COMMITTEE ON THE STATUS OF MINORITIES IN ASTRONOMY

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SPECTRUM

A report on underrepresented minorities in astronomy

Not "B": Our Experience at the National Society of Black Physicists Meeting

by Kevin Covey and Andrew West, Graduate Students, U. Washington

Graduate students from U. Washington in front of an AAS exhibit at the 2004 Annual Meeting of the National Society of Black Physicists (NSBP). Authors Kevin Covey (left) and Andrew West (right) are pictured with classmate Marcel Agueros.

As we, two white graduate students, stepped into the elevator at the recent meeting of the National Society of Black Physicists (NSBP) in Washington, D.C., we smiled at the African American woman across from us. One of us shyly asked, "Are you here for the conference?" Puzzled, she looked at us and asked, "What conference are *you* here for?" We answered, "The NSBP!" With the same confused look as before, and with a little humor, she responded, "But you're not B!"

(Continued on page 2)

The Diversity of Tenure-Track Astronomy Faculty at PhD-Granting Departments

by Laura Lopez and Donna J. Nelson

This year, Professor Donna J. Nelson of the University of Oklahoma Chemistry and Biochemistry Department and Laura A. Lopez, an undergraduate in the MIT Physics Department, conducted a faculty demographic study of all the United States astronomy and astrophysics PhD-granting departments. Under the auspices of MIT, a survey was sent to the department chairs at 53 institutions. We requested disaggregated data on race/ethnicity, gender, and rank of all tenured and tenure-track faculty conducting astron-

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HIGHLIGHTS:

- *Find the most up-to-date statistics on minority representation among astronomy faculty in the United States.*
- *Learn about the native language preservation work of a Tohono O'odham linguist.*
- *Read two provocative essays on the counterparts to disadvantage: privilege and power.*
- *Meet the first recipients of the new NSBP/AAS scholarships for minority undergraduates.*

Not "B": Our Experience at the NSBP Meeting (cont'd)

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When we first considered attending the NSBP meeting, we were anxious that our presence might be intrusive. We didn't want to disrupt an atmosphere in which scientists of color could candidly discuss the problems they face when interacting with the vast majority of scientists who look like us. We don't claim that we weren't a little nervous on the plane from Seattle, nor can we report that our presence at the meeting was viewed with no skepticism. However, we felt accepted by NSBP members and we left Washington D.C. excited by our interactions, and moved by our experiences. In this article we hope to share some of what we learned and demonstrate that a conference like the NSBP meeting is an ideal forum for more members of the astronomical community to make connections with students and faculty of color.

Our introduction to the membership of the NSBP (and NSHP—the meeting was held jointly with the National Society of Hispanic Physicists) was facilitated by a morning session focusing on the graduate experience. The session was structured to encourage small group discussions and was designed to help students practice informal scientific discussions at professional meetings. It was invaluable for us, providing a perfect opportunity to break the ice and connect with our peers. The personal connections formed in that session grew throughout the conference and allowed us continued discussions and social interactions over the next three days. Without such a session, it would have been much harder for us, given our visible 'outsider' status, to begin to develop relationships with our colleagues.

"We were anxious that our presence at the NSBP meeting might be intrusive. We didn't want to disrupt an atmosphere in which scientists of color could candidly discuss problems ..."

Integration into the fabric of the membership was also made easier by the ample opportunities for networking. A recruiting fair was held for the first two days of the meeting, where recruiters were able to connect with students looking for internship or graduate opportunities. Though we did not set up a booth for our department, a faculty member in the physics department at the University of Washington (UW) had a table with information about the UW Physics REU program. He reported strong interest in the program, returning to Seattle with pages of names and email addresses for possible future student applicants. The AAS had a display as well and we took a turn staffing it, where we had a number of engaging conversations with students and faculty interested in astronomy, and were able to provide information on astronomy REUs as well.

Our scientific interests provided a natural opportunity to connect with students and faculty. An entire day of talks focused on astronomy and space science, and while there were many other sessions on other topics in physics, attendance at the astronomy session was respectable. The session was no different than that of any other scientific conference we have attended, except, of course, for the high proportion of people of color both giving and attending the talks. Both students and faculty presented work ranging from using observations of stars from the space shuttle to probe the structure of the Earth's atmosphere, to theoretical studies of inflation. It was clear from the talks that there is a wealth of talent and astronomical interest within the NSBP community.

One of us, together with another graduate student from UW, gave a talk in one of the sessions. This allowed us to interact directly with the students and faculty interested in astronomy, as we became visible representatives of the field. In fact, discussions sparked in the astronomy sessions spilled out of the allotted time, and after the last session of the day we met with several speakers and session participants in the hotel bar.

The following day one of us presented research during the conference's poster session. This setting allowed us to identify more students with an interest in astronomy, and engage them one-on-one to find out more about their backgrounds and research interests. This also allowed us to expand our physics knowledge; we attended a session on nanotechnology and talked with one of the postdocs

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Diversity of Astronomy Faculty (cont'd)

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omy-related research. Every surveyed department except two chose to participate, and the chairs verified the results after the data were organized. This study was the first to rigorously assess representation and rank of females and minorities within astronomy faculties across the United States.

The survey results of race/ethnicity, gender, and rank of faculty in astronomy and astrophysics departments are presented in Table 1 (see pp. 22-23). Overall, 12.2% of the 652 astronomy professors are women (corresponding to 81 female professors). 90.6% of all astronomy professors are Caucasian, and 80.1% of all astronomy professors are Caucasian male. 6.8% of astronomy professors are of Asian descent, making this group the most well represented of racial and ethnic minorities. With nine Hispanic professors, Hispanics comprise 1.38% of astronomy faculty. 1.08% of astronomy faculty is Black (corresponding to seven professors). With only one Native American professor in the surveyed departments, this group represents 0.15% of astronomy faculty.

As this study disaggregates gender, race/ethnicity, and rank, we can examine the relationships between these characteristics. While females represent 9.8% of all full professors, 20.2% of assistant professors are women. In contrast, underrepresented minority (URM) groups are equally distributed in faculty rank. For example, with four full professors and four assistant professors, Hispanic faculty is evenly represented with respect to tenure status. The higher representation of females among URM faculty than among White faculty corresponds to higher representation of females among URM PhD recipients than among White PhD recipients. Overall, URM female representation is fairly bleak, with 0.6% of all professors being URM women.

In 2002, Dr. Nelson conducted similar surveys within thirteen other science and engineering disciplines. Table 2 displays the results from some of these studies for comparison. Although astronomy is a comparatively smaller field than physics, the trends between the two disciplines can be compared. With 6.6% female faculty of the 1,988 physics professors, female representation in astronomy is approximately double female representation in physics. Racial/ethnic breakdown of physics faculty is roughly the same as astronomy, with the exception of Asian professor representation (11.2% in physics versus 6.8% in astronomy). Both fields have decreased female representation in higher faculty ranks: physics and astronomy each have half the female representation in full professor positions as in assistant professor positions.

The survey results can be compared to NSF PhD attainment data in order to assess the pipeline for women and minorities within astronomy. Table

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More Than Just Words: Stages of American Indian Language Revitalization

by Ofelia Zepeda, University of Arizona

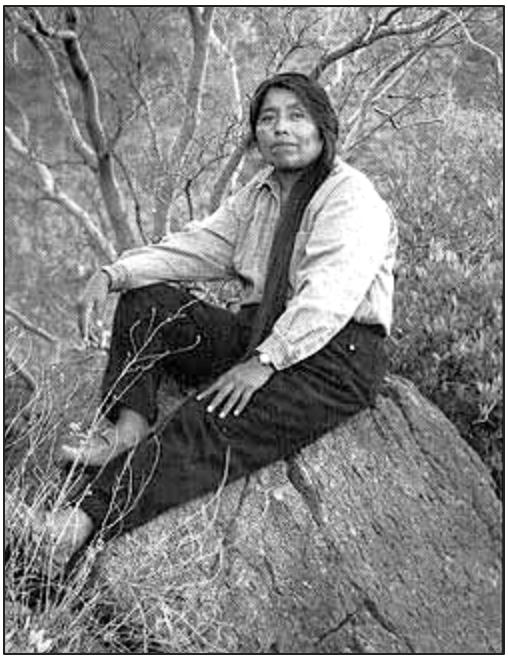
Editor's note: While this article focuses on work in the area of linguistics, which may not be within the usual sphere of professional astronomers, we felt this article would be of interest to SPECTRUM readers given astronomy's ties to the Tohono O'odham nation, on whose land the Kitt Peak National Observatory resides.

Every time we use our language I feel that all of creation understands us, and is rejuvenated.
—M.Vera, Yowlumni speaker.

How much does the Cheyenne language weigh? How much does the Cheyenne language cost? How much room does the Cheyenne language occupy? How does the Cheyenne language feel, taste, or smell? What does it look like? If the Cheyenne language can be put in those quantifiable terms, then the more prevalent white society may understand the total impact of what it means to be losing the Cheyenne language. But we [Cheyenne people] will never be able to weigh the Cheyenne language.
—A Cheyenne elder

Languages are going extinct twice as fast as mammals; four times as fast as birds. Approximately half of the languages of the estimated 300 languages that were spoken at contact in North America are currently still spoken or remembered in the year 2001. Experts conclude that there has always been language loss as there has always been language change for all languages of the world. Currently, though, the situation with American Indian languages of the U.S. is these languages are being lost at a faster rate then ever before. At the end of the last century nearly all American Indian languages were considered moribund, that is, they have very few or no new speakers among their population.

The true reality of language loss for contemporary speakers of American Indian languages did not actualize itself until as recently as the 1980's for some, and for others, even more recently. This realization has prompted Native people to mobilize all for the cause of language. The efforts to turn the tide of language shift away from the English language has been varied, creative, frustrating, fun, enlightening, and all worthwhile.



Dr. Ofelia Zepeda, a MacArthur Fellow, is professor of linguistics and American Indian studies at the University of Arizona, Tucson.

This brief overview will consider what some tribal groups and communities have been doing in order to create new, young speakers for their population. Language revitalization efforts presently range from small family groups gathering a few evenings a week around a kitchen table in Santa Clara Pueblo to hear and speak a Keresan language, and at the other end of the spectrum a person of Choctaw ancestry in Seattle hunches in the glare of a computer learning Choctaw via a web-based language "classroom" originating out of Oklahoma. And then there is that of the Hawaiians who at their immersion schools have drawn a line on the floor and are serious when they say, "If you cross the line you must speak Hawaiian or remain silent, English stays on the other side of the line." These are but a few examples. The following is a list of sorts with some brief descriptors and examples of various ways that tribal communities are making

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inroads at redirecting language shift.

First, the question often asked is how did languages get to this stage of endangerment, or moribundity? The reasons are varied. As mentioned before language is a living entity and so behaves as such, it changes, adapts and it can fade depending on its environment. However, American Indian languages like other indigenous languages of the world have been influenced, overtaken and literally wiped-off the map by virtue of warfare, colonization both political and economic, and by acts of genocide and catastrophe. Specifically, American Indian languages, in a 1991 article by socio-linguist Jane Hill and I, we state that historically the two factors most responsible for language loss among American Indian tribes in the U.S. was, introduced organized religion and American schooling. Presently, many still see these two institutions as contributors. In the 1991 article we write, "…Brandt (1988:324) finds that some fundamentalist churches on the San Carlos Apache Reservation in Arizona and the Alamo Navajo Reservation in New Mexico forbid any speaking of Apache or Navajo or attendance at any event at which the languages are spoken. Even where evangelical groups do not directly forbid indigenous language use, they strongly discourage members from participating in indigenous religious contexts, including healing, which are often major arenas for the use of native languages, especially of their most complex and creative registers."

"… historically the two factors most responsible for language loss among American Indian tribes in the U.S. was, introduced organized religion and American schooling."

And in regards to American schooling, it is a tragic and shameful part of America's history. My colleague, Teresa McCarty (1998:31) writes, "Compulsory education at the boarding schools became the instrument of a federal policy guided by an ideology of racial superiority and planned cultural transformation. Key to this was the extirpation of indigenous languages. "The objective," wrote Commissioner of Indian Affairs J.D. Atkins in 1887, was "to blot out the boundary lines which divided [tribes] into distinct nations, and fuse them into one homogenous mass. *Uniformity in language will do this—nothing else will*" (cited in Crawford 1992:48, emphasis added).

The Efforts for Language Maintenance & Renewal

At the outset the efforts to attempt language maintenance and renewal of American Indian languages in the U.S faces a number of obstacles but nonetheless many tribal communities are working hard at their efforts both at the national and local level. This brief essay will describe a small number of these efforts. For further and more detailed accounts of American Indian language issues in this era of language loss, renewal and recovery the author recommends interested readers to see the essays in *The Green Book of Language Revitalization in Practice*, edited by Leanne Hinton and Kenneth Hale, 2002.

Canonical Language Classes

Many tribal communities continue to offer basic language classes both in classrooms and in community settings. These classes are often modeled after high school or college foreign language classes. Most of these classes are conversational classes while still others teach the structure of the language, basic grammar and conversation.

These classes often promote literacy at some levels however this has not been seen as a mechanism for fully developing literacy among speakers. Presently, the Tohono O'odham community offers classes of this type at their tribal community college as do the Yaqui, Hopi and Navajo. These classes may not be a successful format for creating new speakers however they are most effective in developing an awareness of the language as a written language and also exposes tribal members to the aspects of the linguistic structure of their language. This type of language teaching is still a very popular format for many in particular for tribes that have community colleges.

The Master-Apprentice Approach

This method is one that was specifically designed for the languages of California. California is a state

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White Privilege: Unpacking the Invisible Knapsack

By Peggy McIntosh, Wellesley College Center for Research on Women, Reprinted with permission

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> *"I realized I had been taught about racism as something which puts others at a disadvantage, but not to see one of its corollary aspects, white privilege, which puts me at an advantage."*

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> *"I repeatedly forgot each of the realizations on this list until I wrote it down. For me white privilege has turned out to be an elusive and fugitive subject."*

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The Culture of Power

by Paul Kivel, Reprinted with permission

If you are a woman who has ever walked into a men's meeting, or a person of color who has walked into a white organization, or a child who has walked into the principal's office, or a Jew or Muslim who has entered a Christian space then you know what it is like to walk into a culture of power that is not your own. You may feel insecure, unsafe, disrespected, unseen or marginalized. You know you have to tread carefully.

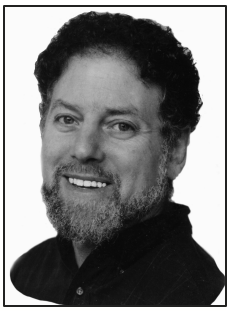
Whenever one group of people accumulates more power than another group, the more powerful group creates an environment that places its members at the cultural center and other groups at the margins. People in the more powerful group (the "in" group) are accepted as the norm, so if you are in that group it can be very hard for you to see the benefits you receive.

Because I'm male and live in a culture in which men have more social, political, and economic power than women, I often don't notice that women are treated differently than I am. I'm inside a male culture of power. I expect to be treated with respect, to be listened to, and to have my opinions valued. I expect to be welcomed. I expect to see people like me in positions of authority. I expect to find books and newspapers that are written by people like me, that reflect my perspective, and that show me in central roles. I don't necessarily notice that the women around me are treated less respectfully, ignored, or silenced; that they are not visible in positions of authority nor welcomed in certain spaces; that they pay more for a variety of goods and services; and that they are not always safe in situations where I feel perfectly comfortable.

> *"Remember when you were a young person entering a space that reflected an adult culture… What let you know that you were on adult turf and that adults were at the center of power?"*

Remember when you were a young person entering a space that reflected an adult culture of power—a classroom, store, or office where adults were in charge? What let you know that you were on adult turf and that adults were at the center of power?

Some of the things I remember are that adults were in control. They made the decisions. They might have been considerate enough to ask me what I thought, but they did not have to take my concerns into account. I could be dismissed at any time, so I learned to be cautious. I could look around and see what was on the walls, what music was being played, what topics were being discussed, and, most important, who made those decisions, and I knew that it was an adult culture of power.



I felt I was under scrutiny. I had to change my behavior-how I dressed ("pull up your pants," "tuck in your shirt"), how I spoke ("speak up," "don't mumble"), even my posture ("sit up, don't slouch," "look me in the eye when I'm talking to you")-so that I would be accepted and heard. I couldn't be as smart as I was or I'd be considered a smart aleck. I had to learn the adults' code, talk about what they wanted to talk about, and find allies among them-adults who would speak up for my needs in my absence. Sometimes I had to cover up my family background and religion in order to be less at risk from adult disapproval. And if there was any disagreement or problem between an adult and myself, I had little credibility. The adult's word was almost always believed over mine.

The effects on young people of an adult culture of power are similar to the effects on people of color of a white culture of power or the effects on women of a male culture of power. As an adult I rarely notice that I am surrounded by an adult culture of power which often puts young people and their cultures at a severe disadvantage as they are judged, valued, and given credibility or not by adults on adult terms. Similarly, as a white person, when I'm driving on the freeway I am unlikely to notice that people of color are being pulled over

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based on skin color. Or when I am in a store I am unlikely to notice that people of color are being followed, not being served as well, or being charged more for the same items. I assume that everyone can vote as easily as I can and that everyone's vote counts. I am never asked where I am from (and this would be true even if I had stepped off the boat yesterday).

In a society that proclaims equal opportunity I may not even believe that other people are being paid less than I am for the same work or being turned away from jobs and housing because of the color of their skin. When I am in public spaces, the music played in the background, the art on the walls, the language spoken, the layout of the space, the design of the buildings are all things I might not even notice because, as a white person, I am comfortable with them; if I did notice them, I would probably consider them bland, culturally neutral items. Most of the time I am so much inside the white culture of power and it is so invisible to me that I have to rely on people of color to point out to me what it looks like, what it feels like, and what impact it has on them.

"The problem with a culture of power is that it reinforces the prevailing hierarchy. When we are inside a culture of power we expect to have things our way…"

We can learn to notice the culture of power around us. Recently I was giving a talk at a large Midwestern university and was shown to my room in the hotel run by the university's hotel management department. After I had put my suitcase down and hung up my clothes, I looked around the room. There were two pictures on the wall. One was of a university baseball team from many years ago-twenty-two white men wearing their team uniforms. The other picture was of a science lab class-fourteen students, thirteen white men and one white woman dressed in lab coats and working at lab benches. In total I had thirty-five white men and one white woman on the walls of my room. "This clearly tells me who's in charge at this university," I said to myself; these pictures would probably send an unwelcoming, cautionary message to people of color and white women who stayed in that room that they could expect to be excluded from the culture of power in this institution. I mentioned the composition of the pictures to the hotel management and referred to it in my talk the next day.

A few years ago I would not have seen these pictures in terms of race and gender. The pictures themselves, of course, are only symbolic. But as I walked around the campus, talked wit various officials, and heard about the racial issues being dealt with, I could see that these symbols were part of the construction of a culture of power from which people of color and most white women were typically excluded. I have learned that noticing how the culture of power works in any situation provides a lot of information about who has power and privilege and who is vulnerable to discrimination and exclusion; this institution of higher education was no exception.

The problem with a culture of power is that it reinforces the prevailing hierarchy. When we are inside a culture of power we expect to have things our way, the way with which we are most comfortable. We may go through life complacent in our monoculturalism, not even aware of the limits of our perspectives, the gaps in our knowledge, the inadequacy of our understanding. We remain unaware of the superior status and opportunities we have simply because we're white, or male, or able-bodied, or heterosexual. Of course a culture of power also dramatically limits the ability of those on the margins to participate in an event, a situation, or an organization. Those marginalized are only able to participate on unfavorable terms, at others' discretion, which puts them at a big disadvantage. They often must give up or hide much of who they are to participate in the dominant culture. And if there are any problems it becomes very easy to identify the people on the margins as the source of those problems and blame or attack them rather than the problems themselves.

Every organization has work to do to become more inclusive. I want to focus on some ways that groups often fail to include members of our country's most marginalized members-those marginalized by economic status, physical ability, and English language ability.

Often, when groups talk about diversity issues,

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Meet the First Annual NSBP/AAS Scholarship Winners

by Keivan Guadalupe Stassun

In the spirit of fostering cooperation between the AAS and professional organizations serving minorities in physics and astronomy, the AAS Council in January 2004 approved four new scholarships to encourage minority undergraduates to pursue advanced study in astronomy and space science. Up to four new scholarships of $1000 each, funded jointly by the AAS and the National Society of Black Physicists (NSBP), will be awarded annually to undergraduates through a competitive process administered by NSBP. Judging will include participation of AAS members.

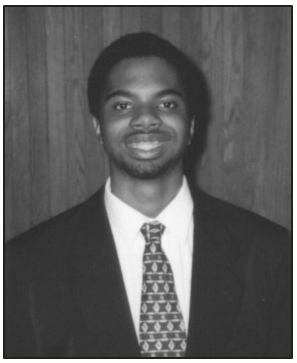
NSBP is the largest and most widely recognized organization devoted to the African-American physics community. NSBP represents faculty and students at Historically Black Colleges and Universities, and its annual meetings draw over 600 attendees, with an increasing number of recruiters from graduate schools around the country. Indeed a primary motivation for these scholarships is to bring AAS members into direct contact with minority students at institutions that are the primary producers of minority talent in physics.

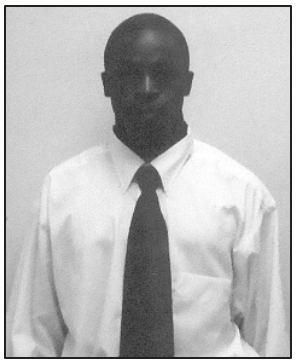
The first annual NSBP/AAS scholarships were awarded at the NSBP meeting in February 2004, with AAS members Charles McGruder and Barbara Williams serving as judges.

The scholarships are named to commemorate African American astronomers and space scientists Harvey Washington Banks, Walter McAfee, Ronald McNair, and Michael Anderson. These scholarships are offered in their memory and in the hopes of inspiring the next generation of astronomers and space explorers.

Dr. Harvey Washington Banks was the first African American to receive the Ph.D. degree specifically in astronomy, from George Washington University in 1961. He taught physics and astronomy at Delaware State College and Howard University.

Dr. Walter McAfee graduated from Cornell University under Hans Bethe, and spent most of his professional career at the US Army Communications and Electronics Command. In 1997 the US Army dedicated the McAfee Center at Ft. Monmouth in recognition of Dr. McAfee's significant contributions to space communications and radar, including the first successful efforts at lunar ranging.





First annual NSBP/AAS Scholarship winners Joshua Banks (left) and Christopher Jones (right).

Dr. Ronald McNair and Colonel Michael P. Anderson were NASA astronauts who perished in separate space shuttle accidents. Dr. McNair was lost in the Challenger accident of 1986 and Col. Anderson was lost aboard the Columbia in February 2003.

Dr. Kennedy Reed, NSBP scholarships coordinator, gave a brief background sketch on each of these individuals before announcing the scholarship winners. Two scholarships were awarded this first year. Walter McAfee's daughter presented one of the awards and also gave a personal tribute to her father. Michael Anderson's wife presented the other award and spoke movingly about her husband, who died almost exactly one year before in the Columbia shuttle accident.

The first annual NSBP/AAS scholarship recipients for 2004 are Joshua Banks and Christopher Jones.

Joshua Banks is a graduating high-school senior at the Baltimore Polytechnic Institute. In the tenth grade he received awards from the National Society of Black Engineers and the Army Corps of Engineers for his science fair project which analyzed the properties of light emitting diodes and regular resistors. As a junior, he was a member of the school's Physics Olympics Team, which placed second at the University of Maryland Physics Olympics. He is currently enrolled in a research practicum through which he is conducting research

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Not "B": Our Experience at the NSBP Meeting (cont'd)

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who presented at that session. It was refreshing to hear talks about what is happening at the forefront of other physical sciences.

Just as important as the science sessions were sessions devoted to social issues facing minority students in physics and astronomy. Hearing from several students and faculty members who relayed their experiences as people of color in physics, we learned how challenging it can be to be in a place where there are no role models who look like you, which can make students feel that they are not only responsible for proving their individual worth, but also for proving the worth of all people of color. The speakers described the obstacles they faced during graduate school in creating effective study and social groups, and the lack of close mentors to show them the ropes and help them advance in the field.

We also heard a number of students express their desperation during their first term of graduate school, as they struggled to keep up with a full load of graduate physics courses, only to realize many of their peers had half of their course-load at the advanced undergraduate level. We found ourselves identifying with a number of these situations, reinforcing our belief that providing better mentoring and detailed advising would make the graduate experience better not only for students of color, but would also improve the graduate experience for *all* students.

> *"Walking around D.C., we passed several young people of color and asked ourselves, 'Are they physicists?' This wasn't the first lens through which we'd viewed these students before..."*

For both of us these sessions were eye-opening. It was good for us to hear first-hand accounts from students and faculty. Although we can never understand what it feels like to enter a graduate program as a minority, it gave us some ideas for making that experience a little easier.

The structure of the conference generally helped to ensure a welcoming atmosphere. All meals were provided for the duration of the conference; these provided opportunities to meet new colleagues and engage in informal discussions about science and academia. For students, the opportunities to meet peers in different programs or fields extended into their accommodations—students were often assigned roommates from different institutions, increasing their opportunities for interactions all the more. Lastly, activities and discussions involving students from a wide variety of institutions clearly extended long into the night, including a closing night party complete with dance floor and DJs. The informal and intellectual relationships incubated at the NSBP/NSHP meeting help young scientists develop a network of contacts in different fields and institutions as they begin their careers.

As two white males who already believed that the order-of-magnitude underrepresentation of minorities in astronomy is a sign that the field is losing valuable scientific talent, we found the most beneficial aspect of the meeting was simply the experience of meeting the NSBP/NSHP members. For both of us, this was our first experience being in the minority position in a scientific setting. The experience was truly transformative. Actually meeting face to face with large numbers of promising scientists of color helped us confront our own subconscious assumptions about the backgrounds and interests of these students.

Walking around D.C. throughout the meeting, we passed several young people of color and asked ourselves, "Are they physicists?" This certainly wasn't the first lens through which we'd viewed these students before, and that recognition triggered a valuable conversation of introspection and reflection on the nature of our own subconscious beliefs.

Additionally, our discussions with other students highlighted the disconnect between minority-serving institutions and 'gatekeeper' experiences (REU summer programs, fellowships, etc.) which propel students onto further study in astronomy (as they did for us). This disconnect was never more apparent than when we discussed astronomy with students at HBCUs, at both the graduate and undergraduate level. Many students are searching for opportunities to apply their scientific background to interesting astronomical problems and get lost due

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American Indian Language Revitalization (cont'd)

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that has one of the largest Native American populations, but also is the state that has the smallest number of speakers for any of the languages represented there. The indigenous languages of California are some of the most endangered in the country. The majority of the languages have small number of speakers, some as few as three to five speakers, all elderly.

As a result the master-apprentice approach is designed to take advantage of the elderly speakers and their linguistics knowledge. The approach requires a partnership between the master, the elder speaker and the apprentice, the younger student. It should be clarified that these M-A teams are always adults children rarely participate. The goal is for the Master to spend considerable amounts of time with the apprentice on a daily basis and teaching the apprentice as much language as possible in the time they are together.

Often times these M-A teams are related to one another, for instance there have been teams of aunt & niece or nephew; mother and daughter or son, grandmother and adult grandchild. These teams receive training on how to work together in a supportive and learning environment. In most cases the elders has never been put in a situation to teach language to someone so the training is necessary. The elders are coached on basic things such as not to laugh at the apprentice when they make a mistake in pronunciation, not to be too critical, how to correct the apprentice, how to support the student in their efforts. Likewise for the apprentice they are taught various ways of behaving with the elder in their distinct roles as master and apprentice. This format has created some speakers of California Indian languages, however since it is a "one at a time" format the numbers are not significant at the outset however when there were only three to four speakers from one language and one more is added then it is certainly significant.

Many other tribal members outside of California have been trained in the Master-Apprentice format and implemented it in their communities. The Master-apprentice approach requires a tremendous amount of dedication and commitment to the language effort in order to succeed.

Language Camps

Language camps are short-term immersion camps in language and culture. These camps typically are held in the summer when children and families can spend extended time together in a camp setting. These camps typically are designed to teach language and particular cultural content around a specific topic. Since the camps are outdoors the language content takes advantage of the setting and focuses on topics like edible wild plants including harvesting, preparing and eating the foods. Other topics might include teaching about medicinal plants, building shelters, and traditional territory. The key to the language camps is careful preparation of meeting basic needs such as food, water and shelter but also assuring the language teachers are well prepared on how to "teach" the topics in these settings. The language camps are intergenerational and so content must be adapted for all audiences. The community members within the White Mountain Apache, Acoma, Cochiti and Navajo have organized successful language and culture camps at one time or another.

Language Immersion Method

The language immersion method is one that produces speakers. Many Native American learned to speak the English language through language immersion however in many instances it was not a supportive type of immersion the immersion approach experienced by most Native Americans was also known as "sink or swim", the name is self-explanatory. The method employed for the purposes of language revitalization is a highly supportive approach. This method came to the attention of Native American populations in the early 1990's when it was learned it was a method used by the Maori of New Zealand for teaching language and traditional culture, a method they called "language nests" This method is perhaps most noted for the success it has had in creating hundreds of new speakers of the Hawaiian language. Today the Hawaiians have Hawaiian language immersion schools serving pre-k to college age students.

Tribes have implemented language immersion programs at the community level but have only

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been successful in serving very young children. One of the most successful immersion programs is the Piegan Institute in Browning, Montana. The immersion approach requires that all education be taught in the target language and no English is allowed. This method requires a tremendous amount of training on the part of the immersion teacher. The tribes that have implemented immersion programs have proven the success this method has in creating speakers.

The American Indian Language Development Institute

The American Indian Language Development Institute (AILDI) is an institute that has been in existence for 25 years. The founder of AILDI is Lucille Watahomigie, a Hualapai tribal member and language activist. Her goal 25 years ago was to develop college credited courses for her teaching staff who were also speakers of Hualapai and teachers of the language. The college courses were to assist these teachers in their professional development, but more importantly provide them with the language and linguistic skills to be able to think critically about their language. They were also to be trained in all areas of linguistic inquiry so that they would be their own tribal linguist/teachers. In the 25 years this language institute has accomplished its original goal and has become a nationally recognized institute for providing college credited courses in all areas of American Indian linguistics, language pedagogy, literature, creative writing, language policy and planning, curriculum development and research methods. The AILDI is one of the few formal organizations providing courses on language immersion theory and methods for American Indian languages.

The American Indian Language Development Institute is at the University of Arizona in Tucson, Arizona. The institute has trained and assisted huge numbers of Native American educators to complete degrees or seek advanced degrees in all areas of language research and teaching. Currently AILDI has been replicated in two other locations one in Oklahoma with their institute, ONALDI, Oklahoma Native American Language Development Institute and CILLDI, Canadian Indigenous Languages and Literacy Development Institute in Alberta, Canada. The Tucson AILDI attracts students from all parts of the U.S., Canada, Mexico and South America. It is held during the first summer session at the University of Arizona and offers 6 credit hours. For a more extensive description of the American Indian Language Development Institute (AILDI) see the article, "School-University Collaboration: The American Indian Language Development Institute" by Teresa McCarty, Akira Yamamoto, Lucille Watahomigie & Ofelia Zepeda in *Teaching Indigenous Languages*, edited by Jon Reyhner.

Concluding Thoughts

The individuals who are involved in language maintenance efforts are often tireless individuals. Most are working in under funded projects and often times in obscurity. These individuals though are more often then not ones who may make a difference regarding the future of a people's language. These people know that intervention is possible and that revitalization can happen. Unfortunately, all too many of these individuals involved in these efforts also know that time is clicking at their heals as they work. What will be the rate of their success in language maintenance and revitalization? In some instances only time will tell.

Walking With Language

Some have carried it, held it close, protected.
Others have pulled it along like a reluctant child.
Still others have waved it like a flag, a signal to others.
And still, some have filled the language with rage and
Dared other to come close.
And there are those who find their language a burdensome
Shackle.
They continually pick at the lock.

References:

Hinton, Leanne, Hale Kenneth. (2001). The Green Book of Language Revitalization in Practice, CA: Academic Press.

McCarty, Teresa L., & Zepeda, Ofelia. (1998) Indigenous Language Use and Change in the Americas, Special Issue, International Journal of the Sociology of Language.

Reyhner, Jon. (1997) (Editor) Teaching Indigenous Languages. Flagstaff: Northern Arizona University.

(Continued on page 14)

Three Poems by Ofelia Zepeda

How To End a Season

Food is put in place for the ancestors.
Prayer sticks are buried for the saguaro, for the season, for the earth.
Songs are sung for the spiritual health of everyone, everything.
And in the fading light of a bright summer day
The people sit down to eat and visit.

There are decorations paying commercial homage to the saguaro.
Balloons with smiling little saguaros on them,
and others in large type reading, SAGUARO, and in small letters, "credit union".
Amid the festive decorations the sun lowers on the horizon,
colors begin to show.

The people are treated to stews of chile,
different types of beans, tortillas, and breads.
Salad and chicken for the kids.
And of course there is the ever present, ciolim, for everyone.
Marigold, lavender, and a touch of hibiscus
hang above the dry desert mountains.

The singer's soft voices carry songs across the desert floor.
To the east a bright star takes a long trailing fall,
the glow is wide
And slow.
The people point,
The gohimeli songs begin.
They step to the rhythm, feel the beat of the earth.
They look at all that is around them,
and drink the wine for the goodness of the earth.
As the celebration continues
A toy-like machine stumbles across the landscape of a red planet.
NASA knocks on the window of America's childhood memories
With "Rover," "Yogi," and "Barnacle Bill."

July 16, 1997

Notes: Saguaro Credit Union was once an active credit union in Tucson. "Ciolim" is a bud from the cholla cactus, harvested in spring by the O'odham it is dried and stored for year round use as a vegetable. "Gohimeli" is a dance step from O'odham traditional ceremony. 1997, Earth received images from Mars.

(Continued on page 15)

American Indian Language Revitalization (cont'd)

(Continued from page 13)

Dr. Ofelia Zepeda is a member of the Tohono O'odham Nation and is currently Professor of Linguistics, and co-director of the American Indian Language Development Institute (AILDI). She teaches a course on beginning Tohono O'odham and wrote the first pedagogical grammar for O'odham, A Papago Grammar. *In 1999 the MacArthur Foundation acknowledged Ofelia for her work on American Indian languages and on efforts to work with tribes to revitalize and maintain American Indian languages.*

In all of her teaching and research Ofelia always has the larger community in mind. Her recent work on dictionary development for the O'odham language is an example. She along with her colleagues is involved with creating the first on-line dictionary of O'odham, and simultaneously creating a paper dictionary with members of the O'odham Nation. Other recent projects include the first interactive CD on language lessons for O'odham based on the Papago Grammar. She has been a guest co-editor of special volumes of journals on the topic of language loss including the International Journal of the Sociology of Language (IJSL) and the Journal on Bilingual Research.

Ofelia is also the series editor of Sun Tracks*, a Native American Indian literary publication series published by the University of Arizona Press. She is also a published poet with two books of poetry,* Ocean Power: Poems from the Desert*, and a bilingual collection with a CD recording,* Jewed I-hoi/Earth Movements*. She has been instrumental in promoting creative writing in American Indian languages as a form of expression and as an avenue for language documentation. Her poetry and other essays have appeared in numerous anthologies and collections including,* Reinventing the Enemy's Language*, edited by Joy Harjo and Gloria Bird,* Fever Dreams*, edited by Leilani Wright and James Cervantes,* Home Places*, edited by Larry Evers and Ofelia Zepeda, and* Poetry of the American West: A Columbia Anthology*, edited by Alison Deming.*

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Birth of a Star

They have seen the place where stars are born.
They are embryonic.
Hydrogen gas, microscopic dust, silica, carbon, ultraviolet radiation, evaporation and erosion in space.
On the journey, and somewhere along the way they stopped and saw,
They saw the place where stars are born.
Tres Estrellas de Oro,
Take a ride to that place where the ancestors have gone.
Or travel to the place where the earth was created.
Or travel to the place where the earth will end.
Or travel to the place where stars are born.
And they wonder if perhaps the mother cries
If her birth stars burn out, become cold.
And they wonder if perhaps the mother cries
If her birth stars all fall in a shower.
And they wonder if perhaps the mother cries
if her birth stars are scattered about and abused by coyote.
On the journey, and somewhere along the way they stopped and saw,
they saw the place where stars are born.

Riding the Earth

She said she felt the earth move again.
I never knew whether she meant she felt a tremor
Or whether it was the rotation of the earth.
I like to think she felt the rotation, because
Anyone can feel a tremor.

And when she felt this
She could see herself
Standing on the earth's surface.
Her thick, wide feet solidly planted,
toes digging in.
Her visualization so strong
she almost feels her body arch
against the centrifugal force of the rotation.
She sees herself with her long hair floating,
floating in the atmosphere of stardust.
She rides her planet the way a child rides a toy.
Her company is the boy who takes the sun on its daily journey
And the man in the moon smiles as she passes by.

"Riding the Earth" and "Birth of a Star" appeared in the collection, Earth Movement/Jewed I-hoi, in a bilingual format published by Kore Press, Tucson, AZ. It was published in 1997

First Annual NSBP/AAS Scholarship Winners (cont'd)

(Continued from page 10)

on ferromagnetic thick films at Morgan State University under the guidance of Prof. Fredrick Oliver.

Joshua is a member of the National Honor Society at Baltimore Polytechnic, and has appeared on the "It's Academic" TV show. He is a mathematics tutor, and volunteers in the "Before and After School" program at his church, helping children with computers. Joshua is on the school tennis team, enjoys bicycling and running, and in his free time enjoys reading Scientific American and science fiction novels. Joshua hopes to earn a Ph.D. in physics/astronomy, and become a university professor and researcher in particle astrophysics.

Christopher Jones is a freshman at Morgan State University in Baltimore, majoring in Engineering Physics. He graduated from Mergenthaler Vocational Technical High School in Baltimore, with a 3.6 GPA. He achieved this academic GPA while competing in all three athletic seasons during the school year. He also received a Presidential Award for Academic Excellence in secondary education.

At Morgan State University, Christopher is majoring in Engineering Physics, and has so far achieved a 3.7 GPA with an honors curriculum. He is in three Freshman National Honor Societies. He is a tutor at his former high school, where he is also an assistant head coach in wrestling. He also enjoys chess. Christopher plans to obtain a graduate degree in astronomy/astrophysics.

For information about the NSBP/AAS scholarships, visit the CSMA website: www.aas.org/csma. If you would like to get involved, contact Keivan Stassun: keivan.stassun@vanderbilt.edu

White Privilege (cont'd)

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> *"We usually think of privilege as being a favored state, whether earned or conferred by birth or luck. Yet some of the conditions I have described work to systematically over-empower certain groups."*

(Continued on page 21)

Not "B": Our Experience at the NSBP Meeting (cont'd)

(Continued from page 11)

to lack of cross-institutional communication, coordination and collaboration. Many institutions are doing good work to ensure that those 'gatekeeper' experiences are accessible to the broadest audience possible—attending this meeting reminded us of just how important this is.

The most lasting benefit of the NSBP meeting may be the way in which it enhanced our ability to recognize and hopefully help remove roadblocks to success that face minority scientists entering astronomy. Now when we speak about how astronomy is missing out on the enthusiasm and intelligence of minority undergrads and graduate students by not fully 'unclogging' the pipeline for them, we think about Marx, Demetrius, Kim, and all of the other people we met at the meeting, making us more effective as advocates for our colleagues.

When dealing with issues of diversity in astronomy, it is important to stress that there is no magic bullet that will fix the problem. There are many areas of the educational pipeline that have sprung a leak and are in desperate need of repair. However, the NSBP meeting provides the unique opportunity to interact with undergrads, graduate students, postdocs and faculty of color who have an interest in physics. These interactions will lead to better awareness of the sociological issues that astronomers of color have to deal with, help identify excellent students who can be encouraged to pursue astronomy, and create a mutual trust and respect between astronomers at *all* institutions.

In summary, we certainly still have no idea what it is like to be a minority physics student at a majority institution, and it is important to realize that no matter how many talks we attend, we never will. We may not be "B", as our friend in the elevator pointed out, but we were welcomed into the NSBP community and both of us plan to return next year. As we left the elevator on that first day, our conversation with the young woman turned to our respective academic interests. It was clear that a connection had been made and that we had been accepted. She told us that she was presenting work on chemical engineering, and studying for a chemistry degree. We turned to her with a smile and announced, "We might not be B, but you aren't a P!"

Profile of an NSBP student

Marx Mbonye, born and raised in Kenya, is a Masters student in physics at Southern University and A&M College. He will graduate in Fall 2004. Marx also received his bachelors degree in physics from Southern U., having been granted a scholarship to join the Timbuktu Academy, a program which recruits minority students majoring in scientific fields. Timbuktu Academy provides students with weekly mentoring sessions to help ensure academic success, and helps direct students into academic research projects early in their college career.

Marx's first exposure to astronomy came at a young age—he can remember reading a number of astrophysics books in his family's personal collection while growing up. His father Manasse Mbonye (now at RIT) is a theoretical cosmologist. Thus, a career in professional astronomy was not a foreign concept to Marx. However, Marx didn't enter Southern explicitly planning a career in astrophysics. A series of internships at Goddard Space Flight Center exposed Marx to the wide range of active areas of research in astronomy. Perhaps most central to his decision to pursue a career in astronomy was his interactions with his current advisor, Dr. Greg Stacy. Marx remembers the classes in astrophysics he took from Dr. Stacy as quite challenging, but that the long nights spent bent over homework were more than made up for by the night visits to the observatory.

Marx's thesis work consists of searching for gamma-ray burst signatures in the COBE and WMAP datasets. Marx also has extensive background in instrumentation, having completed four research summer programs working on electrical systems at Fermilab, ATLAS detectors at CERN, and helping with the optical design for an X-ray interferometer that'll be a major component of the NASA Micro Arcsecond X-ray Imaging Mission (MAXIM). Marx has presented his work at a number of regional meetings over the last two years, as well as at the Annual Meetings of the NSBP. Marx will be applying to PhD programs next fall in astrophysics, focusing on experimental and observational high energy astrophysics.

The Culture of Power (cont'd)

(Continued from page 9)

they address those issues of race, gender, and sexual orientation that are most visible. Without an understanding of how class limits people's ability to participate in organizations a group may end up with a remarkably diverse group of middle class participants. Those who are homeless, poor, single parents, working two jobs, or poorly educated (and many people fall into more than one of these categories) often are unable to attend meetings or events because they cannot afford the time, the fees, the childcare, or the energy. When they do attend, they may feel unwelcome because they have not participated previously, because they do not speak the language (or the jargon) of the organizers, or because they are unfamiliar or uncomfortable with the middle-class values and styles of the group.

People with disabilities can be similarly excluded when meetings are held in rooms and buildings which are not accessible, when signing for the hearing impaired is not provided, when accessible public transportation is not available, or when the pace and organization of the meeting does not allow them to participate.

When English is not people's primary language, they may face comparable barriers to finding out about meetings, attending events, becoming part of the leadership of an organization, or simply participating as a member when interpretation is not provided. They are left out when non-English media and communication networks are not utilized or when the pace and style of the group does not allow for the slower pace that a multilingual process requires.

I am Jewish in a Christian culture. I am often aware of ways that the dominant culture of organizations I work with exclude me. When I get together with other Jews in a group I can feel so relieved that we are all Jewish that I fail to notice ways that parts of the Jewish community have been excluded. Because I am in the culture of power in terms of disability, I can overlook the fact that we may all be Jews in the group but we have scheduled a meeting or event in a place that is not accessible. We may all be Jewish but we may have failed to do outreach into the Jewish lesbian, gay, bisexual, and transgendered communities. Or because we are predominantly middle-class Jews, during our discussions we may be unaware of how we are excluding Jews who are poor or working class.

We each have ways that we are in the culture of power (for me, for example, as a white male) and ways that we are marginalized (for me as a Jew). Although we may be good at recognizing how we have been excluded, we are probably less adept at realizing how we exclude others because we do not see excluding others as a survival issue for us. We have to look to people from those excluded groups to provide leadership for us.

It is important that we learn to recognize the culture of power in our organizations so that we can challenge the hierarchy of power it represents and the confinement of some groups of people to its margins.

Assessing the Culture of Power in Your Organization

What does the culture of power look like in your organizations? What does it look like in your office or area where you work? In your school or classroom? In our living room or living space? In our congregation? Where you shop for clothes? In agencies whose services you use?

The following questions can be used to identify cultures of power based on gender, class, sexual orientation, religion, age, race, language, physical ability, immigrant status, or education:

1. Who is in authority?
2. Who has credibility? Whose words and ideas are listened to with most attention and respect?
3. Who is treated with full respect?
4. Whose experience is valued?
5. Whose voices are heard?
6. Who has access to or is given important information?
7. Who talks most at meetings?
8. Whose ideas are given importance?
9. Who is assigned to or expected to take on background roles?
10. How is the space designed? Who has physical access?

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11. What is on the walls?

12. What languages are used? Which are acceptable?

13. What music and food are available?

14. How much are different people paid? How are prices determined?

15. Who cleans up?

16. Who makes decisions?

Every person has the right to complete respect, equitable access, and full participation. Anything less limits the effectiveness of an organization by denying it the contributions—the experiences, insights and creative input—of those individuals and groups excluded or discriminated against.

Those inside the culture of power rarely notice it, while those excluded are often acutely sensitive to how they and others are being marginalized. Therefore leadership in efforts to eliminate the culture of power needs to come from those in excluded or marginalized groups. Unless they are in leadership positions with sufficient respect, status, and authority, the organization's efforts to change will be token, insufficient, and have limited effectiveness.

As they become better at identifying patterns of exclusion, people from within the culture of power can learn to take leadership in identifying marginalizing practices so the organization doesn't have to rely as much on people at the margins to do this work. Although groups will always need to look to the insights of people at the margins to completely identify how systems of oppression are currently operating, there is an important role for those inside the culture of power to take leadership as allies of those excluded. They can challenge the status quo and educate other "insiders" who are resistant to change. It is precisely because they have more credibility, status, and access that people on the inside make good allies. They can do this best not by speaking for or representing those marginalized, but by challenging the status quo and opening up opportunities for others to step forward and speak for themselves.

Every institution of higher education has a culture of power. Each department, division, school, program, and office within it has its own subculture of power. These may not be consistent or overlapping.

The university may have an educated white male administration while the women's studies department has a middle-class white woman's culture of power which excluded poor and working-class white women and women of color of all classes. To be in opposition to the prevailing culture of power does not preclude us from creating subcultures of power that, in turn, exclude others who are even more marginalized than we are.

We have a responsibility, as people who have had access to educational opportunities, to not let the fact that we are on the inside of a culture of power deny educational opportunities to those who are on the outside. We need to fight for equal opportunity and full access and inclusion not just for those groups of which we are a part but also for groups to which we do not belong. For most of us that responsibility means listening to those on the margins, acknowledging our inside status compared with some other groups, and acknowledging our access to power, our resources, and our privileges. Then we can work with others to use our power, resources, and privileges to open up the educational structures to those who continue to knock on the doors.

One of our goals should be to create organizations and institutions that embrace an internal culture of full inclusion and whose members are trained to think critically about how the culture of power operates. We each have a role to play; we each have much to contribute to create such organizations; and we each must push every group we are a part of to move from a culture of power to a culture of inclusion.

Paul Kivel is a trainer, activist, writer, and a violence-prevention educator. His work gives adults and young people the understanding to become involved in social justice work and the tools to become more effective allies in community struggles to end racism. Kivel is the author of numerous books including Uprooting Racism: How White People Can Work for Radical Justice, *which won the 1996 Gustavas Myers Award for best book on human rights,* Men's Work, Making the Peace, Helping Teens Stop Violence, *and most recently,* Boys Will Be Men: Raising Our Sons for Courage, Caring, and Community and I Can Make My World A Safer Place; A Kid's Book about Stopping Violence. *This chapter has been adapted by the author from* Uprooting Racism: How White People Can Work for Racial Justice © *Paul Kivel, 2001 (revised 2002). He can be contacted at pkivel@mindspring.com or through www.paulkivel.com.*

Diversity of Astronomy Faculty (cont'd)

(Continued from page 3)

Table 2: Demographics of Tenured and Tenure-Track Faculty in Various Science and Engineering Disciplines

	Demographic*					
Discipline	Females (all)	White	Black	Hispanic	Asian	Native Amer.
Astronomy	12.2%	90.6% (11.7%)	1.08% (28.6%)	1.38% (22.2%)	6.8% (18.2%)	0.15% (0%)
Physics	6.6%	86.3% (5.9%)	0.6% (0%)	1.91% (18.4%)	11.2% (10.4%)	0.05% (0%)
Chemistry	12.1%	91.2% (10.5%)	1.1% (5.6%)	1.3% (22.7%)	6.2% (10.9%)	0.2% (33%)
Mathematics	8.3%	84.7% (7.6%)	0.9% (10.5%)	2.6% (12.7%)	11.6% (12.4%)	0.1% (0%)
Electrical Eng	6.5%	71.2% (6.3%)	1.8% (20.6%)	2.5% (6.1%)	24.5% (6.1%)	0% (0%)
Bio Sciences	20.2%	88.9% (19.7%)	1% (24.3%)	1.9% (18.8%)	8.1% (25.3%)	0.1% (0%)

* The percentages in the parentheses of the race/ethnicity columns represent the percentage of females within that group. For example, 90.6% of astronomy professors are white, and 11.7% of the white astronomy faculty is female.

3 shows the numbers of astronomy-PhD recipients by demographic from 1985 to 2002. The right four columns give the totals as well as the overall percentages for 1985 to 2002 and 1993 to 2002. To study the pipeline, we examined the makeup of PhD-recipients in the last decade to representation in assistant professors. Table 4 shows these statistical comparisons for astronomy and physics. Without consideration of race and ethnicity, representation of men and women is roughly constant from PhD attainment to assistant professor rank. When these groups are divided by race and ethnicity, some variations become apparent. For example, white male representation decreases from 69.8% to 63.3% from PhD attainment to assistant professor rank. Another somewhat alarming difference is in underrepresented minority (Native American, Black, and Hispanic) females. Although 1.2% of

(Continued on page 23)

Table 3: Astronomy PhD Attainment From 1985-2002.

	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	85-02	%
US citizen & perm res	84	91	73	104	82	96	86	106	111	112	141	149	158	147	117	139	123	109	2028	100%
male	75	84	64	90	69	78	79	91	88	91	116	114	132	120	91	104	94	87	1,667	82.2%
female	9	7	9	14	13	18	7	15	23	21	25	35	26	27	26	35	29	22	361	17.8%
White	77	79	69	93	74	86	83	95	100	97	111	131	132	120	109	115	103	87	1761	90.1%
male	69	76	60	81	63	70	77	84	79	78	92	101	110	96	86	89	76	69	1,456	74.5%
female	8	3	9	12	11	16	6	11	21	19	19	30	22	24	23	26	27	18	305	15.6%
Asians	2	6	1	5	2	5	0	4	3	10	22	12	8	13	3	13	6	13	128	6.5%
male	2	4	1	4	0	3	0	2	1	9	18	8	7	10	3	9	6	12	99	5.1%
female	0	2	0	1	2	2	0	2	2	1	4	4	1	3	0	4	0	1	29	1.5%
Native Am.	0	0	0	0	2	0	0	0	1	0	0	0	1	1	1	1	1	0	8	0.4%
male	0	0	0	0	2	0	0	0	1	0	0	0	1	1	0	0	1	0	6	0.3%
female	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0.1%
Black	0	0	2	0	0	1	0	1	2	0	1	0	2	1	2	1	1	1	15	0.8%
male	0	0	2	0	0	1	0	0	2	0	1	0	1	1	0	0	1	0	9	0.5%
female	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2	1	0	1	6	0.3%
Hispanic	0	2	0	2	2	2	1	4	2	2	4	2	3	2	1	3	7	4	43	2.2%
male	0	1	0	2	2	2	1	3	2	2	2	1	2	2	1	2	6	3	34	1.7%
female	0	1	0	0	0	0	0	1	0	0	2	1	1	0	0	1	1	1	9	0.5%

Data source: Survey of Earned Doctorates (NSF/NIH/USED/NEH/USDA/NASA).

White Privilege (cont'd)

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93-02	%	
1306	100%	US citizen & perm res
1037	79.4%	male
269	20.6%	female
1105	88.0%	White
876	69.8%	male
229	18.2%	female
103	8.2%	Asians
83	6.6%	male
20	1.6%	female
6	0.5%	Native Am.
4	0.3%	male
2	0.2%	female
11	0.9%	Black
6	0.5%	male
5	0.4%	female
30	2.4%	Hispanic
23	1.8%	male
7	0.6%	female

Table 4: Representation of PhD Recipients vs. Assistant Professors in Astronomy and Physics

	Astronomy (FY 2004)		Physics (FY 2002)	
Demographic	PhDs	Asst Prof	PhDs	Asst Prof
Males (all)	79.4%	79.8%	86.7%	88.8%
Females (all)	20.6%	20.2%	13.3%	11.2%
White Males	69.8%	63.3%	68.9%	70.6%
White Females	18.2%	16.5%	9.2%	7.1%
Asian Males	6.6%	11.0%	13.9%	14.9%
Asian Females	1.6%	3.7%	3.4%	2.2%
URM Males	2.6%	5.5%	3.8%	3.3%
URM Females	1.2%	0.0%	0.7%	1.9%

Table 1: Tenured/Tenure-Track Faculty at PhD-Granting Astronomy/Astrophysics Departments by Race/Et

	White				Black				Hispanic			
University	Full	Assoc	Asst	*Tot*	Full	Assoc	Asst	*Tot*	Full	Assoc	Asst	*Tot*
Boston U	11	2.01	2.01	*15.02*	-	-	-	*0*	-	-	-	*0*
Brigham Young U	3	2	1	*6*	-	-	-	*0*	-	-	-	*0*
Cal Inst of Tech	17.02	2.01	2.01	*21.04*	-	-	-	*0*	-	-	-	*0*
Case W Reserve U	1	2.01	-	*3.01*	-	-	-	*0*	-	-	-	*0*
Clemson U	10	4	4.01	*18.01*	1	-	-	*1*	-	-	-	*0*
Columbia U	9.02	3	3.01	*15.03*	-	-	-	*0*	-	-	-	*0*
Cornell U	22.01	1	-	*23.01*	-	-	-	*0*	-	-	-	*0*
Dartmouth Col	6.01	1	3.01	*10.02*	-	-	-	*0*	-	-	-	*0*
FL Inst Tech	1	1	-	*2*	-	-	-	*0*	-	-	-	*0*
Georgia St U	3	5	-	*8*	-	-	-	*0*	-	-	-	*0*
Harvard U	13.01	1	2	*16.01*	-	-	-	*0*	-	-	-	*0*
Indiana U	6.02	1	1.01	*8.03*	-	-	-	*0*	-	-	-	*0*
Iowa State U	4.01	1	2	*7.01*	-	-	-	*0*	-	-	1	*0*
Johns Hopkins U	12.01	1	-	*13.01*	-	-	-	*0*	-	-	-	*0*
Michigan State U	4	3.01	-	*7.01*	-	-	-	*0*	-	-	-	*0*
NM Inst of M & T	3.01	1	2.02	*6.03*	-	-	-	*0*	-	-	-	*0*
NM State U	3	2	3.01	*8.01*	-	-	-	*0*	-	-	-	*0*
Northwestern U	3	2	1.01	*6.01*	-	-	-	*0*	-	-	-	*0*
Ohio State U	14.01	4.01	-	*18.02*	-	-	-	*0*	-	-	-	*0*
Penn State U	9.01	1	3	*13.01*	1.01	-	-	*1.01*	1	-	-	*0*
Princeton U	12.02	1	-	*13.02*	-	-	-	*0*	-	-	-	*0*
Rice University	5.01	2	4	*11.01*	-	-	-	*0*	-	-	-	*0*
Rutgers St U of NJ	4	4	3.01	*11.01*	-	-	-	*0*	-	-	-	*0*
SUNY Stony Brook	6	1	-	*7*	-	-	1	*1*	-	-	-	*0*
Texas Christian U	-	1.01	-	*1.01*	-	-	-	*0*	-	-	-	*0*
Tufts U	1	-	-	*1*	-	-	-	*0*	-	-	-	*0*
U Arizona	18.03	3	5.01	*26.04*	-	-	-	*0*	1	-	-	*1*
U Cal - Berkeley	11.01	-	1	*12.01*	1	-	-	*1*	-	-	-	*0*
U Cal - Santa Cruz	18.03	-	2	*20.03*	-	-	-	*0*	-	-	-	*0*
U Chicago	25	1	2	*28*	-	-	-	*0*	1.01	1.01	-	*2.02*
U Col - Boulder	12.01	2.01	4	*18.02*	-	-	-	*0*	-	-	-	*0*
U Delaware	2	-	1	*3*	-	1.01	-	*1.01*	-	-	-	*0*
U Denver	4	2	2	*8*	-	-	-	*0*	-	-	-	*0*
U Florida	10.01	6	1.01	*17.02*	-	-	-	*0*	-	-	-	*0*
U Hawaii - Manoa	26.02	3.01	3	*32.03*	-	-	-	*0*	1	-	1	*2*
U Ill, Urb-Chmpgn	5	1	7	*13*	-	-	-	*0*	-	-	-	*0*
U Maryland	7	5.01	3	*15.01*	-	-	-	*0*	-	-	-	*0*
U Mass - Amherst	6.01	1	2	*9.01*	-	-	-	*0*	-	-	-	*0*
U Michigan	4	2	3.01	*9.01*	-	-	-	*0*	-	-	-	*0*
U Minnesota	10.01	-	-	*10.01*	-	1	-	*1*	-	-	-	*0*
U Oklahoma	5	-	1.01	*6.01*	-	-	-	*0*	-	-	-	*0*
U Penn	1	3	1.01	*5.01*	-	-	-	*0*	-	-	1	*0*
U Pittsburgh	2	2.01	2	*6.01*	-	-	-	*0*	-	-	-	*0*
U Rochester	8.01	1	2.01	*11.02*	-	-	-	*0*	-	-	-	*0*
U Texas-Austin	18.01	-	1	*19.01*	-	-	-	*0*	-	-	-	*0*
U Toledo	5.01	1.01	1	*7.02*	-	-	-	*0*	-	-	-	*0*
U Washington	8.02	1.01	2	*11.03*	-	-	-	*0*	-	-	-	*0*
U Wisc - Madison	12.02	1	2.01	*15.03*	-	-	1	*1*	-	-	-	*0*
UCLA	12.02	1	1	*14.02*	-	-	-	*0*	-	-	-	*0*
Vanderbilt U	-	1	1	*2*	-	-	-	*0*	-	-	1	*1*
Yale U	*7*	-	1	*8*	-	-	-	*0*	-	-	-	*0*
Total	418.39	86.12	87.18	591.69	3.01	2.01	2.00	7.02	4.01	1.01	4.00	9.02
% within race	70.7%	14.6%	14.7%	100%	42.9%	28.6%	28.5%	100%	44.5%	11.2%	44.3%	100%
% of grand total	64.1%	13.2%	13.4%	90.6%	0.46%	0.31%	0.31%	1.08%	0.61%	0.15%	0.61%	1.38%
% Fem in column	9.3%	14.0%	20.7%	11.7%	33.3%	50.0%	0.0%	28.6%	25.0%	100%	0.0%	22.2%

*Numbers after decimals designate number of females. Departments granting the PhD in astronomy or astrophysics not shown are those wh

Reference: "The Nelson Diversity Surveys" Nelson, D. J.: Norman, OK, 2003; http://cheminfo.chem.ou.edu/faculty/djn/diversity/top50.h

nicity, by Gender, and by Rank (FY 2004)*

Asian				Native Am.				Total
Full	Assoc	Asst	*Tot*	Full	Assoc	Asst	*Tot*	
-	-	-	*0*	-	-	-	*0*	**15.02**
-	-	-	*0*	-	-	-	*0*	**6**
1	1	1	*3*	-	-	-	*0*	**24.04**
-	-	-	*0*	-	-	-	*0*	**3.01**
1	1	1	*3*	-	-	-	*0*	**22.01**
-	1	-	*1*	-	-	-	*0*	**16.03**
-	1	-	*1*	-	-	-	*0*	**24.01**
-	-	-	*0*	-	-	-	*0*	**10.02**
-	-	1	*1*	-	-	-	*0*	**3**
-	-	-	*0*	-	-	-	*0*	**8**
1	-	-	*1*	-	-	-	*0*	**17.01**
-	-	-	*0*	-	-	-	*0*	**8.03**
-	-	-	*0*	-	-	-	*0*	**7.01**
-	-	-	*0*	-	-	-	*0*	**13.01**
-	1	-	*1*	-	-	-	*0*	**8.01**
-	-	-	*0*	-	-	-	*0*	**6.03**
-	-	-	*0*	-	-	-	*0*	**8.01**
1	-	-	*1*	-	-	-	*0*	**7.01**
1	1.01	-	*2.01*	-	-	-	*0*	**20.03**
-	-	1	*1*	-	-	-	*0*	**15.02**
-	-	-	*0*	-	-	-	*0*	**13.02**
1	1	-	*2*	-	-	-	*0*	**13.01**
-	-	-	*0*	-	-	-	*0*	**11.01**
-	-	-	*0*	-	-	-	*0*	**8**
-	-	-	*0*	-	-	-	*0*	**1.01**
-	-	-	*0*	-	-	-	*0*	**1**
-	-	2	*2*	-	-	-	*0*	**29.04**
-	1.01	1	*2.01*	-	-	-	*0*	**15.02**
3	-	-	*3*	-	-	-	*0*	**23.03**
1	1	1	*3*	-	-	-	*0*	**33.02**
-	-	-	*0*	-	-	-	*0*	**18.02**
-	-	-	*0*	-	-	-	*0*	**4.01**
-	-	-	*0*	-	-	-	*0*	**8**
-	-	-	*0*	-	-	-	*0*	**17.02**
2.01	1	1	*4.01*	-	1	-	*1*	**39.04**
1.01	-	-	*1.01*	-	-	-	*0*	**14.01**
-	-	-	*0*	-	-	-	*0*	**15.01**
1	2	1	*4*	-	-	-	*0*	**13.01**
-	-	1	*1*	-	-	-	*0*	**10.01**
-	-	1.01	*1.01*	-	-	-	*0*	**12.02**
-	-	1.01	*1.01*	-	-	-	*0*	**7.02**
-	-	1	*1*	-	-	-	*0*	**6.01**
-	-	-	*0*	-	-	-	*0*	**6.01**
-	-	-	*0*	-	-	-	*0*	**11.02**
2	-	-	*2*	-	-	-	*0*	**21.01**
-	-	-	*0*	-	-	-	*0*	**7.02**
-	-	-	*0*	-	-	-	*0*	**11.03**
-	-	-	*0*	-	-	-	*0*	**16.03**
-	-	-	*0*	-	-	-	*0*	**14.02**
-	-	-	*0*	-	-	-	*0*	**3**
-	-	2.02	*2.02*	-	-	-	*0*	**10.02**
16.02	12.02	16.04	44.08	0	1	0	1	**652.81**
36.3%	27.3%	36.4%	100%	0%	100%	0%	100%	
2.5%	1.8%	2.5%	6.8%	0%	0.15%	0%	0.15%	**100%**
12.5%	16.7%	25.0%	18.2%	0%	0%	0%	0%	12.2%

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(Continued from page 20)

astronomy PhDs are received by this demographic (corresponding to 14 women), none is an assistant professor.

Future studies should continue to assess the trends in rank and representation of women and minorities. Particularly, analysis should focus on the 20.2% female assistant professors and their advancement to higher ranks. Our results indicate the pipeline from PhD attainment to tenure-track faculty positions is generally filled. However, the overall numbers of women and minorities are still bleak. Consequently, outreach efforts should continue to encourage historically underrepresented groups to pursue astronomy and technical sciences as a whole.

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Laura Lopez graduated from MIT in May, 2004. She will join the graduate program in astronomy at Penn State University in the Fall. Dr. Donna Nelson is professor of chemistry at the University of Oklahoma. This article, and all accompanying data, are also available on the CSMA website at: www.aas.org/csma

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