17% were in postdoctoral positions, 5% worked for corporations, and 6% were in other types of jobs.

Myths

The prevailing ideas about diversifying the faculty involve myths that impede the search process. Consequently, the first strategy for recruiting and retaining faculty of color must be to confront and debunk the myths. Here are the most prevalent ones that emerged from our study.

Myth. The scarcity of scholars of color in the pipeline means that many institutions must compete against one another to seek out and hire minority candidates.

Reality. In fact, only 11 percent of the scholars of color in our sample were recruited for a faculty position and encouraged to apply. If the candidates had a choice—and many did not—it was usually between two or three institutions, but not the two or three of their choosing. And even among this select group, few had institutions bid for them. If they got to negotiate, it was usually over a computer or a



Daryl Smith is professor of education and psychology at the Claremont Graduate University.

(Continued on page 5)

Feature Article: How to Diversify the Faculty (cont'd)

(Continued from page 4)

modest research stipend.

One participant, a Latina, commented, “I would say that I find it a little surprising that I do not regularly get phone calls with regard to recruitment. We are so few, it’s amazing that most universities will say [they] can’t find anybody, yet persons like myself are not recruited. I think I should be getting phone calls, and I don’t get phone calls.”

An African American woman reported on efforts at her institution to hire persons of color: “Out of eleven faculty hires, there was one person of color.... One of the excuses is that black people won’t come here.... I have been lucky personally, but the notion that it is easy to get a job if you are a person of color is not true.”

This research does not necessarily negate the “pipeline” argument. If all U.S. institutions of higher education were aggressively diversifying their faculties, there would be too few scholars of color in the pipeline. But it seems that most campuses substitute talk about diversity and “business as usual” for effective approaches to change.

Myth. The scarcity of faculty of color in the sciences means that those who are available are in high demand.

Reality. Most of the scientists in our sample, all of whom were persons of color, were pursuing postdoctoral study. Only 16 percent held faculty positions. None of those doing postdoctoral work had been sought out by colleges or universities. Indeed, many worried about finding permanent jobs; others had already left academe for industry because of their inability to find faculty positions.

One Chicano astrophysicist spent four years in postdoctoral positions and finally, after unsuccessful academic searches, took a job in industry. A Latino geophysicist from a prestigious East Coast institution went into industry after getting no academic offers.

Myth. Faculty of color are leaving academe altogether for more lucrative positions in govern-

ment and industry.

Reality. Most of the scientists in our sample who took non-academic posts discussed the need to establish a career before age forty; they did not want to continue in multiple post-docs. Others spoke of inhumane search processes that left them feeling unappreciated. Still others noted the difficult job market. Thus the decision to leave academe often reflected problems in academia, not irresistible temptations outside.

Myth. The kind of scholars represented in this study, both because of their competitive positioning in the market and their elite education, consider only prestigious institutions in their job searches, making it virtually impossible for other institutions to recruit them.

Reality. The participants in our study expressed interest in different positions, regions, and institutional types. Limited mobility explained some but not all of these preferences. The candidates based their choices on the environment in which

they wished to live, a desire to teach a diverse student body, an interest in institutions with missions related to their professional goals, or other factors. Some participants regretted not having been recruited by a regional institution with which they had some affinity.

Myth. Wealthy and prestigious institutions draw established faculty of color away from non-elite institutions with fewer resources, creating a revolving door that limits progress for any single institution in diversifying its faculty.

Reality. Outside offers do lure some faculty members away from their institutions. But most of our participants indicated an unwillingness to move frequently solely because of monetary incentives. Moving oneself, let alone a family, is not easy. The participants who had moved did so because of dual career choices, questions of fit, or unresolved problems with their institutions, such as having to deal with multiple demands as a result of being one of just a few faculty of color in a department or an institution.

“None of the [persons of color] doing postdoctoral work had been sought out by colleges and universities.”

(Continued on page 8)

Numbers and Trends: Under-represented Minorities in Astronomy

by Keivan Guadalupe Stassun

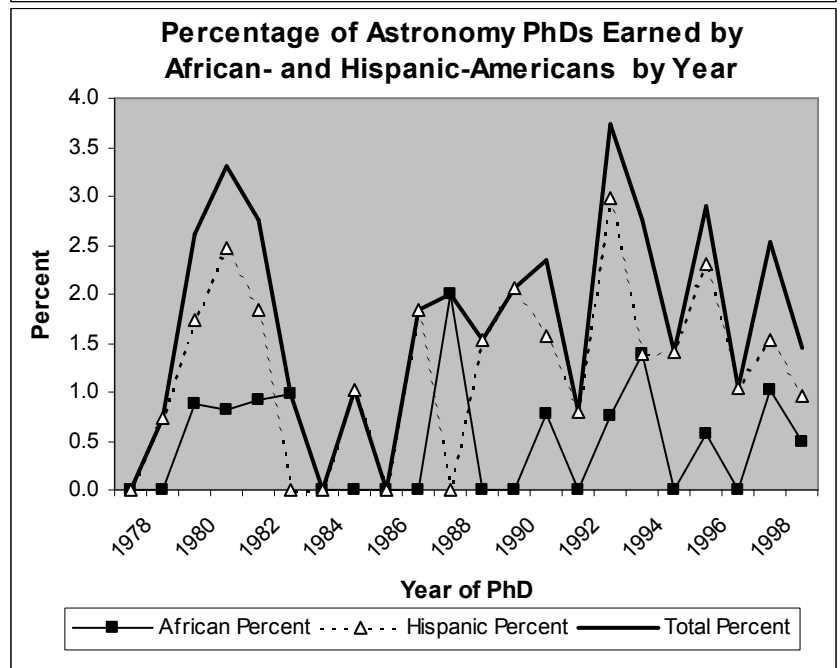
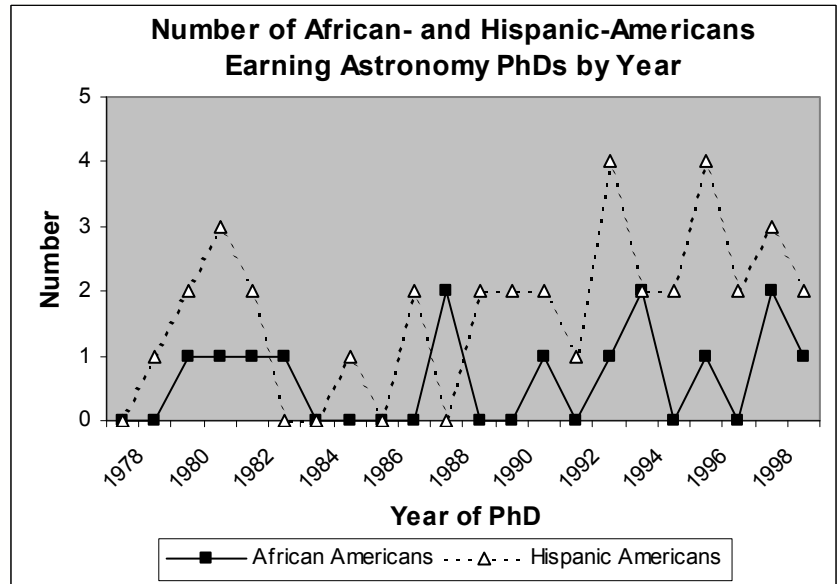
An important starting point for any discussion of minority representation issues is a statistical comparison of minorities in the profession relative to minorities in the general population.

According to the recent 2000 US Census, African- and Hispanic-Americans together comprise approximately 24% of the population. And Hispanics (especially Mexican-Americans) are the single fastest growing ethnic group in the country.

By comparison, and in stark contrast, these ethnic groups comprise only 8% of the science and engineering labor force in the U.S., 6% of science and engineering PhDs, and less than 4% of tenure-track faculty positions in science and engineering fields (NSF 99-338).

In astronomy specifically, the numbers are even more grim. Statistics compiled by the American Institute of Physics (AIP) over the past 25 years show that, on average, African- and Hispanic-Americans together account for approximately 1.5% of the Astronomy PhDs (the AIP numbers include only US citizens and permanent residents). In any given year, fluctuations can cause this percentage to range from a high of about 3.5% to a low of 0%. In a typical year, Hispanics earn roughly twice as many astronomy PhDs as do African-Americans, even though these groups are roughly equally represented in the general population. These numbers have held steady since the mid-1970s.

As a specific example of these trends, in 1998 (the most recent year for which AIP statistics are available), one PhD went to an African-American, two went to Hispanics, a total of 1.4% of the 208 astronomy PhDs earned that year. Ten years previous, no African-Americans earned astronomy



PhDs, while 2 went to Hispanics, a total of 1.5% of the astronomy PhDs granted in the US that year.

Interestingly, the percentage of African- and Hispanic-Americans earning 4-year college degrees increased during this time.

A long-term function of the Committee on the Status of Minorities in Astronomy will be to further explore these statistics and to make appropriate recommendations for their remedy.

Strategies for Creating an Inclusive Outreach Program

by Rolf Danner — adapted from presentation at June 2001 AAS Meeting

Lessons learned

Early in the strategic planning for our educational outreach effort for the Navigator program I was asked who we were trying to reach. I naively answered, "Everybody!"

When I had a moment to reflect on my bold assertion, I started to wonder what it might take to "Invite All Americans", a line that quickly became the motto for our public engagement plan. Once I started to think about this, I realized, and am still realizing, what an enormous challenge is hidden in these three simple words.

The core of this challenge lies in the simple fact that most of us (scientists or not) tend to talk and interact with others who have similar educational, ethnic, economic, gender, backgrounds. Similarities attract and make it easier for us to connect. This is a great tool for talking to our colleagues, families, friends and neighbors. However, it is also the reason why it is so hard to be universally understood.

This is because the majority of our fellow humans have different backgrounds from us, based on different experiences resulting in a different world view. If this is a bit theoretical, just try watching one of the special interest cable shows that you are NOT interested in: golf, cooking, stamp collecting, take your pick. Or talk to a female colleague, if you are male, or a gay friend, if you are heterosexual.

While I had a theoretical concept of this in the beginning, I was still reluctant to accept the implications. Wasn't I someone who spoke clearly and with conviction? Didn't what mattered to me matter to everyone? The answer of course is "it depends".

Eventually, I put myself in situations talking in depth and sharing experiences with others that had different views than I. In this process, my understanding has been greatly influenced by the members of our diverse team, and interactions with people from African-American, Hispanic, Native American and Native Hawaiian groups. At length I started to understand the obvious. Our audience knew what they were interested in, and in most cases they were ready to share their views.

So my simple advice is to listen to your audi-

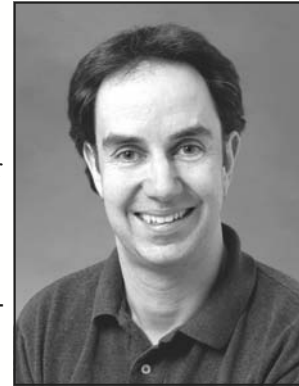
ence. However, what we need to realize is that true listening is very difficult, because we need to set aside, even if it is only for a moment, what we think we know about the world. I invite you to try this to-

day for yourself. Talk to two people outside your own comfort zone,

whether it is the person in the DMV line, the assistant in the department store, or the traveler in the plane seat next to you. Ask them a question that you think you know the answer to, take the time to listen to their explanation without "correcting" it right away, and see what happens. You might be surprised.

Strategies

- Adopt inclusiveness and equity as core values
- Take a long-term approach
- Build trust
 - Go where your audiences are (groups may not use internet, may not watch PBS)
 - Spend time (this is a sign of respect; listen actively and follow through with requests)
 - Bring your high-ranking managers and officials (this will benefit both sides)
- Seek advice from professional organizations
 - American Indian Science and Engineering Society
 - National Society of Black Physicists
 - National Society of Hispanic Physicists
 - NASA Office of Space Science Support Network (spacescience.nasa.gov/education)
- Measure EPO by the same quality standards as other mission or research elements
 - Include evaluation and quality control
 - Take a scholarly approach: Include peer review and publication
- Acknowledge the challenges: "This isn't rocket science — it's a lot harder!"



Rolf Danner is Outreach Scientist for the Navigator program and a member of GLBTQastro.

*"'Invite All Americans' ...
what an enormous
challenge is hidden in
these three simple words."*

Feature Article: How to Diversify the Faculty (cont'd)

(Continued from page 5)

Myth. Campuses focus so heavily on diversifying the faculty that heterosexual white men have no chance.

Reality. Our sample included white men and women, which allowed us to address this argument. Most of the European American men in our study, like the others in the sample, were highly successful. Those who had expertise related to diversity enjoyed a special advantage on the job market.

The white faculty members in the study had an important perspective on the hiring process. Instead of reporting that they had been hurt by affirmative action, they suggested that efforts to diversify the faculty at their institutions could have gone further. One white faculty member at an elite liberal arts college reflected, "When I look at whom we hired, of the twelve jobs available, we hired only one minority and we got special funding for her."

If institutions really want to hire and retain faculty of color, they must move beyond merely debunking the myths. They must commit themselves to diversity and transform their search procedures. Approaching the search process in the usual ways simply will not work. In fact, our research and that of others suggest that how institutions handle hiring decisions is more important than the pipeline issue.

To successfully recruit and retain faculty of color, institutions and departments need to consider how diversity will affect their institutions. Why is it important to the department or to the institution? Institutions that have recruiting plans incorporating diversity are much more likely to succeed. But all too often, search committees proceed according to tradition, looking for qualities associated with focused, if not narrow, disciplinary concerns that exclude new scholarship or persons with different academic backgrounds.

Colleges and universities should treat diversity in the same way they do technology. Many campuses have started to seek radically new kinds of

qualifications and experience in prospective faculty because of the increasing importance of technology in many disciplines. Technology's growing prominence has also prompted a rise in interest in candidates with work experience in industry.

The parallel to diversity is apt in that a diverse faculty can bring new kinds of scholarship to an institution, educate students on issues of growing importance to society, and offer links to communities not often connected to our campuses.

Strategies and Issues

As they begin to explore what diversity can contribute to higher education, institutions might consider the following strategies and issues.

Mission. How is the mission of the institution related to and served by diversity? Many institutions have committed themselves to educating their students to function and thrive in a pluralistic and global society, in much the same way that they have dedicated themselves to educating students for technology. This commitment positions diversity at the center of what is taught, how it is taught, and to whom students are exposed.

Many campuses point to the changing demographics of the student body as the rationale for diversifying the faculty. An even more compelling reason to rethink faculty searches, however, rests in the need to educate all students for diversity. Qualities to look for in candidates include teaching experience with diverse populations and scholarly expertise related to diversity in a discipline or area.

Scholarship. The emerging evidence shows that faculty of color often introduce new scholarship that engages issues of diversity. As more campuses add diversity requirements to the curriculum, the demand for faculty who have expertise in non-traditional areas will increase.

Teaching. The rise in diversity among students on U.S. campuses demands that job descriptions stress experience in teaching different kinds of students as well as skill in developing classroom envi-

"If institutions really want to hire and retain faculty of color, they must ... commit themselves to diversity and transform their search procedures."

(Continued on page 9)

Feature Article: How to Diversify the Faculty (cont'd)

(Continued from page 8)

ronments that facilitate learning for all students. Looking for these qualities is especially important in the sciences, where the content of the curriculum may or may not change because of issues of race and gender, but where helping students of diverse backgrounds to succeed is a widespread goal. Many faculty of color bring the expertise needed to accomplish that goal.

Institutional viability. Increasingly, the viability of our campuses will rest on whether they reflect the diversity of society. Institutions that desire credibility among communities on and off the campus need to look diverse at all levels. Student diversity and success are important but not sufficient if the rest of the campus remains homogeneous.

Active searches. Institutions need to abandon passivity in their searches if they want to diversify their faculties. The standard practice of issuing highly specialized job descriptions, advertising, seeking written recommendations, and sending form letters does not work well for this purpose.

The most successful approaches involve personal contact with the candidate after the search committee or administrator has become familiar with the candidate's areas of interest and fit for the position. In addition, faculty and administrators from underrepresented groups can serve as important resources for searches.

Diverse search committees. The search process, in which faculty committees look for multiple talents and potential fit with an institution, is by necessity complex and subjective. Having a diverse search committee helps in gaining access to and evaluating candidates of different backgrounds; it also makes it less likely that the committee will overlook talented individuals with non-traditional kinds of experience.

Personal support. Our study found that the presence of a "champion" was one of the most important factors in determining whether a candidate of color was hired. The champion was someone at

the hiring institution, on the search committee, or from the candidate's graduate institution who knew or got to know the candidate and served as a supporter. The champion facilitated communication, advised the candidate about the process, and made sure the committee had the opportunity to fully assess the candidate's talent.

Elitism. Relying on institutional prestige as a surrogate for quality undervalues many talented individuals. Search committees serious about diversity need to consider real indicators of excellence rather than surrogate ones, such as the institution from which the candidate earned a degree.

The tight academic labor market allows search committees in teaching institutions to ratchet up requirements to match those of elite research institutions. A search committee in the sciences, for example, may be impressed by a candidate who has had three or four postdoctoral research assignments to the point of ignoring whether the candidate's interests and background fit the needs of the campus. A committee at a teaching college would do better to consider the mission of the institution and the candidate's success in teaching the kinds of students it attracts.

"Faculty of color in our sample had little respect for colleges and universities that sent out form letters 'urging minorities or women to apply' ..."

Affirmative action. Our study indicated that scholars of color support affirmative action, but with some ambivalence. People want to be hired for their scholarship and abilities, not solely for their ethnicity. The faculty of color in our sample had little respect for colleges or universities that sent out form letters urging minorities or women to apply instead of making personal efforts to contact them. They believe this practice shows a lack of genuine interest in the candidates themselves. Many also spoke eloquently about their fear that the current backlash against affirmative action would reduce incentives to diversify the academy.

Dual-career issues. The challenge of dual-career relationships is an important theme in academic hiring today. Our study found that helping candidates with dual-career concerns influenced the successful outcome of searches. Because the pool

(Continued on page 10)

How To Diversify the Faculty: Resources from the CSMA

by Keivan Guadalupe Stassun

The article "How to Diversify the Faculty" by Prof. Daryl Smith (page 4, this issue) presents a critical review of faculty search processes and gives recommendations for strategies that search committees might adopt for enhancing the diversity of university science faculty.

The CSMA is working to provide resources that astronomy departments may find useful for responding to these recommendations.

As pointed out by Prof. Smith, faculty search committees might consider taking a more proactive approach in their recruitment of those minorities who are already in the academic "pipeline". The study described in Prof. Smith's article indicates that minorities currently in postdoctoral positions represent a largely untapped source of prospective applicants for faculty jobs.

How might search committees go about identifying these prospective applicants? Several organizations actively maintain directories that include minority scholars in a variety of scientific disciplines; a couple of these directories are available online, making them readily and easily usable.

For example, the online Directory of Ford

Foundation fellows, maintained by the National Research Council, can be searched by various criteria, such as name, institution, field of study, etc. A quick search on the fields of physics and astronomy returned 24 hits. The directory can be accessed via: www4.nationalacademies.org/ffellows/ffellows.nsf.

Similarly, the American Physics Society (APS) maintains a Roster of Minorities. The APS charges a fee for searches; instructions can be found at the APS Committee on Minorities website: www.aps.org/educ/com/index.html.

The CSMA's website includes links to these directories, as well as its own listing of minority AAS members, at: www.astro.wisc.edu/members.htm. We encourage minority AAS members to add their names to the CSMA listing, which is voluntary and free of charge.

We invite all AAS members, as well as faculty search committees, to make use of these resources. We also welcome information about additional resources; simply send email to csma-info@astro.wisc.edu and we'll gladly add the information.

Feature Article: How To Diversify the Faculty (cont'd)

(Continued from page 9)

of faculty of color is limited, this issue becomes even more important when an institution seeks to diversify its faculty.

Post-hiring support. Getting a job in the academy is only the first step. Achieving tenure is a much more challenging proposition. Many faculty of color in our study stressed the importance of earning tenure, despite the difficulties involved, especially if a faculty member wants to assume institutional leadership. But the climate on campuses makes it hard for many faculty of color. Issues of isolation, lack of appreciation, institutional disinterest in diversity, racism, and sexism were all mentioned as barriers to earning tenure.

Open Doors

To engage issues of diversity successfully, col-

leges and universities need to develop a truly diverse faculty. They cannot rely on myths. Faculty search committees that hold unverified assumptions cause campuses to engage in self-fulfilling prophecies regarding the recruitment of minority faculty.

Concerns about the scarcity of faculty of color are indeed valid, but campuses also need to take a new look at their recruitment and hiring processes. They must understand how faculty diversity affects their institutions, revamp their search strategies, and institute a program for championing candidates of color. And these efforts must be forceful and intentional, not passive or bureaucratic. In a word, search processes will need to change in ways that open rather than close doors.

Reprinted with permission from the September/October 2000 issue of Academe, magazine of the American Association of University Professors.

A Multicultural Approach to Astronomy Teaching

by Randy Phelps—adapted from presentation at June 2001 AAS meeting

Editor's note—The CSMA believes that minority issues and astronomy education issues have potentially important areas of overlap. This article features one approach to incorporating culturally relevant material into astronomy teaching; we are confident that other examples of work at this interface exist within the AAS. We would like to hear of such examples, and welcome the opportunity to feature these in future issues of SPECTRUM.

As part of an introductory astronomy course at California State University, Sacramento (CSUS), I have developed a set of “Night Observing Exercises” to help students learn about astronomical events and motions, and to help them better understand their place in the Universe.

The CSUS student body is among the most diverse in the Western U.S. A unique aspect of these Night Observing Exercises is the ability to enhance the multicultural component of astronomy teaching. The Inca and the Maya, for example, were meticulous observers of the Sun and Venus, respectively. These observing exercises can thus be used to show students, from cultures typically underrepresented in science, how astronomy is part of their own heritage.

The observing exercises are also designed to help CSUS students, who often have evening jobs and family obligations, fit the exercises into their schedules. This differs from a traditional astronomy lab that requires a student to be on campus during evening hours. Observations are made at home or work and use crude measurement techniques (e.g. angles measured via outstretched hand), but they nonetheless give the precision needed to demonstrate astronomical concepts.

Additionally, the measurements are used, at the end of the semester, to answer specific questions while incorporating discussion of uncertainties associated with the measurements. With these exercises, students gain an appreciation of the beauty of the astronomical sky, understand the short- and long-term motions that occur there, and get a sense of the importance of uncertainties in scientific measurements.

Connections to native cultures

It comes as a surprise to many to learn that an-

cient peoples excelled at observations that few today could match in precision. Why did native cultures expend so much energy on astronomy?

The reasons vary depending upon the cultures of which one speaks, but a recurring theme throughout much of the Americas is that native American people often wove astronomical cycles and events into the fabric of their lives.

Calendars were devised, and celestial events were predicted, based on motions in the sky to plan for festivities and for the planting of crops. Possession of this knowledge was often so important that it provided the claim to power for leaders within several societies (e.g. the Inca). In short, unlike their counterparts today, native skywatchers actually served the daily needs of societies in which they lived!

Example activity: Sunset/Sunrise

According to the Zuni Indian creation myth, “Water-Skate” was asked by the wandering Zuni people to find the world Center. The world Center is more than a mere geographical place to the Zuni, for it is the place where they will thrive as a people. According to their wishes, Water-Skate stretched his legs and pointed them to the four directions corresponding to the summer and winter solstice sunrise and sunset points. Where the heart of Water-Skate was located was the world Center.

As the previous paragraph indicates, the position of the Sun on the horizon was of extreme importance to Native Americans (and others), leading to daily solar observances. Today, knowledge of basic solar motion in the sky is generally lost to most non-astronomers. The purpose of this exercise is to show students how simple observations of sunset or sunrise were used by ancient peoples to establish the seasons.



Randy Phelps is professor of physics and astronomy at California State University, Sacramento.

(Continued on page 12)

Multicultural Approach to Astronomy Teaching (cont'd)

(Continued from page 11)

At the beginning of the semester, a survey is given to assess student misconceptions about movements in the sky. For solar motion, for example, students are asked: "A home builder needs a house to face due west to meet city codes. The builder need only watch the setting Sun to establish this location with precision. True/False."

After having established the directions of north, south, east, and west in a previous exercise, students are asked to undertake the following procedure:

1. Sketch the views of your northern, southern, eastern, and western horizons.
2. On every possible day on which a sunset (or sunrise!) is visible, mark the location of the Sun at sunset (or sunrise) in the space provided, being sure to indicate the date and time of observation in the table provided.

Figure 1 is a reproduction of a student's sketches.

It is quite easy for students to note from these observations, *often for the first time*, that sunset is not always due west and/or that sunrise is not always due east. While these are simple statements,

and can be understood based on lecture material, observations are needed to override students' deeply planted misconceptions.

The view of the student's horizons (Figure 1) provides a reference for their observations, much as pillars on hills surrounding Cuzco, Peru, provided references for Inca observations of the Sun. The following accounts are a few taken from Bauer & Dearborn (1995) that describe Spanish accounts of Inca solar observations:

"In another section [of Cuzco, Peru] stands Karmenka hill, where at intervals there are small towers which [the Inca] used to study the movement of the Sun, to which they attached great importance.

The world in its totality they call Pacha, and they know the revolution the sun makes, and the waxing and the waning of the moon. They counted the year, by this, and it consists of twelve months, by their calculations. They had a number of small towers, of which there are many on the hills of Cuzco, now in a state of neglect, so that they could tell by the shadow the Sun made on them when to plant, and other things they gathered from this."

Using their own observations of the setting

(Continued on page 13)

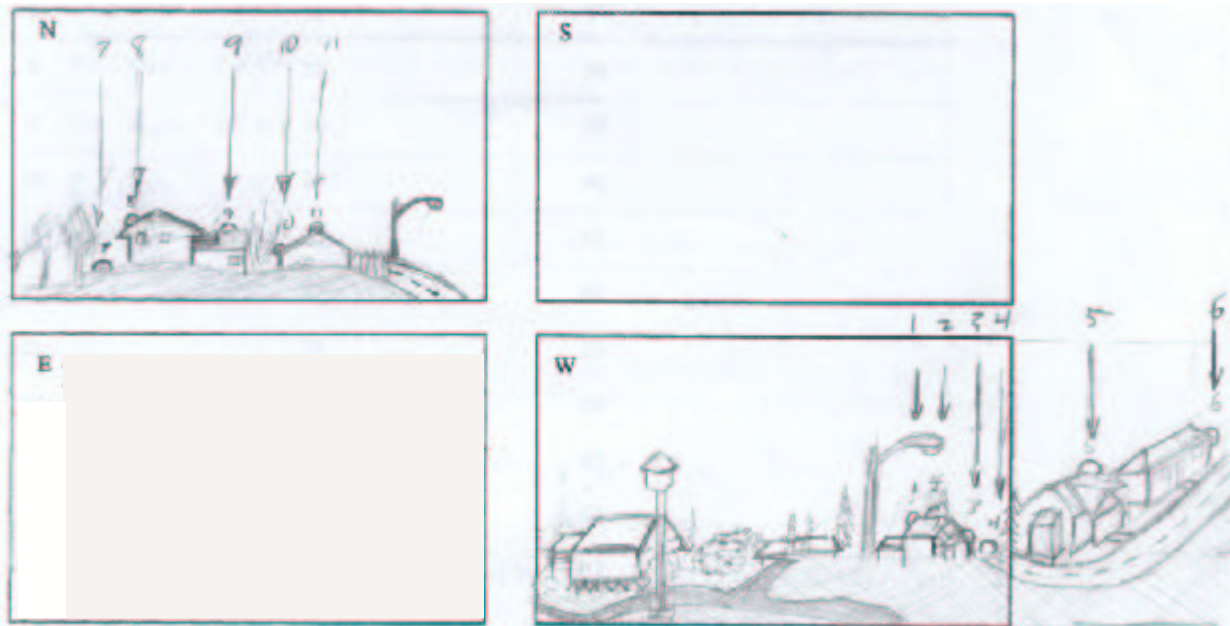


Figure 1: Reproduction of a student's sketches of the locations of sunset on different dates of observation. Note that the student was not careful in identifying the direction of north, based on observations of Polaris. These issues are addressed in the "error analysis" section of the exercises, at the end of the semester.

CSMA: Looking Back, Looking Ahead (cont'd)

(Continued from page 3)

Eddie Guerra

Eddie Guerra is assistant professor of physics and astronomy at Rowan University, where he is also director of the Rowan University Observatory and Planetarium.



Home in the Cosmos.”

Patrick Osmer

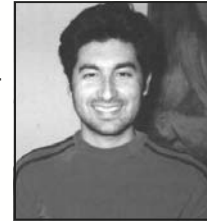
Patrick Osmer is Chair of the Department of Astronomy at the Ohio State University in Columbus.

Benjamin Peery

Benjamin Peery is professor emeritus in astronomy at Howard University.

Keivan G. Stassun

Keivan Stassun is editor of SPECTRUM. He is a Hubble Fellow at the University of Wisconsin—Madison.



Isabel Hawkins

Isabel Hawkins is Senior Fellow and Director of the Department of Science Education at the Space Sciences Laboratory, UC Berkeley.

Charles Liu

Charles Liu is an astronomer in the Department of Astrophysics at the American Museum of Natural History. He is also affiliated with the Department of Astronomy at Columbia University, and serves as Visiting Assistant Professor at Barnard College. He is co-author of the book “One Universe: At

Future activities

The CSMA plans to step up its efforts toward raising awareness within the Society of minority issues. Following the model of the Committee on the Status of Women, the CSMA plans to host special sessions at AAS meetings on a regular basis,

Multicultural Approach to Astronomy Teaching (cont'd)

(Continued from page 12)

Sun, students can understand and appreciate the sophisticated knowledge possessed by cultures often portrayed in negative terms throughout history.

Additionally, for students from those cultures, a view that science is part of their own history may strengthen. Furthermore, concepts introduced in class (relation between intrinsic size, angular size and distance) can be used to understand the archeological quest to find traces of the Cuzco pillars, and uncertainties that must be faced.

Other connections

Lunar observations are also an integral part of the Night Observing Exercises. Students determine the lunar phase and measure the angle between the Sun and the Moon to see the correlation between that angle and phase. The students determine the lunar synodic period from these data, as well as the sidereal period by plotting the position of the Moon

relative to background stars.

As the Maya, for example (Aveni 1980), are known to have derived accurate synodic periods, students own observations can provide insight into the intellectual achievements of ancient peoples.

In addition, references to well-known objects by more than their familiar western names adds diversity in a simple, yet meaningful way. For example, the Pleiades star cluster can be associated with the Japanese car Subaru (including the Subaru logo), and with paintings of the Tianquiztli from the Florentine Codex of the Aztec.

Implementation

The complete set of observing exercises, with the multicultural enhancements, is being used during the 2001-02 academic year. The material will be available for students, and others interested in their potential use elsewhere, at:

www.csus.edu/indiv/p/phelpsr

Committee on the Status of Minorities in
Astronomy

American Astronomical Society
2000 Florida Avenue, NW
Suite 400
Washington, DC 20009-1231

Phone: 202-328-2010
Fax: 202-234-2560
Email: csma-info@astro.wisc.edu



We're on the web!
[www.astro.wisc.edu/
csma](http://www.astro.wisc.edu/csma)

The Committee on the Status of Minorities in Astronomy

(CSMA) is a Standing Committee of the

American Astronomical Society.

*'SPECTRUM' is a semi-annual publication describing the ac-
tivities of the CSMA, highlighting resources, and providing a
forum for discussion of issues relevant to the representation of
minorities in the astronomy profession.*