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the Zine

Ed. 1

## **Diversity in the Sciences**



## **Letter from the Editors**

### Dear Reader,

Thank you for picking up our first issue of the Athens Science Observer Zine! What you are reading now is ultimately the result of years of hard work by dozens of dedicated student scientists.

Why a zine at all though? Well, back in 2015, the Athens Science Observer was founded with the goal of bridging the gap between town and gown. Since then, we have published over 500 articles on our website, collaborated with public radio, reached over 80 countries, and received thousands of visitors each month. We believe involvement in the community is essential and hope that by publishing this zine, we can bring a little more science directly to you, the Athenian.

This first issue features several articles and works of art highlighting the diversity of people working in STEM fields. At ASO, we believe this is an important issue and we hope you see that too. In future issues of this zine, we will explore a variety of topics, such as the plant and bug life of Athens, and the groundbreaking research happening at UGA.

If you have any comments, questions, or suggestions you can reach out to us at <u>contact@athensscienceobserver.com</u>. We can't wait to hear from you!

Sincerely, Max and Simone

#### **Athens Science Observer Zine**

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# 800 m 100 Why Diversity in STEM Matters

Jenny Kurasz

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The goals of STEM (science, technology, engineering, and math) are two-fold: first, we seek to understand the phenomena we observe in the world around us, and second, we apply this information in ways that improve life. If we compare demographics in regions that are major players in STEM to those that are not, it becomes apparent that access to guality STEM education and research correlates with economic prosperity, longer lifespan, and an higher quality of life.

Unfortunately, due to the associated costs and mountains of red tape, STEM in America has historically been a field for the privileged. Addressing issues of diversity in STEM will require awareness of our shortcomings and a commitment to change. But some will ask: as long as the work is being done, why do we care who's doing it? To answer that question, here are three reasons why diversifying STEM makes a difference:



**1. Institutional racism is a "gatekeeper" of race-based research.** Much of the scientific research in this country is funded by government agencies – in other words, we the taxpayers foot the bill. That being said, the US Census Bureau predicts that black, Hispanic, and other people of color will make up the majority of the population by the year 2050. However, decisions about STEM research, from who gets funding to who gets attention, are not necessarily proportionate to our current and future demographics.

An analysis of top tier psychology journals found that, during the last 40+ years, the vast majority of editors-in-chief were white males. In that time, few studies involving race were accepted by these journals for publication. Ironically, the few articles that made the cut were all written by white authors (and not for lack of submissions by BIPOC researchers, many of which went on to be highly regarded in the field). Important studies about race, conducted by those with the most insight, go unnoticed by top journals because the people in charge are less likely to see their importance. Publication record then affects one's ability to obtain funding, thus perpetuating a cycle of inequity.

### The reason why is simple: diverse people bring diverse ideas.

2. Diversity increases productivity and creativity. Science in the modern age is a small world. Even in my graduate research, I've had coworkers and collaborators from all over the globe. Survey data shows research labs that make a concerted effort to diversify their personnel are more productive in terms of both the quantity and quality of their work. The reason why is simple: diverse people bring diverse ideas. Problems in science are becoming ever more complex; solving them often requires an interdisciplinary and creative approach. These days, it is becoming nearly impossible to do science in a vacuum (unless you're a particle physicist).

**3. Lack of diversity in research subjects affects medical outcomes.** A couple of years ago, I wrote a post for the ASO website about gender gaps in medical research, but this is an issue that touches race as well. This time, I'm not talking about the scientists; I'm talking about their subjects.

A study found that almost half of surveyed medical trainees believe at least one race-based myth, such as "black people's skin is thicker than white people's" or "black people have less sensitive nerve endings." The false belief that people of different races perceive pain differently has caused countless BIPOC patients to receive insufficient pain treatment. This is not helped by the fact that medical textbooks almost exclusively focus on white people. We also know that some diseases are more prevalent in people of different races, but our understanding of how racial factors affect disease prevalence is far from complete. Diversity in STEM must include diversity of STEM subjects as well.



Steven O. Roberts, a Stanford University professor who researches the psychological biases that reinforce racism, wrote: "One's social identity shapes how one experiences and sees the world. Any notion to suggest otherwise is colorblind, and that is one of the most insidious ways in which racism persists." A scientist may have all the necessary expertise, but without the help of a diverse group of peers, they will struggle to apply that knowledge toward contexts for which they have no personal experience. We live in complicated times, and all of our needs are not exactly the same. We absolutely require the cooperation of many people, living many different lives, coming together to solve the problems of this era.

## Voices in STEM

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Perspectives from UGA Students

Chazz Jordan - On Diversity

As biologists, much of our weight is thrown behind the study of humans and other animals. Despite the fact that the plant kingdom is largely responsible for sustaining life on Earth, there are surprisingly large gaps in our knowledge about plants simply due to our biases toward organisms that are most similar to ourselves. Similarly, in our broader world there is a lot of racial and socioeconomic illiteracy leading to biases among people; individuals lack the necessary information and exposure to see how systems negatively affect different individuals within societies.

I love to study flowers and their variation in floral forms and structures. Orchids, for example, have hundreds of physical variations called morphologies. Each of these morphologies is beautiful in its own way, and orchids are appreciated for being different and interesting.

Their unique characteristics allow them to have different experiences with pollinators and other factors within their environments. All of these orchids can look drastically different, but at the end of the day, they are all still orchids.

I feel that this is how humans should see each other: all different forms and appearances, yet in the end, all similar and part of one collective group. Like flowers, our differences give us unique life experiences from which we can all listen and learn. Imagine how our science would flourish if ideas and experiences were shared from diverse professors, researchers, technicians, and students.

## Primarily White vs. Primarily Hispanic Serving Institutions

Ale Villegas

As a first-generation Mexican American student I immediately felt out of place at my first, predominantly white, undergraduate institution. After taking four science courses as a senior and competing with the math team in high school, I thought I was well prepared for the next step. I never imagined I could fail a math class. However, I could not seem to attain the same level of success in this new environment. The large class sizes, the lack of diversity, my off-campus job and commuter status at a residential campus—these things made me feel isolated and led to a belief that I did not have what it took to pursue a career in science. After a few unsuccessful years, I dropped out. It was after I found much needed mentorship in a job setting that I gave school another shot at Northeastern Illinois University (NEIU), a Minority and Hispanic Serving Institution.

Minority Serving Institutions (MSIs) are higher education institutions that enroll students from all backgrounds that also provide targeted educational and professional development opportunities for Black, Indigenous and People of Color (BIPOC). MSIs include Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs), and Asian American and Pacific Islander Serving Institutions (AAPISIs).

> The difference was like night and day.

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The difference was like night and day. Smaller classes, aware and attentive faculty, and diversity! Everyone was a commuter and many were non-traditional college students, meaning they were likely older students. Some had families and kids. Some were attending school part-time. Many were looking for a career change. Wanting to give science another shot, I enrolled in 'Essential Skills for Biologists' my first semester and immediately started building what would become my home for the following four years. The smaller classes allowed me to make more meaningful connections with faculty in that first semester than I was able to at my first institution in three years. The diverse and encouraging advisors were better able to offer personalized guidance and share experiences we could relate to and learn from. Plus, the non-traditional and diverse student body made for a much more collaborative and nurturing environment rather than a competitive one.

Minority Serving Institutions do just that, they make a proactive effort to serve, support, and encourage underrepresented students in higher education. They provide mentorship that is targeted to those whose parents or families may not have had the opportunity to pursue higher education. As an underrepresented and firstgeneration college student, I feel lucky to have attended NEIU, where I first learned about research opportunities and where I received the encouragement and mentorship I needed to succeed in STEM.



### Black Ecologists Matter

Kaylee Arnold



**Finding a community** that one can feel comfortable and safe with is very important. As a Black woman in ecology, I rarely meet people in academic or other professional spaces who look like me. However, when I attended my first Ecological Society of America (ESA) conference in 2018, I was introduced to a community of Black Ecologists and was finally able to build the community that has been lacking in my life.



Rebecca Atkins

Less than 1% of ecologists identify as Black or African American. This became immediately apparent to me as I started graduate school and began attending conferences. Now, I've become accustomed to being one of the very few Black scientists in academic spaces. The

University of Georgia is the third predominately white institution (PWI) that I've attended, with UGA having a Black student body of only 8.3% in a state and county where 32% and 28% identify as Black or African American respectively. In addition to low Black student body populations, I've also had very few Black professors. Across my three institutions, I have only had three Black professors, and I hadn't met a Black woman ecologist until I started at UGA at the age of 26. However, when I attended my first ESA conference, that all changed.

### I was... finally able to build the community that has been lacking in my life.

The Black Ecologist Section was founded in 2015 at the ESA conference in Baltimore by Drs. Nyeema Harris, Jasmine Crumsey Forde, and Senay Yitbarek. The first of its kind at ESA, this group was created to provide professional and personal support for individuals who identify as Black. Non-Black individuals are welcome to join the section as allies as well.

The Black Ecologist Section not only provides a space for Black Ecologists to meet, but it also functions as a section to foster networking, collaborations, mentorship, opportunities for outreach, and undergraduate recruitment and support. The section has also used its collective voice as bargaining power at ESA to support Black scholars and other marginalized scholars to request funding and leadership roles within the society. The Black Ecologist section understands that it is not enough to simply make space for our current members to exist, but that we need to make impactful changes to the systems and institutions that have historically excluded Black scientists and other minoritized voices from Ecology and other STEM fields. Our hope is that by increasing representation and inclusion within ESA membership, we can encourage similar practices in other institutions and societies to finally make ecology a more inclusive field.





#### On Sharing your Science - Inam Jameel

### "So you want to be a farmer?"

Well, Ammi, not really. Plants are just a versatile tool to answer interesting questions about genetics and the environment!

"Genetic engineering? That's no good, beta (son). Do you know what they have done to food? Everything is a hybrid!"

> Well, sure, they might be 'hybrids', but I don't think you know exactly what that-

"I don't know? So many more people have gluten allergies now! And Autism!"

Back in 2015, I had no training in science communication and this was how conversations with my family would typically go. I couldn't use tools like visuals or powerpoints, and struggled to come up with easy to understand examples to include in our discussions. The current public mistrust of science makes it clearer than ever that, as scientists, we need to be able to effectively communicate our research in a public forum. It is really up to scientists to learn the skills to convey complex topics in a digestible format. After all, what good is your science when you can't explain it to your own mother?

## A UGA Call to Action

Neely Wood

**AARLS** (Advocates for Anti-Racism in Life Sciences) is a UGA graduate student group that formed in June 2020 in solidarity with the Black Lives Matter movement and in response to the history of systemic racism within academia that has been ignored in so many ways and for far too long. As our mission statement says "we are committed to recognizing, addressing and eradicating racism against Black, Indigenous, and non-Black people of color (BIPOC and NBPOC) in the life sciences at the University of Georgia."

We have formed a stable group of committed life sciences graduate students of various backgrounds that have been able to join together to build a platform for making change in the academic environments we find ourselves in. Thus far, we are working to:

- Establish a mentoring program matching minority-background and otherwise PoC undergrads in STEM to graduate mentors
- Distribute a climate survey at UGA
- Work with the Athens community and local schools at all levels to encourage support for budding scientists, and make the community aware of UGA's DEI shortcomings as well as progress

To learn more about our goals, follow us on our social media!



For inquiries, contact AARlifesci@gmail.com



## Women in STEM: How Do We Retain Them?

Sarada Sripada

Women represent half of the college student population and 47% of the total workforce in the US, occupying prominent positions in the fields of medicine, law, and business. However, women account for a mere 28% of the workforce in STEM (science, technology, engineering, and math). In fact, two of the most popular STEM disciplines, computer science and engineering, are heavily male-dominated, with women accounting for only 21% and 19% in these fields. So, why are women not pursuing careers in STEM?

### ...girls need role models to help them envision their careers in STEM fields.

#### Many factors affect women enrollment and retention in STEM

According to a study by Dr. Jacquelynne Eccles, and Mina Vida, at the Institute for Research on Women and Gender, girls lean towards the biological sciences and tend to shy away from careers in science, math and engineering. These researchers believe that young women perceive STEM fields as solitary occupations rather than social endeavours. They also found female undergraduate enrollment in STEM depends on whether women previously developed confidence in math and science subjects, had access to pre-collegiate STEM exposure, and received sufficient information on STEM career opportunities and pathways. In the workplace, several studies have examined gender inequalities that contribute to female disillusionment, such as lower pay and fewer promotion prospects. Motherhood, workplace culture, long working hours, work inflexibility, and residential moves also seem to play vital roles in women's exit from careers in science and engineering.

#### Need for Mentorship

Studies have also shown that having a female mentor is critical to retaining women in STEM fields. According to Karalis Noel, a Clinical Assistant Professor at the University at Buffalo, the sense of belonging is a predictor of success and retention of women in STEM fields. To be the next generation of scientists, engineers and innovators, America's young girls need role models to help them envision their careers in STEM fields. There are many under-recognized inspirational female leaders who created history in STEM, including Katherine Johnson, whose contributions were instrumental in the landing of Apollo 11 on the moon, and Dr. Radia Perlman, who invented the Spanning Tree Protocol that allowed the Ethernet to handle massive networks. Mayim Bialik, who you may know as 'Amy' on The Big Bang Theory, taught us that you can be both a neuroscientist and a successful actress.

#### Promoting women enrollment in STEM

Organizations such as the National Girls Collaborative Project (NGCP), NASA, and various US universities have taken up the task of fostering an interest in science in young girls and encouraging them to pursue STEM careers. NCGP, for example, is implementing the FabFems project, a platform for students to interact and engage with female STEM professionals through STEM activities, talks, and field trips. NASA has organized several outreach programs such as 'Sustaining Women in STEM' and is conducting a 'Girls in STEM' event this year to promote enrollment and retention of women in STEM and to create more inclusive workplaces. Here, UGA students have established an organization called 'Women in Science' (WiSci), aimed at promoting equality in science through mentorship, networking and career development opportunities. In an initiative called the 'Females First Grant', WiSci provides funding to assist women with childcare commitments, allowing for more flexibility in their careers.

To truly make a change, we need to work towards uprooting the gender stereotypes surrounding women and young girls, reassuring them that they are just as likely to excel at STEM subjects as their male counterparts. Being a woman and a STEM major myself, I encourage all of you 'Lady Dawgs' in STEM degrees to pursue your dreams and help set an example for the younger female generations.

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