# FINDINGS FROM THE SURVEY OF PARTICIPANTS OF THE 14TH ANNUAL NATIONAL CONFERENCE OF BLACK PHYSICS STUDENTS

## Physics: The Science That Shapes the Future


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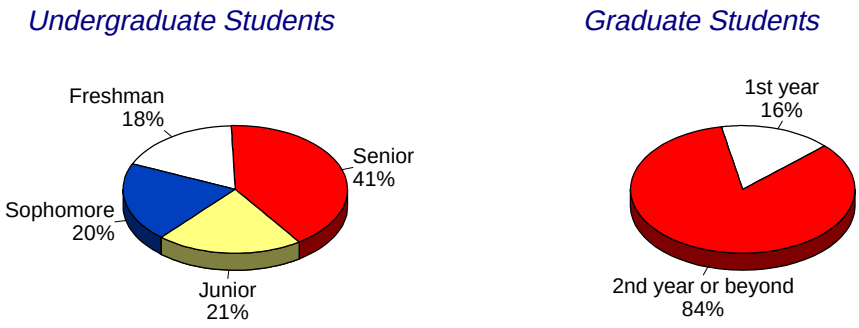
## INTRODUCTION

On the weekend of March 16th -19th, North Carolina A&T State University hosted the year 2000 joint meetings of the National Conference of Black Physics Students (**NCBPS**) and the National Society of Black Physicists (**NSBP**). This marks the 14th consecutive year that the conference brought together Black students interested in physics to meet with Black working physicists, corporate and graduate school recruiters, interested faculty members and administrators, professional society representatives, and others concerned with increasing the representation of minorities in physics. Meeting with the professional society afforded the 168 participating undergraduate and graduate students a unique opportunity to establish contact with experienced Black scientists, and enjoy an opportunity to learn of contributions to physics made by Blacks. Organizers of the conference once again contracted with the Statistical Research Center of the American Institute of Physics to conduct an evaluative study of the meeting.

The objectives of this year's survey, as with the previous conference evaluations, were to examine the backgrounds and demographic characteristics of the participants, to ascertain their goals in attending, and to assess whether the conference succeeded in meeting those goals. The students were queried on their career goal choices, recent physics research experience, and the factors that helped them persist towards their goals. They were also asked to evaluate their physics courses and the professors that they had encountered during their academic careers.

The questionnaire instrument was designed by the Statistical Research Center in consultation with organizers of the conference, and structured to allow comparison with the reactions of participants from previous years. The four-page questionnaire was distributed with registration materials when the students signed in for the conference, and then

**Figure 1. Class standing of NCBPS attendees, 2000.**



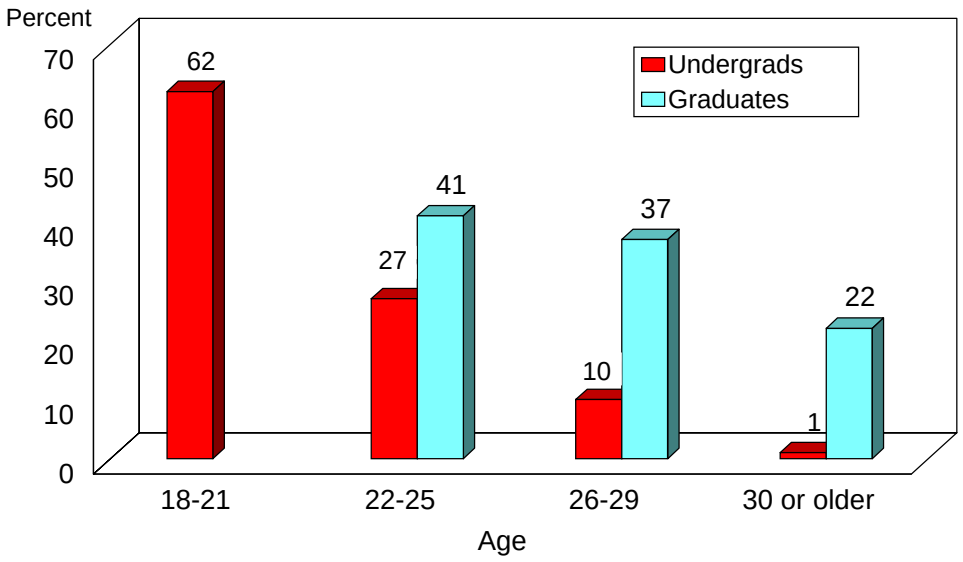
collected on the last day. Of the 168 students who attended the conference, 145 (86%) returned a completed questionnaire, an improvement over last year's 76%.

Conference participants, as in previous years, were fairly evenly distributed between undergraduates (57%) and graduate students (43%). However, a higher proportion (38%) of this year's undergraduates were lowerclassmen, compared to only 21% last year. Among the graduate participants 84% (versus 76% last year) were beyond their first year (**Figure 1**). This is an indicator of the conference's success in recruiting students across the entire range of the academic pipeline.

The median age for undergraduates was 21 years while for graduate students it was 27 years (**Figure 2**). Once we controlled for undergraduate/graduate status, we found that there was little age difference between male and female undergraduate students. There was, however, a slight difference among male and female graduate students. The median age among female graduates was 25, while among male graduates the median age was 27 years.

Women were once again very well represented. The overall proportion of the female respondents was 43%, slightly higher than previous years. The proportion of females among undergraduates this year was 48%, also an increase from previous years. Nationally, we know that around one in five physics bachelors recipients are female. Accurate figures broken down by race are very hard to come by, but the Digest of Educational Statistics data for bachelor recipients in *all* the physical sciences show a significantly higher proportion of women among blacks (56%) than among other racial or ethnic groups (35%).

**Figure 2. Age by degree of the NCBPS attendees, 2000.**

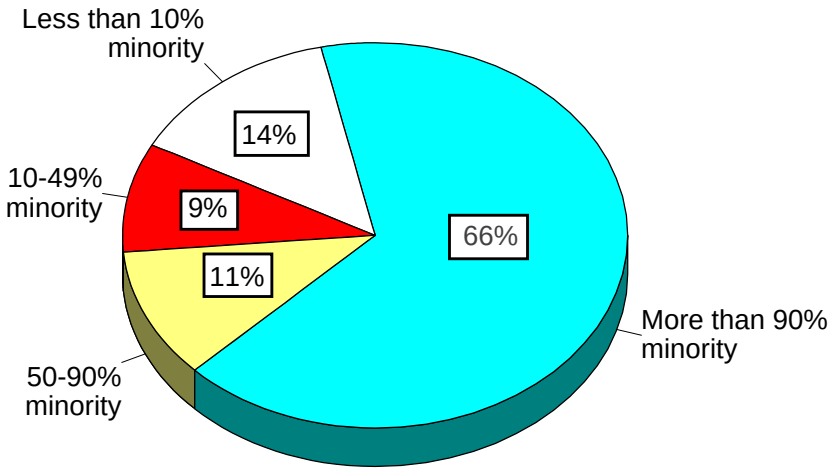


Among graduate students, the proportion of conference participants who were female was 37%, virtually the same as last year. National figures broken down by both race and gender are not available, but the conference figure for graduate women compares favorably to the national average for all physics graduate students of 13% women.

Conference participants were asked about the minority composition at their high school and undergraduate institution. As has been the case at each prior conference, students from minority-majority schools were heavily represented (**Figure 3**). Curiously, we found that female respondents were more likely to come from integrated high schools but less likely to come from integrated colleges. Fifty-nine percent of the female students (versus 41% of the males) indicated that they had attended a white majority high school, while 18% (versus 29% of the males) said that they attended white majority colleges.

Along similar lines, we found that around 87% of the undergraduates at the conference reported that they were attending an Historically Black College or University (HBCU). Nationally, by contrast, AIP's most recent *Enrollments and Degrees Report*, found that 56% of Black physics bachelors recipients went to HBCUs. It is interesting to note, however, that only 44% of the graduate students attending the conference had attended an HBCU as undergraduates. This suggests that strategies to encourage transition to graduate studies in physics may be especially helpful to HBCU students.

**Figure 3. Minority composition at respondents' undergraduate institution, 2000.**



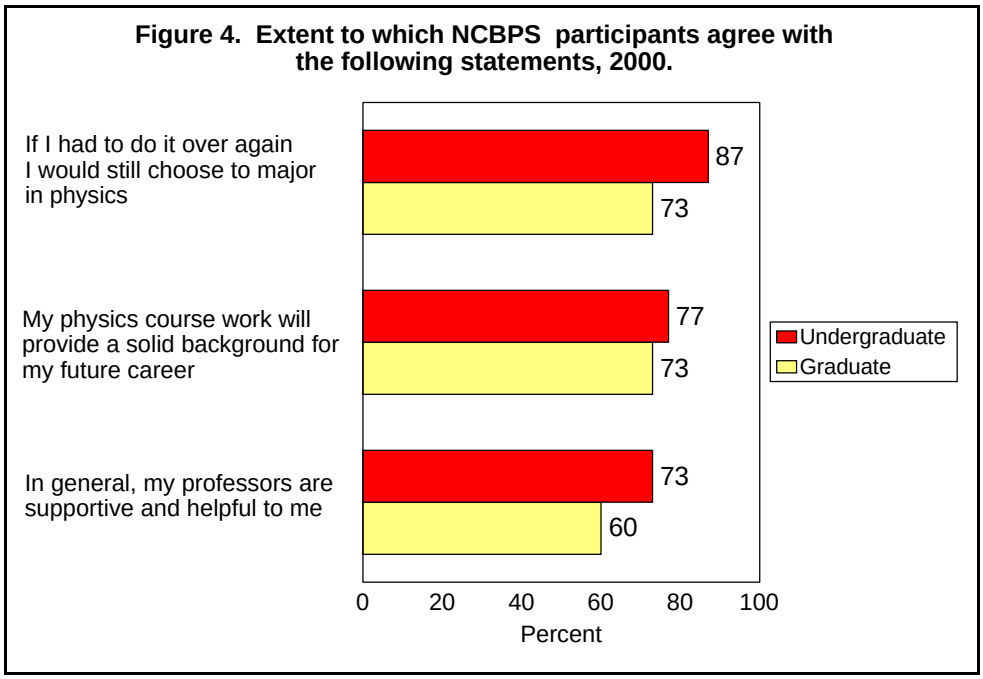
Fifty-eight percent of this year's conference participants reported that they had attended previous NCBPS meetings with about 3 out of 4 of that group attending last year's conference at the University of California - Berkeley. While this was a high rate of repeat attendance, it is also worth noting that over half of the undergraduate students this year were new to the conference, including several from schools that had not been previously represented. However, as before, we still see a high proportion of participants (80%) coming from a relatively small set of schools concentrated in the South, a region where most HBCUs are located.

## PHYSICS (& SCIENCE) BACKGROUND

Attendees were asked about their academic experiences so far, including their evaluations of the courses and professors they had encountered during their academic careers. The overwhelming majority (90%) of the students indicated that physics was their major subject. The high level of satisfaction with their choice of field was reflected in the percentage of respondents (81%) who indicated that they would major in physics again if they had to do it over. Over three quarters of the respondents felt that their physics course work would provide a solid background for their future careers, and two-thirds of the respondents felt that in general the professors they had encountered were supportive or helpful.

There were a number of small but consistent differences in the attitudes by level of study (**Figure 4**) and by gender. For example, men were more likely than women to feel that their physics course work would provide a solid background for their future careers (82% vs 66%). Male students were also slightly more positive about the professors they had encountered during their academic careers than their female counterparts. Interestingly, female graduate student participants were least likely (57% versus 83% for male graduate students, and 74% for

**Figure 4. Extent to which NCBPS participants agree with the following statements, 2000.**



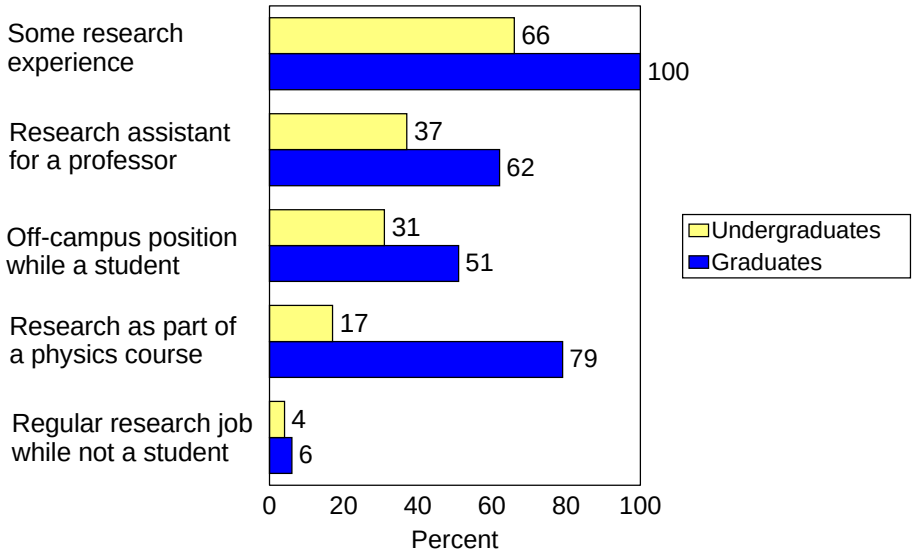
female undergraduates) to say that their physics course work would provide a solid background for their future careers. They were also less likely to feel that they would choose to major in physics again (68% versus 79%), and less than half of them felt that the professors they had encountered in their academic careers were supportive or helpful.

As was the case in previous years, the vast majority of participants reported having already had some type of research experience in physics (**Figure 5**). Over one in three undergraduates and almost two third of the graduate students reported that they had been a research assistant for a professor. Half of this year's graduates and 31% of the undergraduate students indicated that they had an off-campus position while attending school. This year again, more females than males (45% vs 35%) reported that they had worked as a research assistant for a professor. Students at non-HBCUs were more likely than students at HBCUs to have held a research assistantship. Oddly, given the dissatisfactions mentioned at the end of the previous paragraph, female graduate students reported having more research experience as part of their course work, as a research assistant, and in an off-campus job than any other group of students that attended the conference.

## ACADEMIC AND CAREER GOALS

Conference attendees were also asked in detail about their future academic aspirations and career objectives. As in prior years, a very high proportion (80%) of the conference participants indicated their intention to earn a PhD degree. In reality, only a very small fraction are likely to realize this goal. For example, in recent years, only 1 in 7 Black physics bachelors recipient actually earned a Masters degree in physics, and only 1 in 20 went on to a Physics PhD. While

**Figure 5. Proportion of undergraduate and graduate attendees reporting different types of physics research, 2000.**



encouraging academic aspirations is important, it is also vitally important to put realistic information in students' hands, so they may make the best informed and most appropriate choices. Information on what is expected of graduate students, on the typical length of the course of study, and other similar aspects of graduate studies in physics would probably be valuable.

Almost half of the students reported that they definitely wanted to pursue careers in physics, with another 41% indicating that they were considering going in that direction. Fifteen percent indicated a desire to do something outside of the field of physics. As shown in **Table 1**, those hoping for a career in physics were fairly evenly divided between those aiming to remain in or leave academia, with another 18% unsure what employment sector they preferred. Interestingly, undergraduate students were more than twice as likely to want careers outside of physics as graduate students.

Participants of the conference were further asked to indicate the motivation underlying their choice of career goals. As in previous years, we found that the most common reason, ranked number one by around half of all respondents, was the intrinsic challenge of the work. However, the proportion of students who indicated that their main focus was the chance to give something back to the community has been rising steadily from around 20% in 1996 and 1997 to 30% this year. Only 9% pointed to the salary and benefits as the most important factors for them. However, this percentage was higher among students at HBCUs than at non-HBCUs (12% versus 2%). As in prior years, we found that graduate students were somewhat more likely than undergraduates to mention the desire for challenging work (56% versus 44%) as their main reason for choosing their career goals.

New to this year's survey, students were asked to name the most important factors that have helped them to persist in their physics

**Table 1. NCBPS participants' anticipated career goals, 2000.**

| | **Percent** |
|---|---|
| Academic teaching or research in physics | 23 |
| Non-academic physics research in industry | 21 |
| Non-academic physics research in government / national labs | 9 |
| Physics research in unspecified employment sector | 18 |
| Other types of physics-related positions | 10 |
| Careers in other sciences | 14 |
| Careers outside of physics altogether | 5 |

| Table 2. Factors that have helped NCBPS participants' persist in their studies, 2000. | | |
|---|---|---|
| | **Top Factor %** | **Among Top 3 %** |
| Love of subject matter | 28 | 60 |
| Family support | 21 | 57 |
| Career prospects | 16 | 45 |
| Peer Support from other Black students | 14 | 45 |
| Support from Black faculty members | 14 | 51 |
| Support from non-Black faculty members | 4 | 20 |
| Support from other non-Black students | 0 | 10 |
| Other | 3 | 12 |

studies (**Table 2**). The highest proportion of them ranked love of the subject matter as their number one reason, with family support and career prospects coming in second and third. Around one in seven each indicated that support from Black faculty mentors and other Black students was the most important factor. Support from non-Black students and faculty ranked at the bottom of the list.

Graduate students were more likely to mention family support and support from other Black physics students as their main reason for persisting in their studies. Undergraduates, on the other hand, were more focused on love of the subject matter than their counterparts (31% versus 25%). Female respondents were almost twice as likely as male respondents to choose career prospects as the main reason for their perseverance. Male students, on the other hand, put greater stress on their love of the subject (33% versus 23%). Students at non-HBCUs were more likely than HBCU students to rely on family support (33% versus 15%), while, not surprisingly, students at HBCUs stressed peer support of other African-American students (16% versus 9% for those at non-HBCUs).

## ASSESSMENT OF THE CONFERENCE

The purpose of this report is twofold: to present a profile of the participants and their reasons for attending, as presented above, and to obtain their assessment of the conference and evaluate how well it met their stated needs. As part of the latter, attendees were asked about their specific objectives in attending the conference, and whether they found the conference useful in terms of meeting those objectives.

| Table 3. Goals in attending NCBPS conference, 2000. | | |
|---|---|---|
| | **Top Goal %** | **Among Top 3 %** |
| Networking with Black professionals | 30 | 82 |
| Networking with other Black students | 25 | 85 |
| Learning about further physics study | 24 | 59 |
| Meeting with recruiters | 12 | 43 |
| Hearing research talks | 3 | 18 |
| Other | 6 | 13 |

This year we found that networking with Black professionals, rather than other students, was the most common reason participants gave for attending (**Table 3**). This is probably due in part to the fact that the NSBP held their meeting at the same time as the NCBPS conference, giving the students more of a chance to network with Black professionals. While in years past, networking with other Black physics students had been the most important reason for attending, this year it was second on the list. Learning about further physics study came in a close third, with around a quarter of the conference attendees reporting this as their main objective.

Not surprisingly, given where they came from, an even higher proportion (46%) of non-HBCU students reported that networking with Black professionals was their main reason for attending the conference. Along similar lines, we found that graduate students (38%) were also more focused on networking with Black professionals than were the undergraduates (28%). In contrast, respondents at HBCUs were more likely than non-HBCU respondents to focus on learning about further physics study.

Other major objectives of the conference were to give the students an opportunity to hear about recent research and general topics of interest in physics, as well as to offer them tools and contacts to help them persevere on their chosen career paths. As in years past, very few students (12%) reported meeting with recruiters as their primary objective for attending the meeting. Interestingly, however, respondents at HBCUs were more likely to stress meeting with school and job recruiters as their primary motivation than respondents at non-HBCUs (19% versus 2%). By the same token, only 3% of the respondents mentioned hearing research talks as their main impetus for attending. This lower priority given to the research talks is further evidenced by the fact that a third of this year's conference attendees (versus 38% last year) reported attending fewer than 4 research sessions.

The assessment of the conference and its various aspects gives the strongest evidence of the positive experiences of the participants

| Table 4. Overall assessment of key aspects of the conference, 2000. | | | | |
|---|---|---|---|---|
| | Proportion rated exceptional | | | |
| | All % | Most % | Half % | Few/None % |
| Content of research talks | 22 | 54 | 23 | 1 |
| Quality of the speakers | 23 | 49 | 26 | 2 |
| Sessions on: | | | | |
| The undergraduate experience | 36 | 43 | 15 | 6 |
| Getting into graduate school | 28 | 55 | 15 | 2 |
| Getting through graduate school | 29 | 52 | 17 | 2 |
| Pursuing effective career strategies | 44 | 33 | 19 | 4 |

(**Table 4**). The sessions on the undergraduate experience, getting into graduate school, and getting through graduate school were all given high ratings. Surprisingly, undergraduates gave higher ratings to both sessions on getting through graduate school and pursuing effective career strategies than did graduate students. Undergraduates also gave higher ratings to the quality of speakers (82% versus 61%) than graduate students. As in previous years, the most highly rated aspect of the conference was the opportunity for networking, both with other Black students and with Black professionals. An overwhelming majority of the students (95%) rated the opportunity to network as good or excellent (**Table 5**). Learning about further study in physics and meeting with recruiters were rated only slightly less positively.

| Table 5. Performance of conference in meeting goals, 2000. | | | | |
|---|---|---|---|---|
| | Excellent % | Good % | Fair % | Poor % |
| Networking with Black professionals | 72 | 24 | 3 | 1 |
| Networking with other Black students | 77 | 19 | 3 | 1 |
| Learning about further physics study | 51 | 40 | 9 | - |
| Meeting with recruiters | 42 | 43 | 10 | 5 |
| Hearing research talks | 25 | 54 | 18 | 3 |

| Table 6. Ratings of the practical arrangements at the conference, 2000. | | | | |
|---|---|---|---|---|
| | **Excellent %** | **Good %** | **Fair %** | **Poor %** |
| Travel arrangements | 59 | 35 | 5 | 1 |
| Housing facilities | 80 | 13 | 6 | 1 |
| Length of sessions | 30 | 52 | 15 | 3 |
| Length of conference | 50 | 42 | 8 | - |

Although not a priority of attendees, more than 3 out of 4 of them also gave the research talks a strongly favorable rating.

As shown in **Table 6**, the practical arrangements (i.e. travel, housing, length of the sessions, and the overall length of the conference) were also well regarded by the overwhelming majority of the participants. Ratings for travel arrangements were up this year. Ratings for the housing facilities, the length of the individual sessions, and the overall length of the conference were also very favorable, as was the case in previous years.

## CONCLUSION

Although the students may have all had different goals and objectives for attending, the findings in this report definitely suggest that in most ways the conference was quite successful in fulfilling the goals and meeting the expectations of those attending. As an addendum, we are publishing the comments that half of the students added to the questionnaire. We believe that these comments generally speak for themselves, giving one more indication of the critical role the conference seems to play in attracting Black students to physics and then helping to sustain them there.