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## D.E.I. In Physics

*Simonetta Liuti*

A year ago, we published a series of articles in the CSWP Gazette that shared a sense of urgency with the leaders in academia, the funding agencies, and the national labs to take concrete steps to stop sexual harassment in physics [1]. We concluded with a “share of optimism” by noting that many positive signs were pointing at the fact that anti-harassment policies, as well as new initiatives, were taking a central stage among policymakers in STEM, at a higher, more incisive level. We spent the rest of the year believing that we were, in fact, witnessing a continuously progressing movement affecting the physics community’s climate for diversity, equity, and inclusion (DEI) at all levels, in many directions, and in various organizations.

For instance, promoting inclusive and equitable research (PIER) plans were introduced as essential components of DOE grant proposals. PIER plans reflect the applicants proposed activities “to promote diversity, equity, inclusion, and accessibility in their research projects”. The community seemed to move forward, undergoing a thorough introspective analysis and an extensive internal debate on how to improve and avoid possible pitfalls associated with the rise of performative activism. The latter can be defined as “the act of outwardly demonstrating support of a cause without implementing meaningful actions behind the scenes” [2,3]. Performative activism can be detrimental to progress, and it is conducive to not taking concrete action and not challenging people on race and gender issues. Performative activism eventually leads to shutting down critical thinking, despite positioning oneself as anti-racist, and pro-gender equity policies; despite the statements of solidarity. In a progressive move, a substantial portion of the physics community responded to this issue by requesting that accountability be made part of codes of conduct and community guidelines, thus guaranteeing that true behavioral changes are possible [4]. Even if facing obstacles such as the one posed by performative activism, we have been living in times when dialogue has finally become possible. New arenas for discussion have opened where DEI issues can be healthily debated. For example, the particle physics community’s planning exercise (dubbed “Snowmass”) held in July 2022 at the University of Washington, promoting a new community engagement frontier (CEF) to improve and sustain

strategic engagements with students, industry, the public, government, underrepresented populations “drawing support for and strengthening the field of particle physics while playing key roles in serving these communities” [5]. Furthermore, many international physics meetings now regularly include specific DEI discussion sessions.

However, recent events, including actions in several sectors of regional governance, are currently threatening this positive thrust forward. DEI programs might come to a peremptory halt as we are facing new, aggressive, unprecedented challenges. We are witnessing a multipronged backlash that might even bring to reversing many of the recent successes and positive outcomes in the prevention of sexual harassment. We are, therefore, very concerned. The attack on DEI addresses the whole academic community. Two ongoing Supreme Court cases are questioning the legality of diversity and race-conscious admissions of students into college [6]. DEI initiatives would be obliterated if a ruling in the plaintiff’s favor occurred. At the local level, the recent actions by the governors of Florida and Texas constitute a clear threat by recently approving legislation restricting controversial-deemed topics from being taught in general education courses, expanding the hiring and firing powers of university boards and presidents, and, most importantly, prohibiting spending related to DEI programs [7]. Other states might follow suit: the governor of Virginia took out the word “equity” from the title of the office of DEI. Meanwhile, at the University of Virginia, the conservative group named Jefferson Council one of whose members participates in the university board, during its April meeting attacked the university’s DEI programs alleging that DEI efforts have a “sinister nature” and play into “victim narratives”. The university president and provost have assured via a recent email to the community that the university will remain committed to facilitating diversity despite the outcome of the Supreme Court rulings [8].

Given the current climate, what bothers us, specifically, is the attack on DEI in STEM. An idea has been recently circulated nationwide that science is objective and merit-based, therefore it is naturally neutral and not affected by DEI issues. This belief was elaborated on in a

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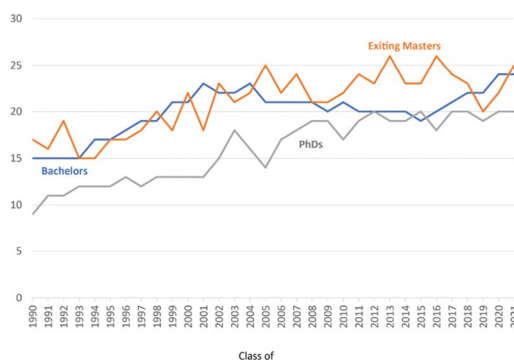
The COM/CSWP GAZETTE, a newsletter of the American Physical Society Committee on Minorities (COM) and Committee on the Status of Women in Physics (CSWP), is mailed free of charge to all those listed on the Roster of Women and Minorities in Physics, all U.S. physics department chairs, and others upon request. Please address all correspondence to: COM/CSWP Gazette, American Physical Society, One Physics Ellipse, College Park, MD 20740-3844, or email to: [gazette@aps.org](mailto:gazette@aps.org). Opinions expressed are those of the authors and do not necessarily reflect the views of the APS or of the COM and CSWP.

## AIP's Data on Gender

Rachel Ivie, AIP Senior Research Fellow, Science and Society

Have you ever wondered where to find data on gender in physics? In addition to government statistics posted by APS, the American Institute of Physics (AIP) has a variety of data on gender at almost every education level and in a variety of sectors. APS is one of AIP's ten Member Societies, and one of AIP's purposes is to collect data that are of use to APS and our other Member Societies. AIP has a team of survey researchers and social scientists dedicated to collecting and providing the latest data on education, employment, and diversity in physics and astronomy. Broadly speaking, AIP collects two types of survey data: 1) from physics and astronomy departments, and 2) from individuals.

Percent of Bachelors, Masters and Doctorates in Physics Earned by Women, Classes 1990 through 2021



From all degree-granting physics and astronomy departments in the US, AIP annually collects data on the number of students enrolled in introductory physics and astronomy courses, the number of students at the junior and senior levels, and the number of degrees earned in physics and astronomy. Based on these data, **Figure 1** shows the percentages of women earning bachelor's, master's, and PhDs over time. After a period of relatively little change between 2005-2015, the percentage of women receiving physics bachelor's degrees recently surpassed the levels that were seen in the early 2000s. It is worth noting that the number of women earning bachelor's continued to climb between 2005-2015, although the numbers of women were increasing at the same rate as the numbers of men.

Until recently, departmental degree data were available by gender and race/ethnicity separately. Starting in the academic year 2020-21, AIP started collecting degree data in order to examine the intersectionality between gender and race/ethnicity. We also

started collecting data on degree recipients who identify as a gender other than man or woman. These new data will be available soon. AIP will provide data on the intersection of gender and race/ethnicity where possible, but sometimes the number of people in these intersectional categories is so small that we cannot make the data public without violating respondents' confidentiality.

Every other year, AIP collects data on the number of faculty members by gender and rank from the physics and astronomy departments. There are few other disciplines that have reliable data on the percentage of faculty members who are women. As **Table 1** shows, the percentage of women faculty members in physics departments has been steadily increasing and is about the same as the percentage of physics PhDs earned by women. Until 2016, AIP collected data on the race and ethnicity of faculty members from the physics and astronomy departments. However, starting in 2021, a survey of individual faculty members will provide data on race and ethnicity.

In addition to collecting data from individual college and university physics and astronomy faculty members, AIP also collects data from high school physics teachers, including data on the gender of people who take and teach high school physics. For example, about half of high school physics students are young women, and about two-fifths of high school physics teachers are women. We also have data on how gender affects teachers' perceptions and teaching experiences. For example, we found that controlling for educational background and years of experience, women felt less well-prepared to teach high school physics than men did.

Our 2021 survey of physics and astronomy majors who are seniors allowed us to examine the differential effects of COVID on students' confidence about academic performance during COVID. As **Figure 2** shows, there is

Percent of Physics Faculty Members Who Are Women, 1998-2020

Academic Rank	Academic Year						
	1998	2002	2006	2010	2014	2018	2020
Full Professor	3%	5%	6%	8%	10%	12%	13%
Associate Professor	10%	11%	14%	15%	18%	21%	21%
Assistant Professor	17%	16%	17%	22%	23%	25%	25%
Instructor / Adjunct	*	16%	19%	21%	23%	27%	27%
Other	13%	15%	12%	18%	20%	19%	19%
<b>Highest Physics Degree Offered</b>							
PhD	6%	7%	10%	12%	14%	16%	16%
Master's	9%	13%	14%	15%	18%	20%	21%
Bachelor's	11%	14%	15%	17%	20%	22%	23%
<b>Overall</b>	<b>8%</b>	<b>10%</b>	<b>12%</b>	<b>14%</b>	<b>16%</b>	<b>19%</b>	<b>19%</b>

\* These data were not collected in the 1998 survey year.

## DNP Allies program (for CSWP)

Filomena Nunes and Roxanne Springer

October 2022: Here we are in downtown New Orleans attending the Division of Nuclear Physics Fall Meeting. The conference hotel has a perfect view of the Superdome made infamous by what Katrina revealed. Yes, this is relevant. Several participants noticed a bunch of physicists roaming around wearing a bright orange scarf or an orange armband. What is going on? they ask. Well, let us tell you the story. It all started a few years ago. Actually, this solution only started a few years ago. The problem has been with us since ... always.

Conferences are an exciting time to share our physics results, discuss the progress in the field, make connections and allow new ideas to blossom. Yet, for some members these meetings are a source of great anxiety, large disappointment, and sometimes physical harm. Despite it being invisible to many, there are members of our community who have negative experiences at our meetings, experiences that drive them away from physics. These experiences can range from repeated microaggressions to extreme situations of sexual harassment or bullying. We are likely all united in agreeing that this shouldn't happen. We hopefully all agree that we can prevent it. In particular, we are scientists who know how to solve problems. If we care about this problem, then we will put as much effort into solving it as we do into finding the mass of neutrinos. Even though it might take longer. The program described below is just an example of one effort.

In 2017 the DNP Allies program was introduced with the goal of promoting an inclusive and welcoming space for everyone, regardless of a person's identities. We Allies are members of our community, we get vetted, and we go through appropriate training by an external consultant Paulette Granberry Russell (J.D.) so we can become effective upstanders. We participate in the DNP fall meeting, just like everyone else in our community, but with the orange scarf we are signaling that we are a safe harbor for anyone who has concerns. Allies are available to talk to participants who believe they have experienced harassment. Allies can help those who feel unsure whether a situation requires additional action and can serve as escorts for participants who don't feel safe. Allies also help members who are less informed to begin to understand problematic behavior. Our presence

is a reminder to all that everyone should abide by the APS Code of Conduct.

The program started small, with only half a dozen of Allies, but every year it has grown, and today we have over 30 trained Allies amongst the DNP membership. Although the program has been considered a success, it does not mean it has been an easy ride. Every DNP meeting comes with its own challenges and surprises, requiring Allies to learn and adapt. There are some in our community who do not value the work we do because they do not experience harassment themselves. There are some who would like to see us do much more. We understand the frustration on both sides. Without the impact of Katrina, many of us would remain in ignorance of the community living in Louisiana that has an entirely different experience from those who see New Orleans as a great vacation spot. Similarly, several recent surveys in Physics show that there is a community of underrepresented people who experience physics meetings entirely differently from those who experience great networking opportunities and the thrill of being part of creating new knowledge.

In the last few years, the word has spread about the DNP Allies to other APS divisions and beyond. We have responded to numerous requests from physicists from other communities and openly shared our wisdom. As a consequence, DPP has already introduced their own Allies program and DAMOP is studying this possibility. We have been asked to consider expanding the Allies program to the APS March and APS April meetings. Non-APS physics conference organizers have contacted us, asking us to send Allies to their events or inquiring whether we can help them training their own Allies. To meet demand, we have begun a train-the-trainer program. Our consultant has worked with the most experienced Allies to provide us with the skills needed to train new Allies ourselves. But at the moment we have not scaled the concept sufficiently to meet all the requests we receive. We need help, from the community, from the APS, and from funding agencies. If more of us are effective "allies" – as part of this program or some other – we are confident that sooner or later, we will create and sustain a broadly welcoming space in physics. We hope each of you will commit to helping solve this problem.



Filomena Nunes



Roxanne Springer



## Carving A Space In Physics: How Racial Inclusivity is Important

Kiara Chantel Ruffin, University of Virginia, Undergraduate Physics Major



Lasata Tulhadar and Kiara C. Ruffin at the UVA table for the 2022 NSBP Conference in Charlottesville

Physics is a discipline filled with countless forms of beauty. From muons to black holes, it was this beauty that initially caught my attention, and that continues to fuel my passion for the subject. My journey into physics began at the age of eight. I vividly remember watching Brian Greene explain the mysteries of the cosmos in his magnum opus *“The Elegant Universe,”* which helped me come to the realization that physics was something that I wanted to pursue in the future. Like Greene, I wanted to explore the mysteries of the cosmos. The thought of being able to study and have knowledge about topics was enticing.

As I grew older and furthered my pursuit of physics, I began to realize that I was an anomaly. I am a Black woman aspiring to obtain a degree in physics —there is no doubt that this is a rare occurrence. Fortunately, I have received positive support and words of encouragement from friends and family from an early age. Of course, there were moments when I would discuss my plans with my peers and receive looks of pure shock or disbelief. These moments helped solidify my choice. This made me become more cognizant of the negative perceptions that the physics community had about the presence of underrepresented minorities. Undeniably, these perceptions had a substantial impact on my outlook toward my career choice.

I had the pleasure of growing up in a diverse area. Upon transferring to my current institution, I went in with the hopes of finding a community within the physics department. These hopes were later disrupted when I

became aware of how monolithic everything was. I was not really used to what I was experiencing. My upbringing was a formative experience that I hoped could be maintained throughout my career. I hope that I could have the same level of comfort as life progressed. As time passed, I began to notice how small the Black physics community really was, which worried me. As I came to this realization, I feared racial discrimination and social alienation from my peers. Ultimately I made the decision to get to know other Black students in physics and other adjacent departments, with the hope of creating a community. This inspired me to establish a National Society of Black Physicists (NSBP) chapter at my institution.

With the NSBP chapter, I want to provide a counter-space for not only Black students but other underrepresented minorities in physics and astronomy as well. We have to emphasize the significance of having an organization dedicated to diversity, equity, and inclusion. Of course, there were varying reactions from students and faculty when it was formally announced that the initiative would take place. A handful of people encouraged me to continue with the effort, while others saw it as a rebellion against the clubs that were already established. Other times we were simply ignored. It was my intent to shape the club as being complementary to the other clubs that were already available. Many Black students in physics are not made aware of the resources, information, and comfort provided to their non-Black peers, so I made it my mission to provide resources for those around me. It was also crucial for me to realize that despite the variety of challenges that I have and will continue to encounter, I can not give up on those around me. I am one person, however, I believe that I can make a difference. There are several changes that need to be made in the environment around me. This can be done by increasing the number of underrepresented minorities at both the student and faculty levels, increasing resources for minority students, and career preparation. I believe these initiatives will help foster an equitable community within my current institution. My goal is to adequately implement a safe space for those around me and I hope to do this by gaining more of an understanding about the prevalence of underrepresentation in the field.

To further my understanding of the state of diversity in physics and astronomy, I searched for evidence to help provide deeper insight into the issues that are being faced by Black physics students. The statistics were shocking, to say the least. Despite efforts to increase awareness of the stark racial disparities in the field, there has been little improvement. In 2017, the American

twenty-six pages long article published in the Journal of Controversial Ideas and signed by twenty-nine authors including two Nobel prize winners and a theoretical physicist [9].

The manuscript was rejected by lead journals, including the Proceedings of the National Academy of Science, as it lacks evidence-based, scientifically sound argumentations. Nevertheless, it reverberated in the community since it was given a large platform by articles/op-eds in the New York Times [10] and in the Wall Street Journal [11].

Against the *misinformation* spread by the confusing, non-scientific-based argumentations stated in this highly publicized article, and contrarily to what the authors of [8] affirm, the motivation for establishing DEI committees in all scientific organizations and STEM departments across the country is to ensure that a *merit* and *excellence*-based system is put in place and guaranteed to be sustainable. As many of us know from being directly involved, establishing DEI committees is just part of an ongoing process, with many components, requiring the whole community to be engaged as elaborated on extensively in the 2017 National Academy of Sciences report [12].

We ask a fundamental question to the authors of [9]: *whose merit* is this?

Underrepresented minorities have notoriously been excluded from participating in the, presumably, meritocratic system which has been shown over again to be dominated by one cultural identity: white and male [13]. Discrimination has been rampaging until recently and still manifests itself despite DEI committees and activities. As underrepresented minorities we have witnessed the bias in person, by being ignored, excluded, treated condescendingly, denied information, demoted, blocked from informal learning instances, and burdened by the lack of childcare and other societal structures, just to name a few of the major hoops we have been forced to go through. Physicists of color suffer compounded sets of discriminatory actions. Ironically, one of the online public responses to the “in defense” article was that it “stated the obvious: science should be based on merit, how could we possibly let political DEI *positioning* take over”.

We would like to reiterate what was written in the Spring 2022 issue of the CSWP Gazette: “The expectation that our physics community is a meritocracy is thus challenged. If we want to change this, we need to change our behavior, i.e., practices. The practices of a community ought to be based on its stated underlying values. To begin, we should rigorously query assumptions that our organizations and the decisions made within them are equitable and seek good evidence that supports this assumption. As scientists, we need to learn from scientists who specialize in the study of human behavior. Equitable processes and procedures, as opposed to hierarchical structures, do not occur naturally in human societies. Developing and maintaining fair procedures and eliminating barriers to traditionally underrepresented people require a focused effort, frequent measurement,

and continuous correction.” [1]

It is disquieting that opinion makers chose to focus on the recent publication while ignoring the documents released at a fundamental community event, Snowmass 2022 [4,5]. Although DEI committees exist and codes of conduct and community guidelines have been written and are continuously updated, many sources of inequity still exist and need to be addressed. It is important that the community keeps being engaged to make sure that the process to make science a truly meritocratic system does not get interrupted by continuing the work on many actionable sectors, from improving the peer review process, to continuously reviewing policies on sexual harassment, establishing rubrics on physics prizes that guarantee equitable treatment, and more.



Simonetta Liuti

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- [13] Rachel Ivie, *this issue* and <https://www.aip.org/statistics/women>

## AIP's Data on Gender (continued from page 2)

a gender gap in confidence for these students. Women were more likely than men to report feeling less confident about their performance on assignments, exams, and labs during the pandemic.

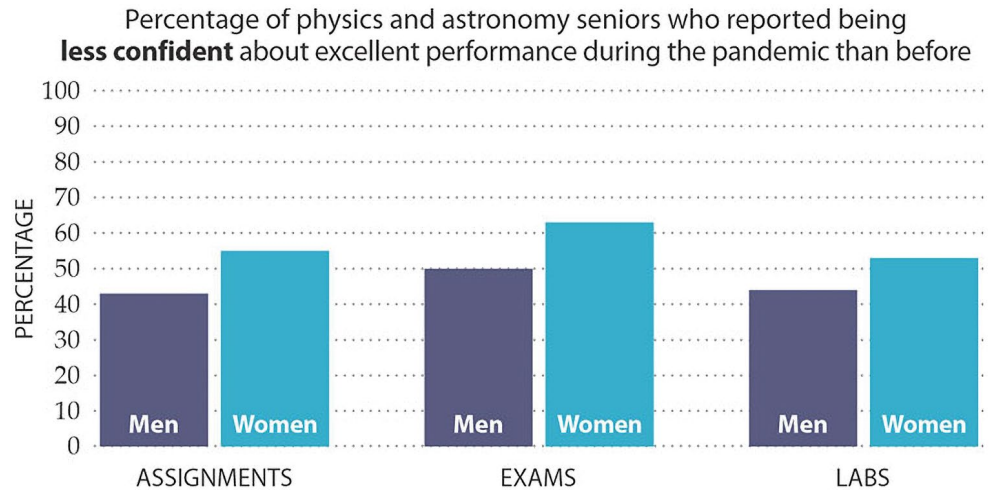
One of the most useful types of data collected from individuals is from our surveys of new physics and astronomy graduates during the year immediately following their graduation. These follow-up surveys are sent to every graduate for whom we receive contact informa-

We are currently in the last year of data collection for a study of gender differences in persistence and attrition from undergraduate physics programs. We have been following physics students at four universities for five years to determine whether people who are interested in majoring in physics upon entering college persist with this major or switch to another major, with a focus on the reasons students give for staying or leaving. This study was planned to help close a gap in our knowledge.



Rachel Ivie

PHOTO CREDIT: DREW BIRD



tion from the departments. The surveys provide data on rates of attending graduate school, post-doc acceptance rates, sectors and fields of employment, and skills used on-the-job. Students, parents, and faculty members use these data to learn about types of opportunities pursued by physics and astronomy graduates. Gender is collected as part of these data, and gender differences (or the lack thereof) are reported when appropriate.

AIP regularly conducts specialized studies. One of these is the Global Survey of Scientists, conducted in partnership with the International Science Council, IUPAP, and seven other international scientific unions. The purpose of this data collection was to document the gender gap in science at a global level. For the physicists participating, we found that women reported less access to career-advancing resources, such as funding, than men did.

About half of high school physics students are young women, but only 20% of physics majors are women. Reasons for this drop-off have not yet been documented, so we hope that the study of persistence and attrition will shed light on this process.

Most of our gender data are available on AIP's website at <https://www.aip.org/statistics/women>. We hope that you will be able to use some of our findings, tables, and charts in your next talk on women in physics. While we cannot promise to be able to answer everything, we welcome data requests. If you are wondering whether we have something, just send us an e-mail to [rivie@aip.org](mailto:rivie@aip.org) or [stats@aip.org](mailto:stats@aip.org).

*The author wishes to thank Susan White and Patrick Mulvey of AIP for their contributions to this article.*

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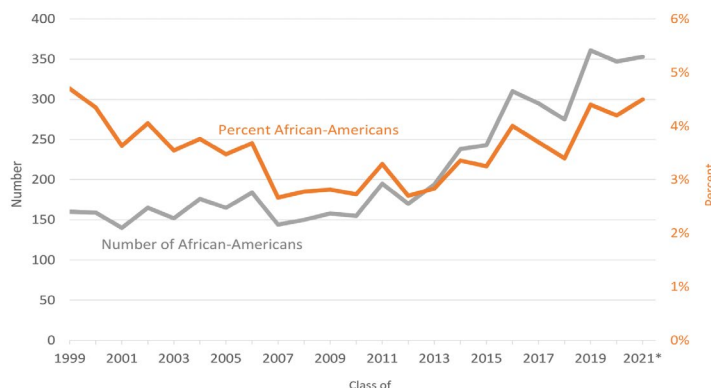


**Carving A Space In Physics: How Racial Inclusivity is Important** (continued from page 4)

Institute of Physics (AIP) established the TEAM-UP task force to investigate and understand the causes of persistent underrepresentation of Black students in physics and astronomy. The AIP TEAM-UP report showed that peer and departmental support are vital to the success of Black students. Unfortunately, this type of support is lacking in most departments. When students from historically underrepresented backgrounds lack the adequate support that is needed to succeed in physics, they often experience feelings of inadequacy, social alienation, or regret their choice to study physics entirely.

According to the study, there has been a steady fluctuation in Black students pursuing a bachelor's degree in physics in the United States. Moreover, the study shows the correlation between the decrease in Black students studying physics and the shift in attendance between Historically Black Colleges and Universities (HBCUs) and Predominately White Institutions (PWIs). Although there is an increase in attendance at PWIs, HBCUs still graduate the majority of black physics students. While this may not seem like an issue, it is quite worrying due to the lack of mentorship and academic guidance provided for Black students to succeed. The percentage of Black students dropped from its peak of 5% to less than 4% in 2017 when the study was initially conducted (See Figure). In recent years, the numbers have started to rise due to initiatives that arose from the study. The numbers are even more shocking for students obtaining their Ph.D. in physics. Only 1% of physics Ph.D.s are held by Black Students. This alarming statistic proves the need for a variety of changes to combat this trend, proving the need for counterspaces such as NSBP and other minority-focused organizations. To further understand the severity, I would encourage everyone to check out the study to find out more information.

**Number and Percentage of Physics Bachelor's Degrees Earned by African Americans**



\*Starting with the class of 2021, a "Two or More Races" category was added to the questionnaire as a response option. The percent of degrees awarded to African Americans is based on US citizens only. In recent years, between 10% and 13% of physics bachelor's were awarded to non-US citizens.



[aip.org/statistics](http://aip.org/statistics)

The study made a significant impact on my understanding of being Black in physics. I have learned the importance of cultivating a strong community. I am grateful to have had the opportunity to create something impactful with my colleagues and the experience will stick with me for years to come. My work is far from over. Over the course of my time at my current university and those that come after, I would like to promote the importance of having underrepresented minorities in physics. I am striving for the continual growth and establishment of the NBSP Chapter at UVA. Ultimately I want to spread awareness at a broader scale and promote diversity outreach. I hope that my story can inspire change in the broader physics community.

*Acknowledgments: I would like to express my gratitude to those that have helped make all of this possible: to Whitney Richardson, Gabby Fuller, Ed Murphy, Jessica Harris, to the NBSP at UVA executive members, Dawn Ford, Altony Foote, and Gary Henderson Jr, to my colleagues and close collaborators, Em Gunter, Philip Velie, Darren Upton, Zaki Panjsheeri, Lasata Tuladhar, and Matt Mitchell.*



Kiara Chantel

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