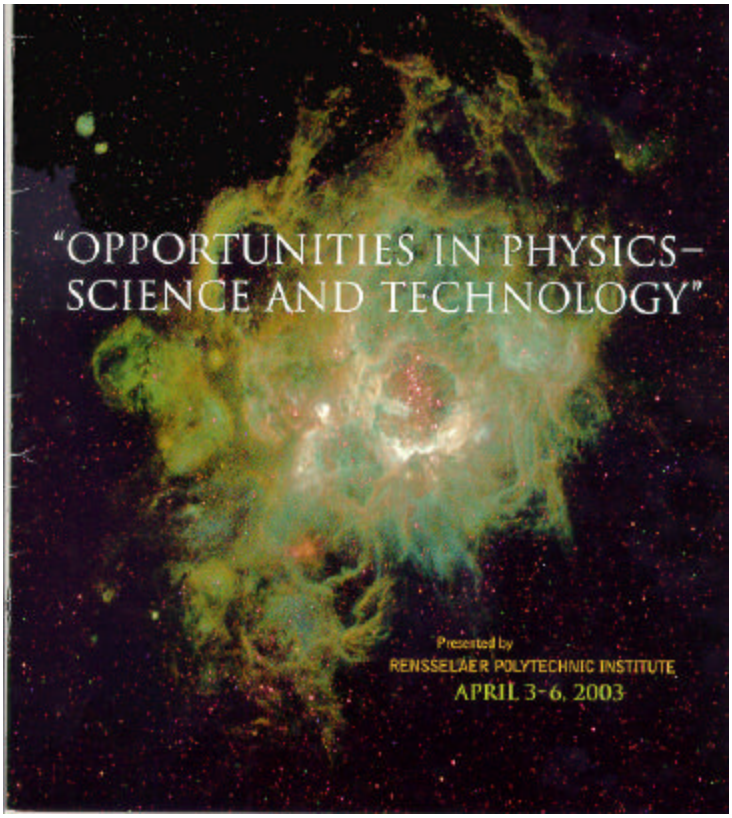
FINDINGS FROM THE SURVEY OF PARTICIPANTS OF THE 17TH ANNUAL NATIONAL CONFERENCE OF BLACK PHYSICS STUDENTS



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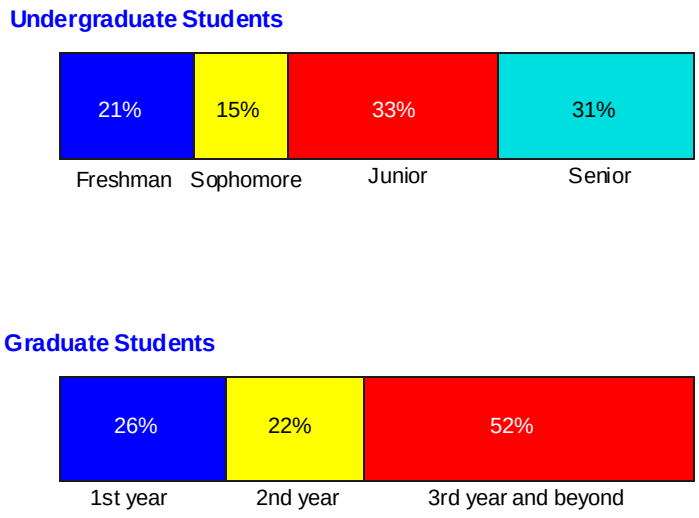
INTRODUCTION

The 2003 National Conference of Black Physics Students (**NCBPS**), held the weekend of April 3rd through April 6th, was hosted this year by the Rensselaer Polytechnic Institute in Albany, New York. This marks the 17th consecutive year that the conference has brought together Black undergraduate and graduate physics students to meet with Black working professionals, corporate and graduate school recruiters, and others concerned with the issue of the continuing paucity and isolation of African Americans in the field of physics. Organizers of the conference once again contacted the Statistical Research Center of the American Institute of Physics to conduct an evaluative study of the meeting.

The objectives of this year's evaluation, as with the previous conference evaluations, were to examine the backgrounds and demographic characteristics of the conference participants, to ascertain their goals in attending, and to assess whether the conference succeeded in meeting those goals. Attendees were asked about their career goals choices, recent physics research experiences, and the factors that helped them persist towards their goals. The questionnaire also asked them to rate various aspects of the conference as well their evaluation of physics courses and the professors they had encountered during their academic careers.

The questionnaire instrument was designed by the Statistical Research Center in close consultation with organizers of the conference and structured to allow comparison with the reactions of conference attendees from previous years. The four-page questionnaire was distributed with registration materials when the students signed in for the conference, and then collected on the last night. Of the 121 students who attended the conference, 104 (86%) returned a completed questionnaire, a slight increase from last year's 81% response rate.

Figure 1. Class standing of the NCBPS attendees, 2003.



DEMOGRAPHIC BACKGROUND OF ATTENDEES

This year we found that there were significantly more undergraduate than graduate participants present at the conference (78% versus 22%). Among other things, this meant that organizers were able to impact physics students earlier in their academic careers, where help and encouragement in persisting might be most effective. Almost two-thirds of the undergraduate student participants, slightly less than last year, were upperclassmen, while close to three-quarters of the graduate student attendees were in their second year or beyond (**Figure 1**). This is a very strong indicator of the organizer's success in recruiting students that span the entire gamut of the academic pipeline.

As was also the case last year, the median age for undergraduates was 21 years, and for graduate students it was 28 years (**Figure 2**). We found that there was little age difference among the male and female undergraduate participants at the conference. The median age for both groups was 21 years. But as was true last year and in prior years, there was an age difference among male and female graduate student attendees. The median age among female graduate students was 24 years, while among their male counterparts it was 29 years.

We found that the overall proportion of females among NCBPS participants this year was 41%, higher than in previous years. Among undergraduate participants, the proportion of females was 44%, slightly higher than last year's 39%. Among graduate students the proportion of conference attendees who were female was 30%, also higher than last year's 23% (**Figure 3**).

Figure 2. Age by degree of the NCBPS attendees, 2003.

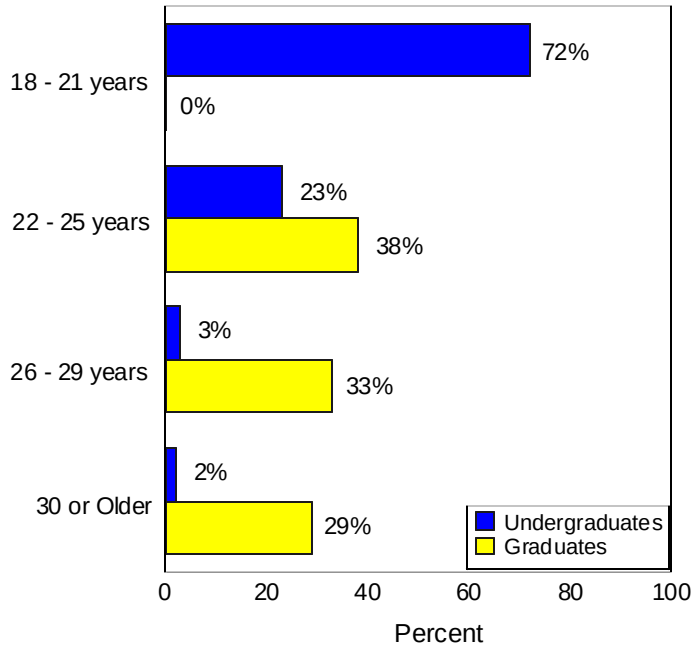
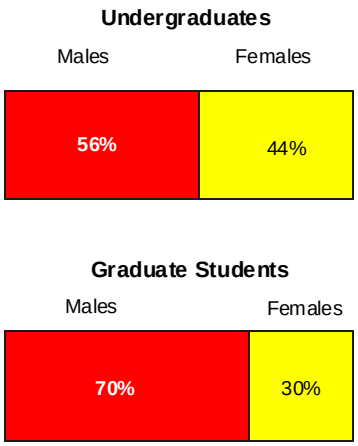


Figure 3. Sex by student status of Conference participants, 2003.



Attendees were asked to provide us background information about the minority composition at their high school, undergraduate institution, and if applicable, their graduate school of higher learning (**Figure 4**). As in years past, students from minority-majority schools were very heavily represented. In high school, 66% of the attendees reported that they had attended minority-majority schools, and the number coming from essentially all-minority high schools continues to increase from year to year. An even higher percentage (84% of all participants) went on to Historically Black Colleges or Universities (HBCUs) or minority-majority colleges.

One curious but consistent finding over the years has been the disparity in school background between male and female graduate students (**Table 1**). We once again found that female graduate respondents were more likely to come from integrated high schools. Yet, every single one of them reported that they had attended essentially all minority-majority

Figure 4. Minority composition at respondents' high school, undergraduate, and graduate institution, 2003.

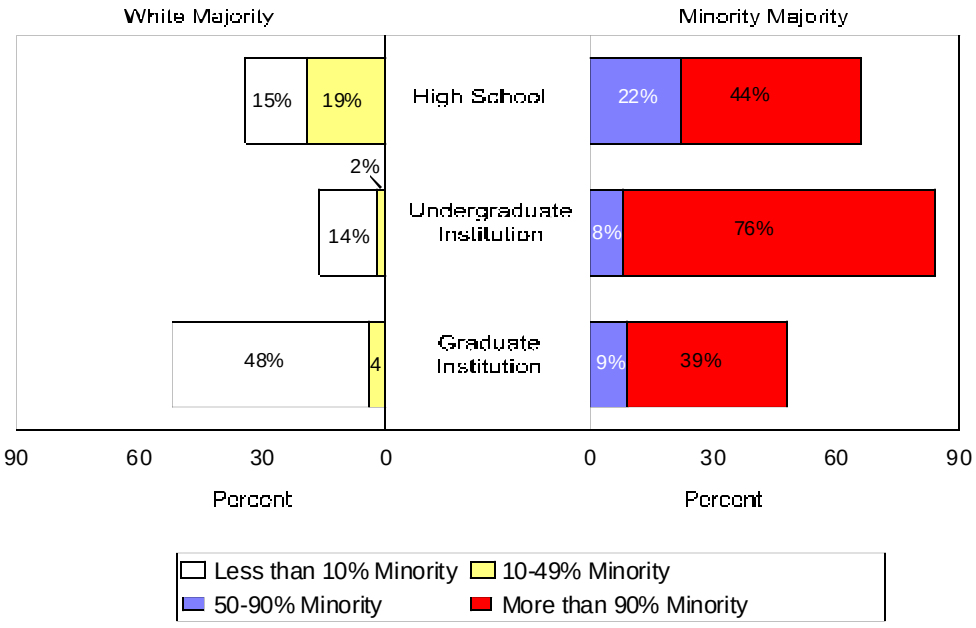


Table 1. Minority composition at respondents' highschool, college and graduate institution, 2003.				
	Undergrad Males %	**Undergrad Females %**	**Grad Males %**	**Grad Females %**
White majority high school	33	37	20	56
Minority majority high school	67	63	80	42
White majority college	18	3	50	-
Minority majority college	82	97	50	100
White majority graduate school	-	-	62	29
Minority majority graduate school	-	-	38	71

colleges and universities as undergraduates, and a majority were attending minority-majority graduate institutions as well. On the flip side, male graduate students were more likely to come from minority-majority high schools but then split equally between minority-majority and integrated colleges. Currently however, they were more likely to be attending integrated graduate institutions.

This year we found that 48% (versus 52% last year) of the conference graduate attendees went to HBCUs for their undergraduate work, compared to 95% of current undergraduate participants (versus 81% last year).

With the relatively small number of African-American physics students in the academic pipeline, the recruiting efforts of the Conference organizers is worth noting. For instance, even though many of the conference participants had attended previous NCBPS meetings, more than half of the undergraduate students, and around one quarter of the graduate students this year were new to the conference. And while in previous years there was a very high proportion of students coming from a relatively small set of school concentrated in the South, this year that percentage was lower. Finally, there were also students from a few colleges that had not been previously represented.

PHYSICS & SCIENCE BACKGROUND

Participants were asked to provide data on their current academic studies, including their evaluation of the courses and professors they had encountered during their scholastic careers. As in the past, the Conference drew only a smattering of students (9%) who weren't majoring in physics, and slightly less than half of these were in engineering. The high degree of satisfaction with their choice of field was once

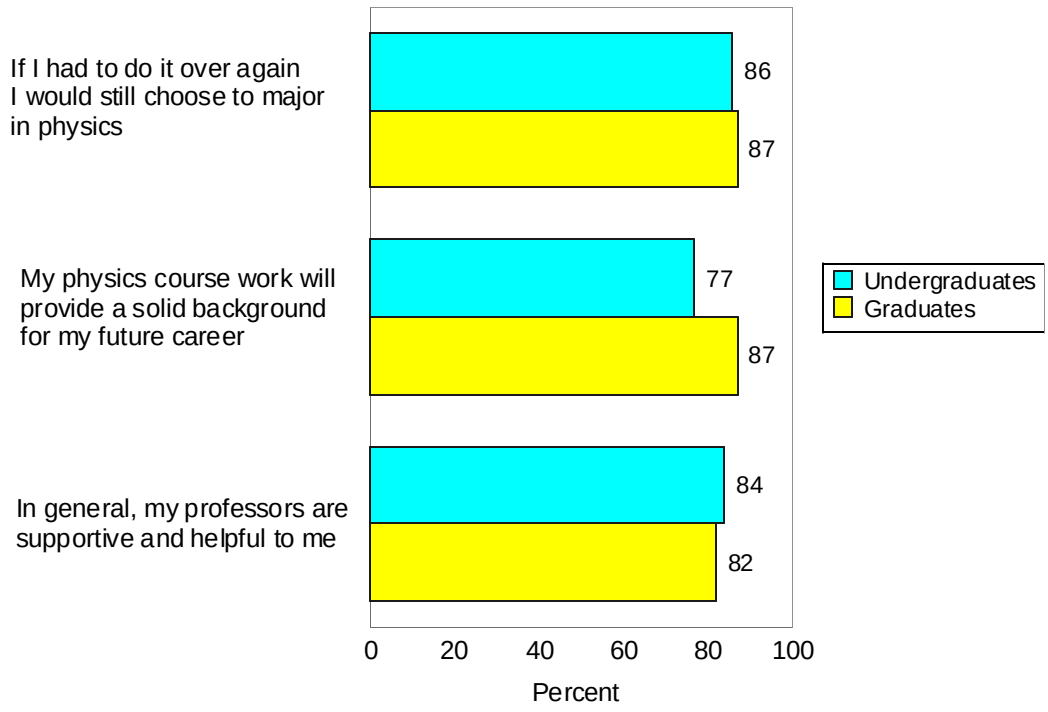
again evidenced by the proportion of respondents (86%) who indicated that they would still major in physics if they had it to do over again.

Other indications of academic satisfaction were that 80% of the respondents felt that their course work would provide a solid background for their future careers, and 83% (versus 76% last year) of them felt that in general the professors they had encountered were supportive and helpful.

However, we found a number of differences when we controlled for gender and level of study (**Figure 5**). Men were more likely to say they would major in physics if they had it to do over again (91% versus 78% for women). They were also more likely than their female counterparts to feel that their physics course work would provide a sold background for their future careers. On the other hand, female respondents were somewhat more positive about the professors they had encountered than were male respondents (88% versus 79%). And not surprisingly, given their more advanced status, graduate student participants were more likely than their undergraduate counterparts to feel that their physics course work would provide a solid background for their future careers (87% versus 77% for graduate respondents).

More detailed examination of the data revealed additional findings of interest. For instance, female undergraduate students were the least likely to want to major in physics again if they had it to do over (76% versus 93% for male

Figure 5. Extent to which NCBPS participants agree with the following statements, 2003.



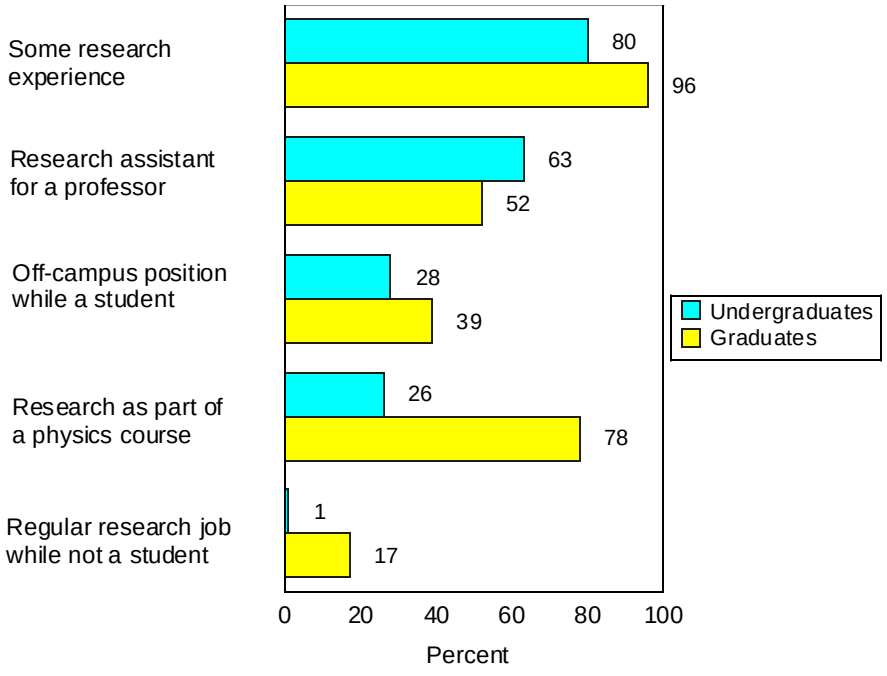
undergraduate students and 87% for graduate students). All of them reported that the professors they had encountered had been helpful or supportive. Along similar lines, we found that a greater proportion of students at HBCUs reported that they would major in physics if they had it to do over again (94% versus 85% for non-HBCU students). And they were also more likely to feel that their course work would provide a solid background for their future careers (94% versus 77% for non-HBCU students).

As we found in prior years, the vast majority of attendees indicated that they already had some type of research experience in physics. As to be expected, this was true for a very high percentage of graduate students (**Figure 6**).

Surprisingly, and at the same time gratifyingly, it was also true for 80% of the undergraduates. This year again, we found that a greater proportion of the undergraduate students indicated that they had been a research assistant to a professor (63% versus 52% for graduate students). In addition 39% of this year's graduate students and 28% of the undergrads reported that they had an off-campus position or internship that included a physics research component.

Not surprisingly, graduate students were more likely to have engaged in research as part of a physics course than their undergraduate counterparts. Interestingly, however, graduate female students were somewhat more likely to have engaged in research as part of a physics

Figure 6. Proportion of undergraduate and graduate attendees reporting different types of physics research, 2003.



course than graduate male students (86% versus 75%). Similarly, they were also more likely than any other group at the conference to have had an off-campus position (57% versus around 31% for the other 3 groups). Among undergraduates, female students were more likely than males to have engaged in research as part of a physics course (31% versus 21%), and more likely to have had a regular research job while a student (69% versus 58% for males).

We also found variations in research experience between students attending HBCU's and those at white-majority schools. More students at non-HBCUs reported having had research experience as part of a physics course than did students at HBCUs (63% versus 33%). On the other hand, a greater proportion of students at HBCUs said that they had worked as a research assistant for a professor (62% versus 50% for non-HBCU students). Finally, a greater percentage of HBCU students reported having worked in a regular research job than their non-HBCU counterparts (33% versus 19%).

ACADEMIC GOALS & CAREER ASPIRATIONS

Participants were queried in detail about their future aspirations and career objectives. Regardless of their current level of study, virtually all of the respondents indicated a desire to obtain a graduate degree, with around 84% aspiring to a PhD. Around half of the students reported that they definitely wanted to pursue careers in physics, with another 39% reporting that they were considering going in that direction. Only 13% indicated definite plans to shift into another field.

An idea of the different types of physics careers conference participants aspired to can be seen in **Table 2**. More than two-thirds of the participants hoped to make their careers in physics research or teaching, including 16% who indicated an interest in physics research but were unsure of the employment sector they preferred. Male students were more likely than females to lean towards a career in academe (33% versus 19% for female students). Not

Table 2. NCBPS participants' anticipated career goals, 2003.

	Percent
Academic teaching or research in physics	27
Non-academic physics research in industry	10
Non-academic physics research in government / national labs	16
Physics research in unspecified employment sector	16
Other types of physics-related positions	10
Careers in other sciences	16
Careers outside of physics altogether	5

surprisingly, graduate students were more likely to favor a career in academe (35% versus 25%), while undergraduate students seemed to be more open to careers in other, albeit related, fields. Students at non-HBCUs were definitely more focused in on physics research in both industry and in academe than were their HBCU counterparts who favored careers in other science related fields instead.

Attendees were also asked to indicate the motivation underlying their career goal choices (**Table 3**). As we found in times past, the most common reason, ranked by almost half of all respondents, was the intrinsic challenge of the work. The chance to give something back to the community came in a distant second, while only 12% indicated that salary and benefits were the most important factors for them. This latter percentage was higher among undergraduate male students than any other group at the conference (18% versus 8% for undergraduate females, 6% for graduate males, and 0% for graduate females). As in the past, we also found that students at HBCUs were far more concerned with giving something back to the community than were students at non-HBCUs (31% versus 19%).

Students were asked to name the most important factor that helped them to persist in their physics studies (**Table 4**). As in years past, love of the subject matter came in first, ranked the number one reason by more than a third of all respondents. Support from African-American faculty came in second , while support from family came in third. However, these feelings were not evenly distributed among participants. Graduate female students stressed external support, from family and from African-American faculty members, while their male counterparts were much more likely to cite love of the subject matter. As was found in years past, students at non-HBCUs were more likely

Table 3. Main factor that led NCBPS participants to their choice of career goal, 2003.

	Undergrad Males %	Undergrad Females %	Grad Males %	Grad Females %	Overall %
Challenging or interesting work	40	42	63	71	46
Chance to give something back to the community	29	36	25	0	29
Salary and benefits	18	8	6	0	12
Respect people have for this type of work	7	11	0	14	8
Other	7	3	6	14	6

Table 4. Factors that have helped NCBPS participants persist in their studies, 2003.		
	Top Factor %	**Among Top 3 %**
Love of subject matter	35	63
Support from Black faculty members	21	42
Family support	19	63
Career prospects	10	48
Support from other Black students	8	41
Support from non-Black faculty members	1	18
Support from other non-Black students	1	5
Other	5	15

to stress love of the subject matter (56% versus 31%), while, not surprisingly, students at HBCUs cited peer support from other Black physics students (9% versus 0% for non-HBCUs). Students at HBCUs were also more likely to stress support from African-American faculty members (24% versus 6%), while students at non-HBCUs focused on family support (38% versus 16%).

ASSESSMENT OF THE CONFERENCE.

Besides the background information on the conference attendees, the main purpose of the study was to elicit the participants' assessments of their experience. We started by inquiring about their general reasons for attending, and their overall evaluation of how successfully the conference met their needs. We subsequently asked about their specific objectives for attending the conference, and whether the conference succeeded in meeting those concrete objectives.

While in previous years the most important specific reason given for attending the conference was networking, this year learning about further study in physics tied with networking with Black professionals for first place (**Table 5**). Networking with other Black physics students came in second with 21% of the students citing this as their main reason, while meeting with school or job recruiters came in third. Hearing research talks was far less of a focus for the student participants. It came in last with only 4% of the respondents mentioning it as their main objective for attending the conference.

Upon closer inspection of the data, we found that graduate students were more focused on networking with other Black physics students

Table 5. Goals in attending NCBPS conference, 2002.		
	Top Goal %	**Among Top 3 %**
Learning about further physics study	29	62
Networking with Black professionals	29	70
Networking with other Black students	21	79
Meeting with recruiters	16	52
Hearing research talks	4	28
Other	-	5

than their undergraduate counterparts (35% versus 17%). Interestingly, we discovered that graduate female students were more interested in learning about further study in physics, while networking both with other Black physics students and with Black professionals was foremost in the minds of graduate male students.

Curiously, undergraduate students seemed to be more interested in hearing research talks than graduate students. And we found that students at non-HBCUs were far more concerned with networking with other black physics students (44% versus 17%), while HBCU respondents were more focused on meeting with school and job recruiters (19% versus 0% for non-HBCU).

The overall assessment of the conference further emphasizes the positive reaction that the participants displayed. While research was not uppermost in their minds, 81% of the respondents viewed all or most of the research talks as exceptional, and around 84% gave a similar rating to the quality of the speakers (**Table 6**). The sessions on career strategies and the keynote addresses were all given positive

Table 6. Overall assessment of key aspects of the conference, 2003.				
	Proportion rated exceptional			
	All %	**Most %**	**Half %**	**Few/None %**
Content of research talks	39	42	16	3
Quality of speakers	43	41	14	2

ratings by the majority of the conference attendees. Around half of the respondents felt that almost all of the research talks were presented in a clear and interesting manner (**Figure 7**). However, only around a third of the students felt that the contents of the talks were directly relevant to the physics they were studying. Surprising, however, was the fact that more than a third of even the graduate students reported that many of the topics covered during the research talks were new ground for them.

Male students felt that the sessions on career strategies were more relevant to their future plans than did female students (67% versus 48%). Similarly, a far lower percentage of undergraduate female respondents felt that the contents of the research talks were directly relevant to the physics they were studying (11% versus 40% for undergraduate males, 38% for graduate males, and 57% for graduate females).

Interestingly, we also found that undergraduate female respondents were the least positive about the sessions on career strategies (44% versus 64% for undergraduate males and 71% for graduate students). Males, on the other hand were in general more positive about the research talks (54% versus 37%), and also more positive about the keynote addresses than were females (74% versus 57%). Interestingly, students at non-HBCU schools were much more positive in general about all aspects of the research talks and about the keynote addresses than their HBCU counterparts.

The students consistently rated the conference a success on all of the goals the conference set for itself. Overall, every goal received an excellent or good rating from over 80% of the participants. However, the most highly rated aspect of the conference this year, surprisingly, was the opportunity to learn about further study in physics (**Table 7**). Networking with Black

Figure 7. Extent to which NCBPS participants agree with the following statements, 2003.

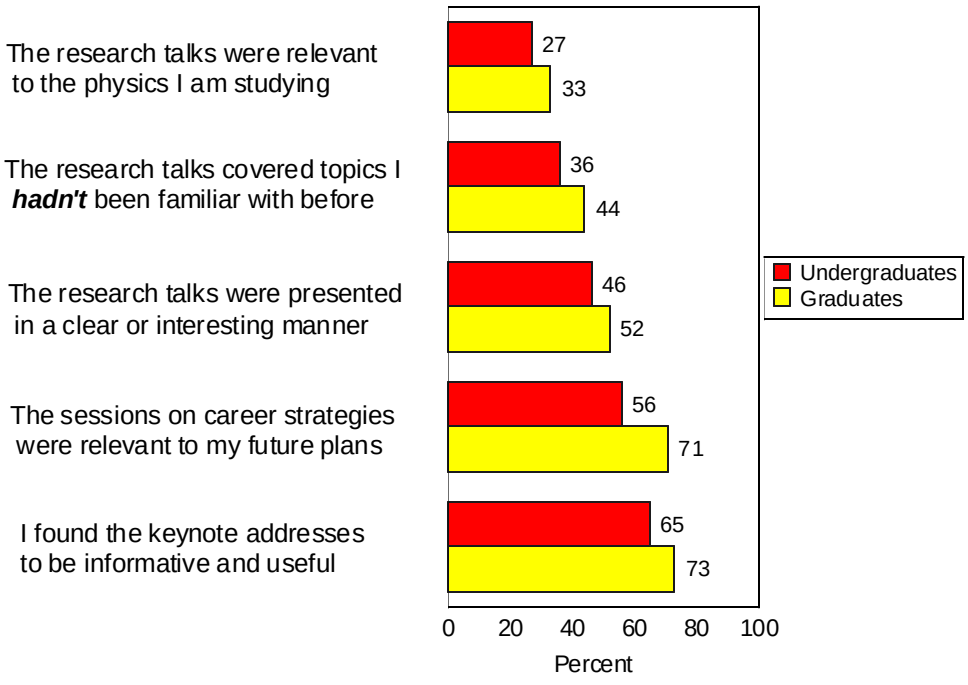


Table 7. Performance of the Conference in meeting goals, 2003.				
	Excellent %	**Good %**	**Fair %**	**Poor %**
Learning about further physics study	51	45	4	0
Networking with other Black students	51	31	18	0
Networking with Black professionals	48	35	12	5
Meeting with recruiters	46	37	15	2
Hearing research talks	51	30	19	0

professionals, number one for a number of years, tied with meeting school and job recruiters for second place. And networking with other Black students tied for third place with the opportunity to hear research talks.

Interestingly, female respondents were more positive about meeting school and job recruiters than male respondents (91% versus 77%), while male respondents gave much higher ratings to networking with other Black physics students (87% versus 75%). Graduate students thought that networking went better than their undergraduate counterparts, while undergraduates felt more positive about meeting with recruiters. Similarly, respondents from non-HBCUs gave very high ratings to the opportunity of networking, both with other black physics students and with Black professionals.

Participants attendees were again asked to rate the practical arrangements (i.e. travel arrangements, housing, length of sessions, geographical location, and the overall length of the Conference) of this year's NCBPS meeting (**Table 8**). Ratings for the housing facilities

Table 8. Ratings of the practical arrangements at the Conference, 2003.				
	Excellent %	**Good %**	**Fair %**	**Poor %**
Travel arrangements	72	21	6	1
Housing facilities	77	20	2	1
Length of sessions	44	35	18	3
Length of the Conference	55	36	6	3
Geographic location of the Conference	32	29	31	8

were up this year. Travel arrangements and overall length of the conference were also rated very favorably, even though slightly below the high ratings of the previous years, while the length of the individual sessions was rated slightly higher this year. We again asked students to rate the geographical location of the Conference, and only slightly more than half of them rated it good or excellent, due mostly to the fact that it snowed and a lot of the students were from southern states and weren't really prepared for the snowfall.

CONCLUSION

The findings reported above and the verbatim comments below clearly indicate that in most ways the conference was quite successful in fulfilling its goals and meeting the expectations of those attending. The content of the sessions, the keynote speakers, and the practical arrangements of the conference all received stellar ratings. In fact, the main negative comment that surfaced was the fact that it snowed during the conference! Otherwise, all indications were that the conference contributed significantly to the goal of nurturing and fostering an ongoing community of Black physicists and future physicists.