Proposed Changes

to

Promote Racial and Gender Equity

and

Improve Domestic-International Student Relations

in the

Department of Atmospheric Sciences
University of Illinois at Urbana-Champaign

The following individuals have provided feedback on this document:

Amy Chen, Anonymous, Carolina Bieri, Chu-Chun Chen, Divyansh Chug, Eunkyoung Choi, Holly Mallinson, Javier Villegas Bravo, Jeffrey Thayer, Jessica Gasparik, Jun Zhang, Lina Rivelli Zea, Puja Roy, Rose Miller, Dr. Swarnali Sanyal

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MOTIVATION

We, graduate students in the Department of Atmospheric Sciences (DAS) at the University of Illinois at Urbana-Champaign (UIUC), propose the following actions and policy changes to promote racial and gender equity and improve domestic-international student relations in our department.

We believe that pervasive and persistent racism in the United States requires us to voice these concerns in a constructive and unified manner. This also requires us to be explicitly and unequivocally anti-racist as an academic organization.

We believe that traditionally and persistently low participation of racial and ethnic minorities, women, and gender minorities in geoscience requires that we take action. Compared to other scientific disciplines, geoscience is one of the least diverse.[1, 2] Moreover, there has been little to no improvement in the representation of racial and ethnic minorities in approximately the last 40 years.[3]

We believe that we must address these disparities in the name of scientific progress. Scientific communities with a diversity of viewpoints are more successful overall.[4, 5] To truly benefit the human populations they serve, scientists should reflect the demographics of these populations.

We believe that we must promote racial and gender equity to support non-white and non-male members of our scientific community. Doing so requires that we work to eliminate conscious and subconscious biases. Research has shown that scientific contributions from underrepresented minority* (URM) students are often devalued, inhibiting their professional growth.[6] Moreover, non-white, female, and gender minority students experience instances of bias which affect their quality of life and can prompt them to exit STEM fields prematurely.[7]

We believe that the modest inclusion of non-white, female, and gender minority students can be improved in DAS. We seek to create an environment which fosters inclusivity regardless of race, ethnicity, national origin, gender identity, disability, sexual orientation, religious beliefs, or membership in another vulnerable group of society. This is necessary to ensure professional advancement, personal well-being and authentic human development of marginalized groups in our scientific community.

To increase diversity and inclusion of non-white, female, and gender minority students in DAS, we propose the changes described below. These changes include short- and long-term approaches. We hope that this document helps DAS acknowledge the urgency to advance these proposals for dialogue and action for the inclusion of all scientists, regardless of background.

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*For the purposes of this document, the definition of underrepresented minority (URM) is the same as the definition provided by the UIUC Graduate College. The Graduate College defines URM as "domestic students who self-identify as American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, Black/African American, or Hispanic/Latino."

DEFINITIONS OF RELEVANT TERMINOLOGY

For convenience and clarity, below are relevant definitions *as provided* by the listed source.

Equality: "The measure of sameness; being treated in the same way."
Source: Racial Equity Glossary, UW LEND seminar series
http://depts.washington.edu/lend/seminars/core/archive/winter/winter2019.html
http://depts.washington.edu/lend/pdfs/3_Racial_Equity_Glossary.pdf

Equity: "A measure of fair treatment, opportunities and outcomes across race, gender, class and other dynamics."

> *Note on equality vs. equity:*
> "This distinction is important. We are told that to be fair we must treat everyone the same (equal), however, when we recognize the legacy of institutionalized and structural racism we understand that differing people and communities need different resources (equity). In order to be equitable we provide specific, unique resources that will support people and communities getting their basic needs met and reaching their full potential. *Sameness is not always fairness if the oppressed group remains disadvantaged*."

Source: Racial Equity Glossary, UW LEND seminar series
http://depts.washington.edu/lend/seminars/core/archive/winter/winter2019.html
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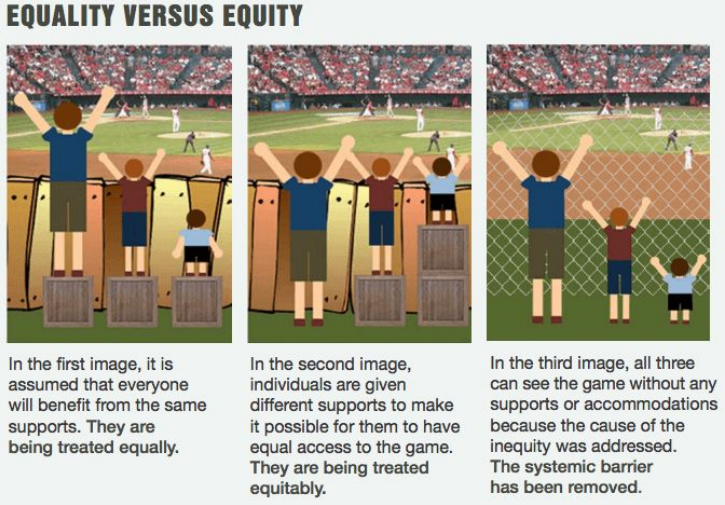


Gender identity: "A person's perception of having a particular gender, which may or may not correspond with their birth sex."
Source: Oxford Languages https://www.lexico.com/definition/gender_identity

Gender minority: A person with a gender identity not recognized by the binary definitions of male or female, including transgender, non-binary and intersex.

Implicit bias: "The unconscious attitudes, stereotypes and unintentional actions (positive or negative) towards members of a group merely because of their membership in that group."
Source: Anti-Defamation League (ADL) https://www.adl.org/education/race-perception-and-implicit-bias

Marginalized: "Treated as insignificant or peripheral."
Source: Oxford Languages https://www.lexico.com/en/definition/marginalized

Microaggression: "A statement, action, or incident regarded as an instance of indirect, subtle, or unintentional discrimination against members of a marginalized group such as a racial or ethnic minority."
Source: Oxford Languages https://www.lexico.com/en/definition/microaggression

Minority-serving institutions (MSIs): "Institutions of higher education that serve minority populations." A list of these institutions is available *here*.
Source: https://www.doi.gov/pmb/eeo/doi-minority-serving-institutions-program

Person of color (POC): "A person who is not white or of European parentage."
Source: Oxford Languages https://www.lexico.com/en/definition/person_of_color

Underrepresented minority (URM): "URM is defined as *domestic* students who self-identify as American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, African American, or Hispanic/Latino."
Source: UIUC GradData https://emails.illinois.edu/newsletter/174031.html

DATA SUMMARIES

DAS Graduate Application Statistics for 2006 - 2019[8]

***Percentages rounded*

***Note: UIUC does not report these data broken down by race/ethnicity or domestic/international student status.*

***Note: 2006 is chosen as the starting point for these statistics since that is the first year these data were provided.*

Summary of Figures:

- From 2006 to 2019, the percentage of female M.S. applicants was always **smaller** than the percentage of male applicants (Fig. 1). This is also true for Ph.D. applicants for most years (Fig. 2).
- Since 2013, the percentage of female M.S. acceptees has been consistently **lower** than that of female M.S. applicants (Fig. 1), likely being a contributing factor in the decreasing female-to-male M.S. student enrollment ratio.
- In some years (2006, 2014, 2019), the percentage of female M.S. acceptees was much **smaller** than the percentage of female M.S. applicants (Fig. 1).
- In some years (2006, 2009), the percentage of female Ph.D. acceptees was much **smaller** than the percentage of female Ph.D. applicants (Fig. 2).
- The gender breakdown is more **consistent** among M.S. or Ph.D. applicants compared to acceptees and enrollees.
- There is **no clear trend** towards an equal gender breakdown for any category (applicants, acceptees, or enrollees).

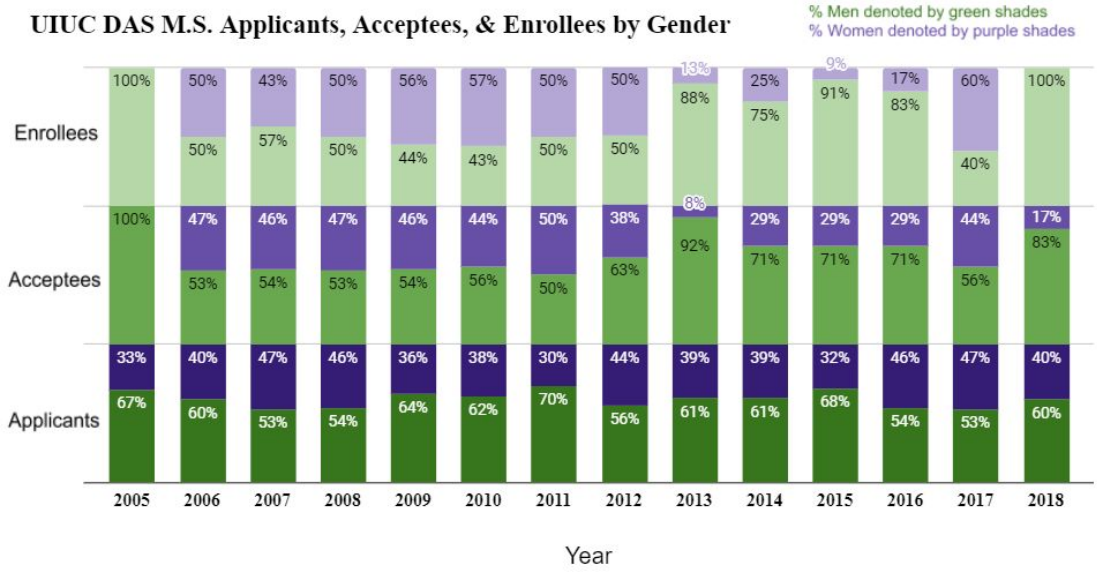


Figure 1. Yearly percentages of female and male M.S. applicants, acceptees (applicants accepted into the program), and enrollees (acceptees newly enrolled as a student) for DAS. Note that the listed year refers to the academic year beginning that fall and continuing into the following spring (e.g. 2005 refers to the 2005-2006 academic year).

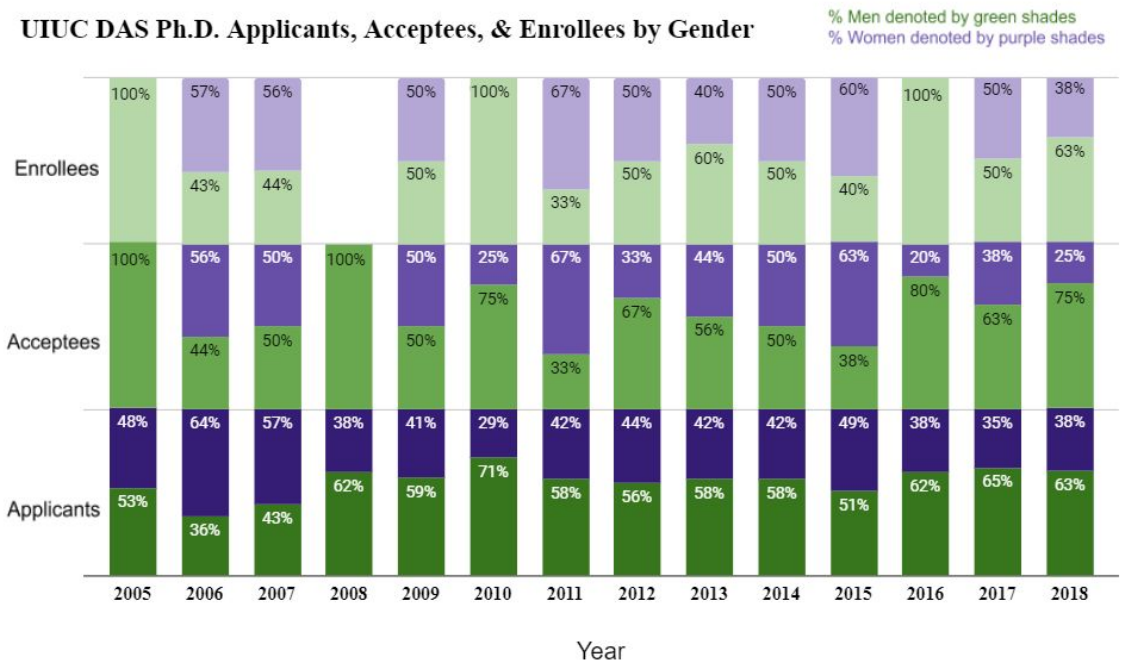


Figure 2. Yearly percentages of female and male Ph.D. applicants, acceptees (applicants accepted into the program), and enrollees (acceptees newly enrolled as a student) for DAS. Note that the listed year refers to the academic year beginning that fall and continuing into the following spring (e.g. 2005 refers to the 2005-2006 academic year).

Summary of DAS Student Enrollment Statistics for Fall 2004 - Spring 2020[8]

***Percentages rounded*

***These data only include the racial and ethnic makeup of domestic students, since UIUC does not report these statistics for international students.*

***Note: Fall 2004 was chosen as the starting point for these statistics since that was the first semester M.S. and Ph.D. students were separately categorized.*

Undergraduate Program in Atmospheric Sciences

- Of **all** undergraduate students, **98%** were **domestic** and **2%** were **international** students.
- Of **all** undergraduate students:
  - **63%** identified as **male**
  - **37%** identified as **female**
- Self-reported race/ethnicity of **domestic** students:
  - **76%** identified as **White**
  - **5%** identified as **Asian-American**
  - **3%** identified as **Black/African-American**
  - **12%** identified as **Hispanic/Latino**
  - **3%** identified as **Multiracial**
  - **<1%** identified as **Native American**

- **0%** identified as **Hawaiian/Pacific Islander**

Master's Program in Atmospheric Sciences

- Of **all** Master's students, **88%** were **domestic** and **12%** were **international** students.
- Of **all** Master's students:
  - **63%** identified as **male**
  - **37%** identified as **female**
- Self-reported race/ethnicity of **domestic** students:
  - **89%** identified as **White**
  - **3%** identified as **Asian-American**
  - **1%** identified as **Black/African-American**
  - **4%** identified as **Hispanic/Latino**
  - **2%** identified as **Multiracial**
  - **0%** identified as **Native American**
  - **0%** identified as **Hawaiian/Pacific Islander**

Ph.D. Program in Atmospheric Sciences

- Of **all** Ph.D. students, **44%** were **domestic** and **56%** were **international** students.
- Of **all** Ph.D. students:
  - **60%** identified as **male**
  - **40%** identified as **female**
- Self-reported race/ethnicity of **domestic** students:
  - **86%** identified as **White**
  - **3%** identified as **Asian-American**
  - **1%** identified as **Black/African-American**
  - **7%** identified as **Hispanic/Latino**
  - **0%** identified as **Multiracial**
  - **0%** identified as **Native American**
  - **0%** identified as **Hawaiian/Pacific Islander**

DAS Student Enrollment Figures for Fall 2004 - Spring 2020[8]

***Percentages rounded*

***These data only include the racial and ethnic makeup of domestic students, since UIUC does not report these statistics for international students.*

***Note: Fall 2004 was chosen as the starting point for these statistics since that was the first semester M.S. and Ph.D. students were separately categorized.*

- The DAS female-to-male student ratio has **decreased** to 1-to-3 since 2013 for M.S. students and since 2015 for Ph.D. students (noting small total enrollment fluctuations; Fig. 3), after having been nearly equal from 2007-2013 (Fig. 4).
- The DAS domestic student enrollment remains **disproportionately white** (~75%) at every degree level, despite a slow decline in the proportion of white students over time (Figs. 5-7).
- The DAS non-white student enrollment at the graduate level has not significantly changed over time (Figs. 6-7) and **remains disproportionately low** on average compared with U.S. population demographics.
- The DAS B.S. non-white student enrollment has been **consistent or increasing slowly** over time (Fig. 5), which indicates a potential "pipeline" issue in which non-white students are enrolling in the B.S. program but not pursuing graduate degrees.
- With DAS international student enrollment **slowly increasing** over time at the undergraduate level and being **consistently large** at the graduate level (Fig. 8), it is **crucial** to create policies and activities that foster inclusion of this significant group of the DAS student body.

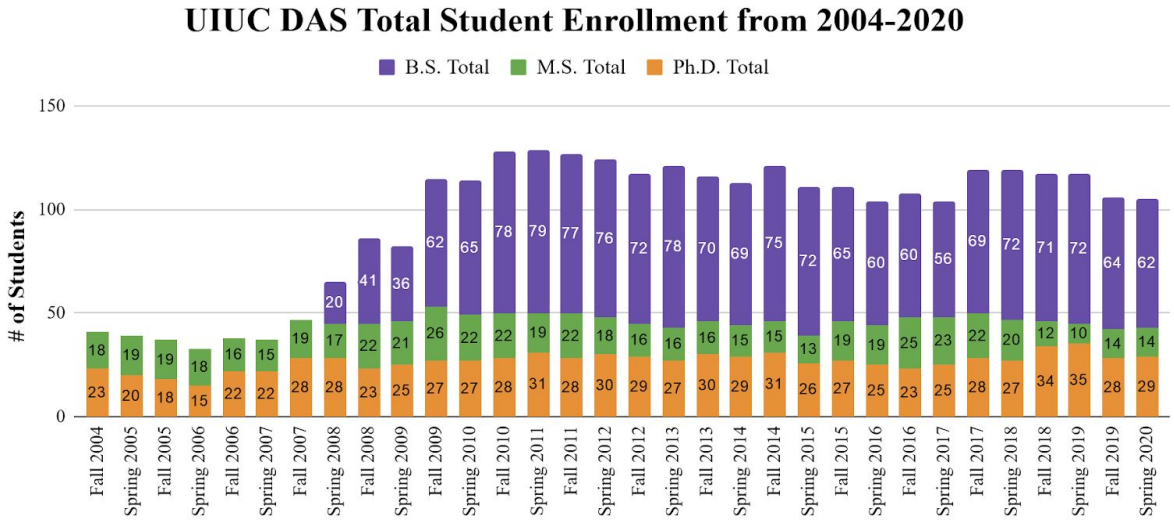


Figure 3. UIUC DAS total student enrollment (# of students) from Fall 2004 to Spring 2020 for each degree level. Note that the DAS undergraduate program was started in 2008.

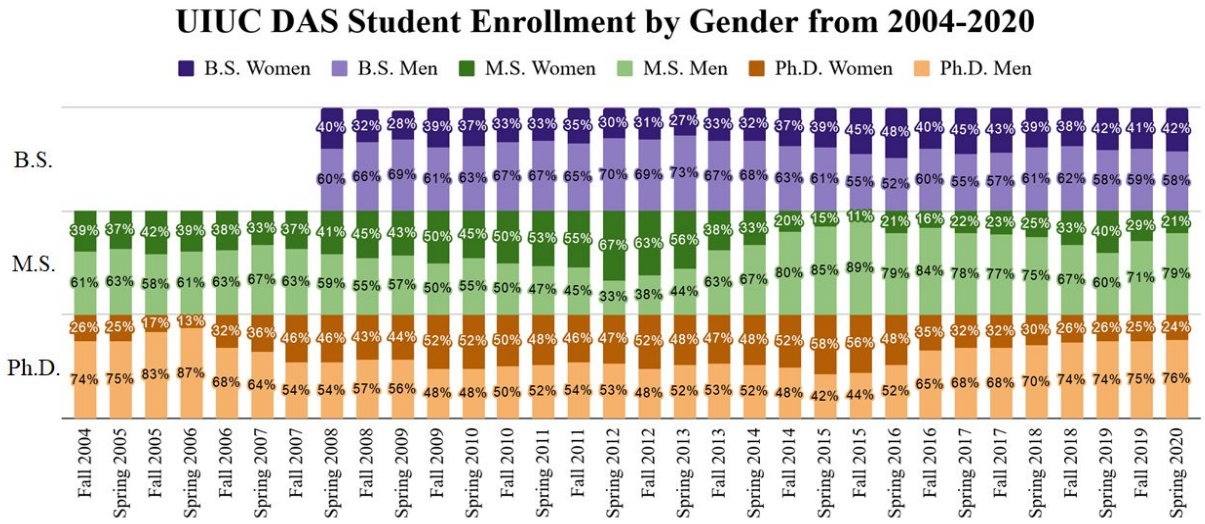
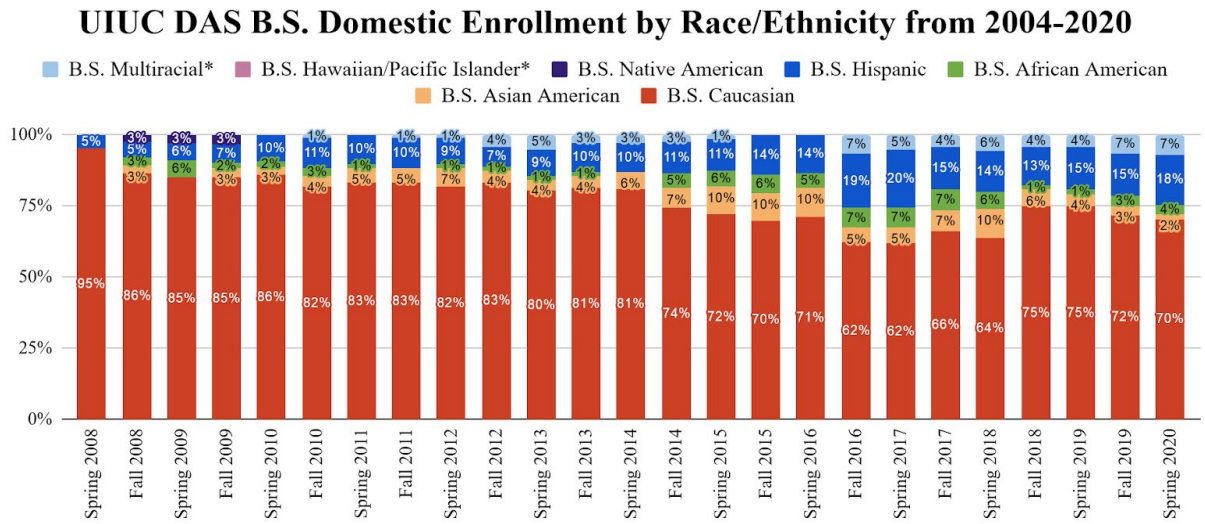
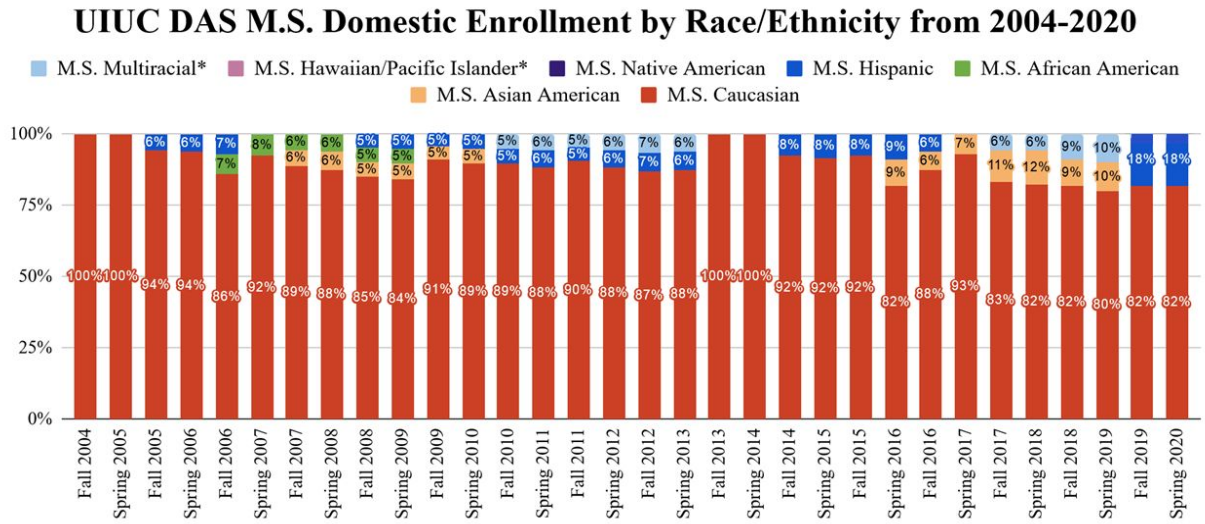


Figure 4. UIUC DAS student enrollment by gender (women and men; %) from Fall 2004 to Spring 2020 for each degree level. Note that the DAS undergraduate program was started in 2008.



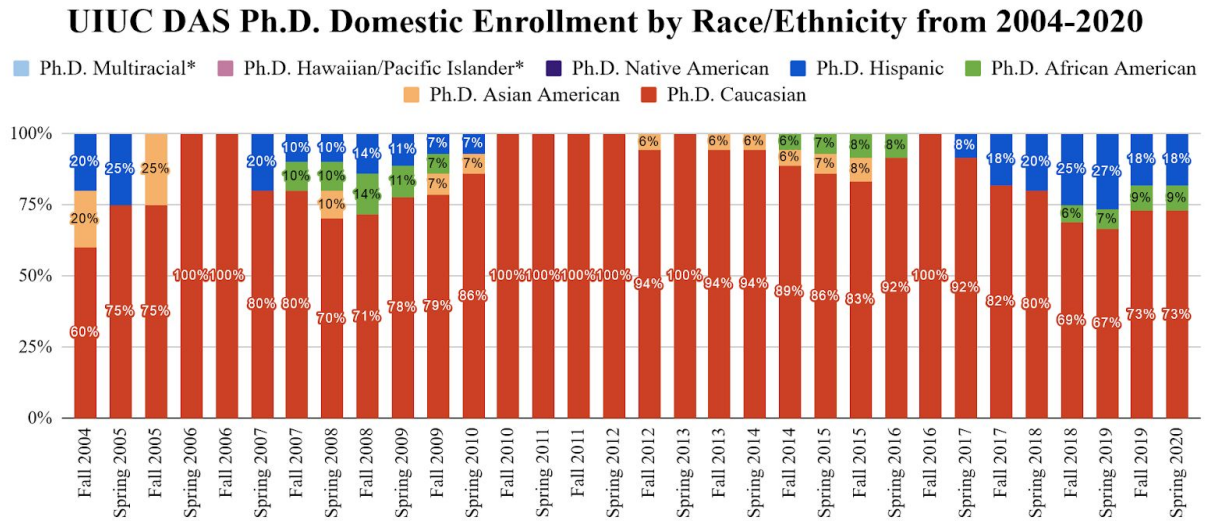
*Hawaiian/Pacific Islander and Multiracial were not included as categories until Fall 2010.

Figure 5. UIUC DAS B.S. domestic student enrollment by race/ethnicity (%) from Fall 2004 to Spring 2020. Note that the DAS undergraduate program was started in 2008.



*Hawaiian/Pacific Islander and Multiracial were not included as categories until Fall 2010.

Figure 6. UIUC DAS M.S. domestic student enrollment by race/ethnicity (%) from Fall 2004 to Spring 2020.



*Hawaiian/Pacific Islander and Multiracial were not included as categories until Fall 2010.

Figure 7. UIUC DAS Ph.D. domestic student enrollment by race/ethnicity (%) from Fall 2004 to Spring 2020.

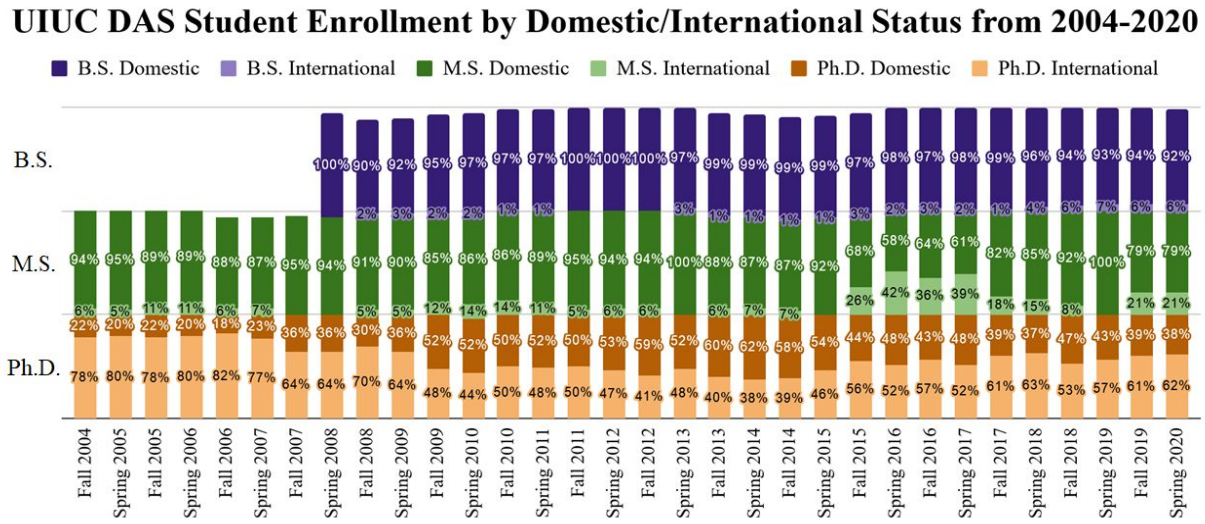


Figure 8. UIUC DAS student enrollment by domestic and international student status (%) from Fall 2004 to Spring 2020 for each degree level. Students with an "unknown" status are not included, yielding a sum of <100% for some semesters for some degree levels. Note that the DAS undergraduate program was started in 2008.

Summary of NSF Statistics on Women, Minorities, and Persons with Disabilities in Science and Engineering (2019)[2]

***Percentages rounded*

***These data only include the racial and ethnic makeup of domestic students receiving degrees, since the NSF does not report these statistics for international students.*

Bachelor's Degrees in Atmospheric Sciences

- In 2016, 714 Bachelor's degrees in atmospheric science were awarded in the United States, 236 (**33%**) of which were awarded to **female students** (Table 5-2).
- Of the **domestic, female** students receiving a Bachelor's (Table 5-4):
    - 189 (**80%**) identified as **White**
    - 15 (**6%**) identified as **Hispanic or Latino**
    - 10 (**4%**) identified as **Black or African American**
    - 4 (**2%**) identified as **Asian**
    - 1 (**0.4%**) identified as **Native Hawaiian or other Pacific Islander**
    - **No degrees** were awarded to **American Indian or Alaska Native** women.
- Of the **domestic, male** students receiving a Bachelor's (Table 5-5):
    - 386 (**81%**) identified as **White**
    - 24 (**5%**) identified as **Hispanic or Latino**
    - 12 (**3%**) identified as **Black or African American**
    - 18 (**4%**) identified as **Asian**
    - 1 (**0.2%**) identified as **American Indian or Alaska Native**
    - **No degrees** were awarded to **Native Hawaiian or other Pacific Islander** men.

Master's Degrees in Atmospheric Sciences

- In 2016, 220 Master's degrees in atmospheric sciences were awarded in the United States (Table 6-1), 76 (**35%**) of which were awarded to **female students** (Table 6-4) .
- Of the **women** receiving a Master's, 55 (**72%**) were **domestic** students, and 21 (**28%**) were **temporary residents** (i.e. international students).
- Of the **domestic, female** students (Table 6-4):
    - 44 (**80%**) identified as **White**
    - 2 (**4%**) identified as **Hispanic or Latino**
    - 2 (**4%**) identified as **Asian**
    - **No degrees** were awarded to **Black or African American, Native Hawaiian or Pacific Islander, or American Indian or Alaska Native** women.
- Of the **men** receiving a Master's, 121 (**84**%) were **domestic** students, and 23 (**16%**) were **temporary residents** (i.e. international students).
- Of the **domestic, male** students (Table 6-5):
    - 101 (**83**%) identified as **White**
    - 6 (**5%**) identified as **Hispanic or Latino**
    - 3 (**3%**) identified as **Black or African American**
    - 2 (**2%**) identified as **Asian**
    - **No degrees** were awarded to **Native Hawaiian or Pacific Islander or American Indian or Alaska Native** men.

PhDs in Atmospheric Sciences

- In 2016, 142 PhDs in atmospheric sciences were awarded in the United States (Table 7-1), of which 51 (**36%**) were awarded to **female students** (Table 7-2).
- Of all Ph.D. recipients, 96 (**68%**) were **domestic** students and 46 (**32%**) were **temporary residents** (i.e. international students) (Table 7-4).
- Of all **domestic** Ph.D. recipients (i.e. male & female) (Table 7-4):
    - 73 (**76%**) identified as **White**
    - 8 (**8**%) identified as **Hispanic or Latino**
    - 6 (**6%**) identified as **Black or African American**
    - 5 (**5%**) identified as **Asian**
    - **No degrees** were awarded to **Native Hawaiians or Pacific Islander or American Indian or Alaska Native** recipients.

Summary of DAS & NSF Degrees Awarded for 2006 - 2016[2,8]

***These data only include the racial and ethnic makeup of UIUC domestic students, since UIUC does not report these statistics for international students.*

***Note: A gender and demographics breakdown is not provided by the UIUC Division of Management Information if 3 or fewer students graduated that year. As such, the data is represented as zero on figures for those years.*

***The population percentage for each group is from 2016 and taken for the 18-24 year old demographic.*

***The percentage of all STEM degrees awarded to international students is computed using Table 7-4 of the NSF Women, Minorities, and Persons with Disabilities Report (2019).*

- For B.S. degree recipients, DAS has a **higher** percentage awarded to Hispanic/Latino and Asian American students and a **lower** percentage of degrees awarded to white students compared to the NSF average for atmospheric science programs (Figs. 9-10). However, a **higher** percentage of B.S. degrees were awarded to white students in DAS compared to their representation in the U.S. population (Fig. 9).
    - During this time period, DAS has awarded **no** B.S. degrees to African American students (Fig. 10).
- Conversely, DAS awards **fewer** M.S. and Ph.D. degrees to non-white students than the NSF average (Fig. 12). This could indicate a "pipeline" problem similar to what is suggested above by the DAS student enrollment statistics.
    - During this time period, there were **6 years** where no M.S. degrees were awarded to students of color. For years in which an M.S. degree was awarded to a domestic, non-white student, only 1 student is represented in each ethnic group so while the percent of students of a certain race or ethnicity awarded a degree are relatively high, **only 1 student represents this demographic** (Fig. 12).
    - A race/ethnicity breakdown of Ph.D. graduates **is not included** since those who were not international students were white (in years with more than 3 graduates), thus it is **imperative** to actively seek ways to diversify the Ph.D. program.
- DAS consistently had **fewer** female B.S. degree recipients than the NSF average for atmospheric science programs and has worked to close this gap (Fig. 14). However, women are still awarded **less than** 40% of B.S. degrees in DAS and nationally.
- While there is strong year-to-year variation in M.S. female degree recipients in DAS (attributed to the low total number of M.S. graduates; Fig. 14), the average for this time period for DAS is ~49%, which is **higher** than the NSF average (~39%).
    - On average, DAS also awarded a higher percentage of Ph.D. degrees to female students (~33%) than the NSF average (~30%)
- Nearly 50% of all Ph.D. graduates in this time period are international students (Fig. 13), thus it is **crucial** to create policies and activities that foster inclusion of this significant group of the DAS student body (as also shown by the DAS student enrollment statistics above).

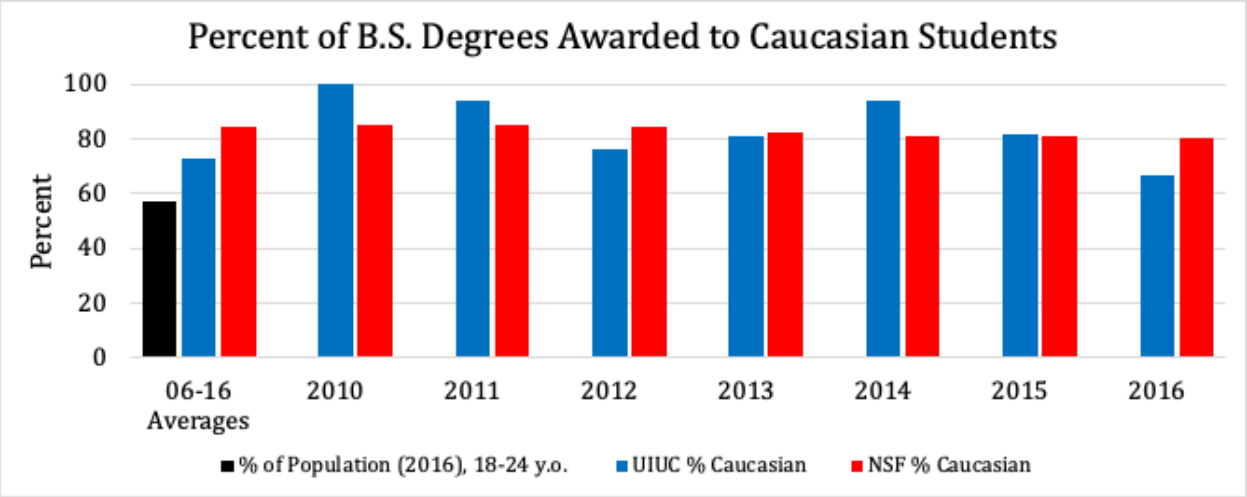


Figure 9. Comparison of bachelor's degrees awarded to students identifying as Caucasian in DAS (blue) and the national average (NSF; red) for 2010-2016. The black bar shows the percent of the U.S. population aged 18-24 years old that identifies as Caucasian versus the 2010-2016 average for both DAS and NSF.
Note: The DAS undergraduate program was not created until 2008 and thus did not award more than three bachelor's degrees until 2010.

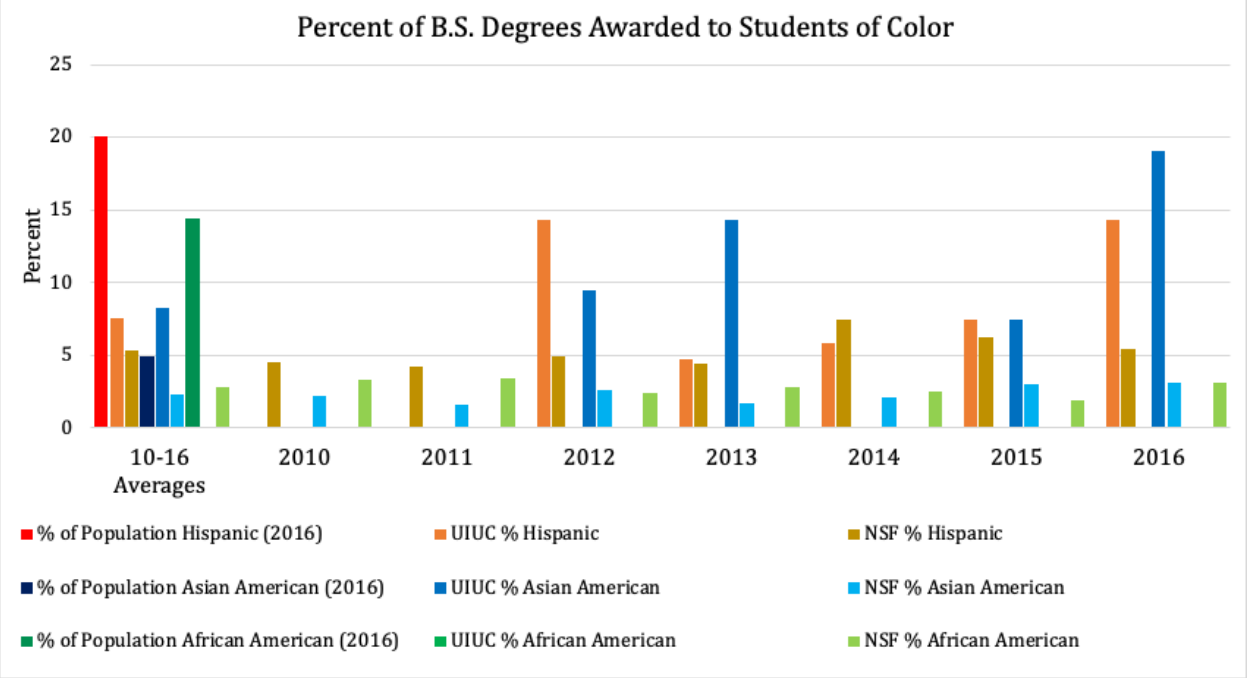


Figure 10. Comparison of bachelor's degrees awarded to students identifying as Hispanic (oranges), Asian American (blues), and African American (greens) for DAS (medium shades) and the national average (NSF; lighter shades) for 2010-2016. The dark shaded bars on the left in the "06-16 Averages" column show the percent of the U.S. population that identifies as Hispanic, Asian American, and African American aged 18-24 years old versus the 2010-2016 average for both DAS and NSF.
Note: The DAS undergraduate program was not created until 2008 and thus did not award more than three bachelor's degrees until 2010.

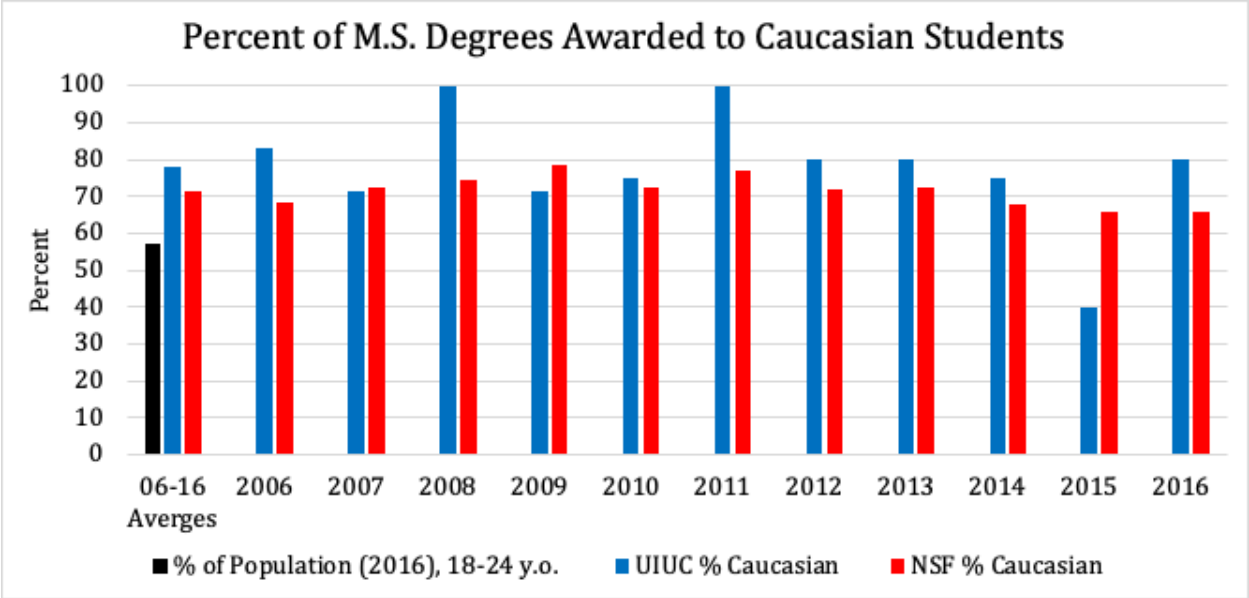


Figure 11. Comparison of master's degrees awarded to students identifying as Caucasian in DAS (blue) and the national average (NSF; red) for 2006-2016. The black bar shows the percent of the U.S. population aged 18-24 years old that identifies as Caucasian versus the 2010-2016 average for both DAS and NSF.

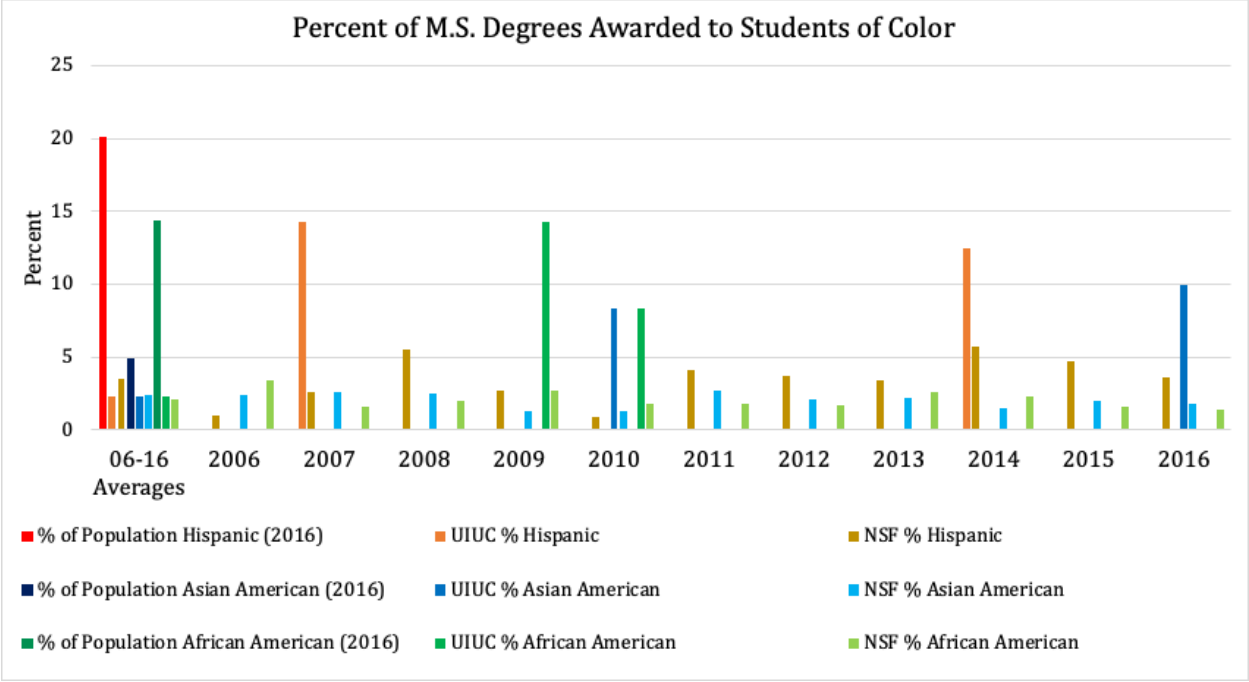


Figure 12. Comparison of master's degrees awarded to students identifying as Hispanic (oranges), Asian American (blues), and African American (greens) for DAS (medium shades) and the national average (NSF; lighter shades) for 2006-2016. The dark shaded bars on the left in the "06-16 Averages" column show the percent of the U.S. population that identifies as Hispanic, Asian American, and African American aged 18-24 years old versus the 2010-2016 average for both DAS and NSF.

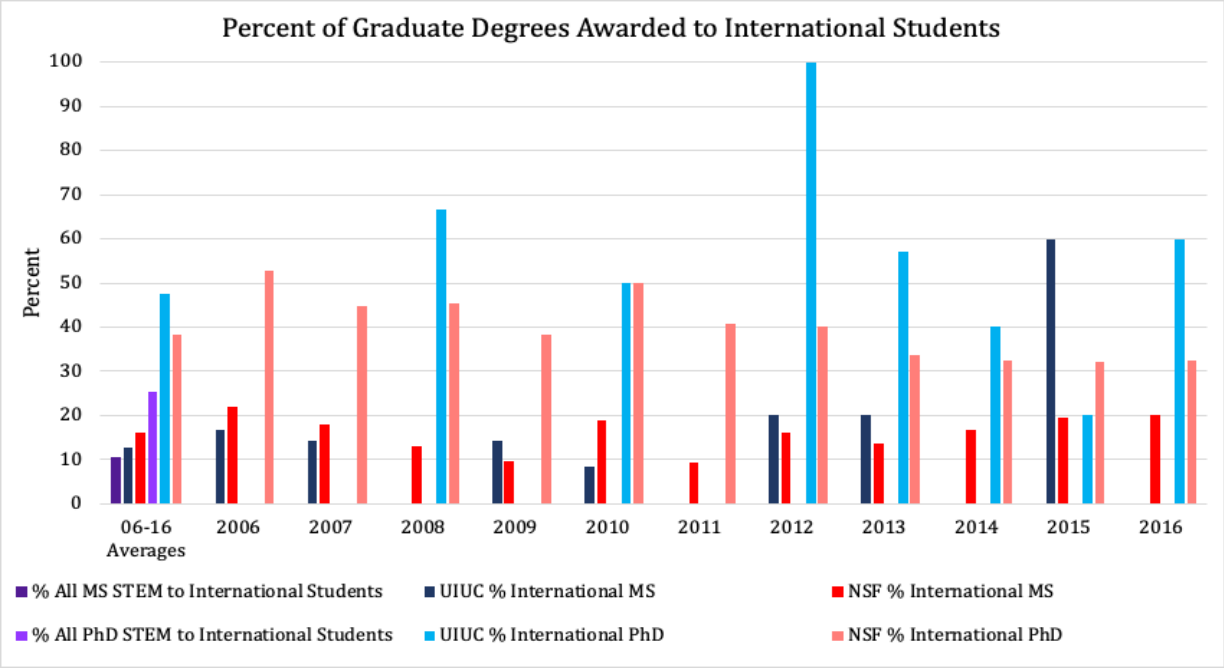


Figure 13. Comparison of master's (dark shades) and doctoral (light shades) degrees awarded to international students DAS (blues) and the national average (NSF; reds) for 2006-2016. The purple bars on the left in the "06-16 Averages" column show the percent of all STEM degrees awarded in the U.S. to international students at the master's and doctorate level versus the average for both DAS and NSF for the 2006-2016 period.

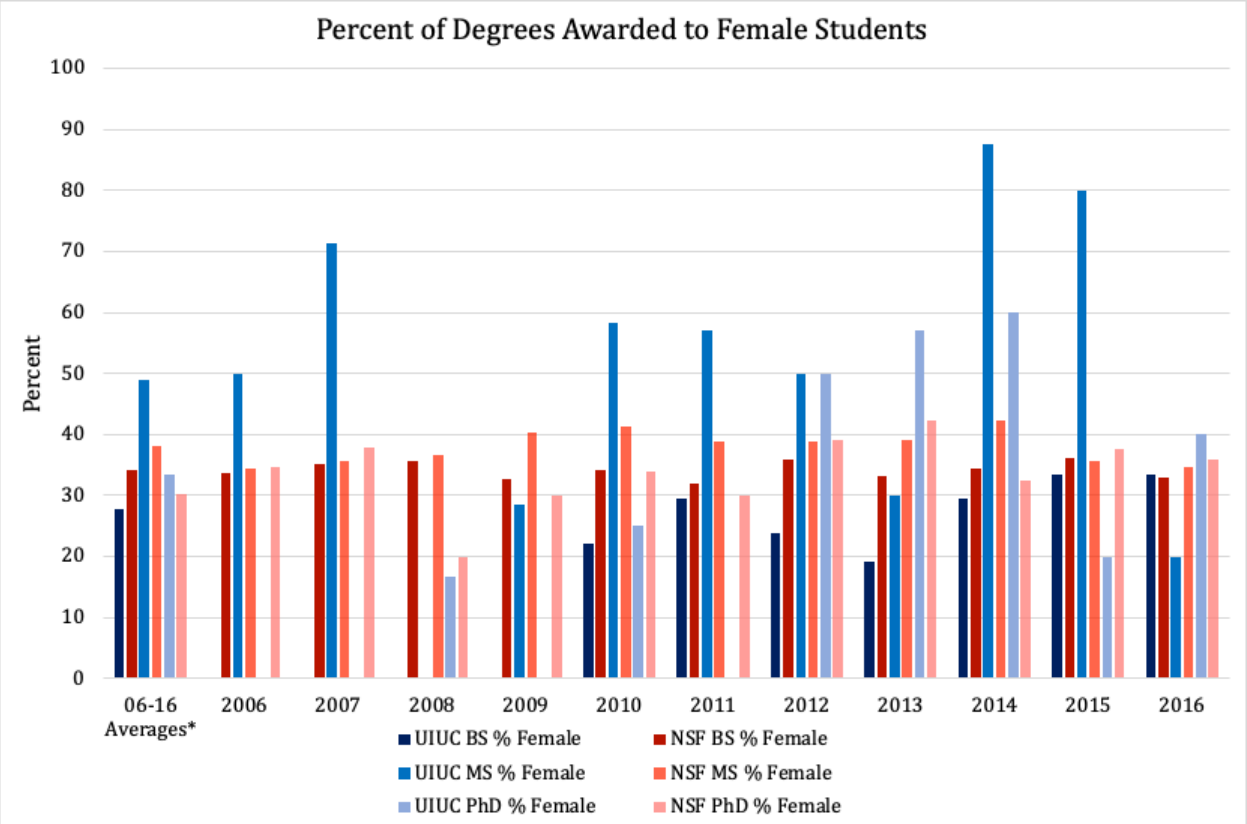


Figure 14. Comparison of bachelor's, (dark shades), master's (medium shades) and doctoral (light shades) degrees awarded to females in DAS (blues) and the national average (NSF; reds) for 2006-2016. The bars on the left in the "06-16 Averages" column show the average for both DAS and NSF for all degree levels during this time period. **Note: The UIUC B.S. % female average is taken from 2010-2016 to take into account the program start date.*

SHORT-TERM CHANGES (within 1 year)

***Note: These changes are not listed in order of significance.*

DAS-related Changes

1. Develop an anonymous Graduate Student Survey administered during Fall 2020 that deals *solely* with instances of bias within our department. To ensure an adequate response rate, the survey will be concise and require multiple-choice answers to statements (e.g., a range from strongly agree to strongly disagree) and questions (e.g., yes or no).

   Possible statements/questions include:
   - Students are respected regardless of their race/ethnicity.
   - Students are respected regardless of their national origin.
   - Students are respected regardless of their gender identity.
   - Students are respected regardless of their sexual orientation.
   - Students are respected regardless of their disabilities.
   - Students are respected regardless of their social class.
   - Students are respected regardless of their religious beliefs.
   - Students are respected regardless of their political beliefs.
   - I have positive interactions with other students, faculty, and staff during class sessions and research work.
   - I have positive interactions with other students, faculty, and staff in social settings.

     Questions regarding bias:

     The following note could be added before the following bias questions to clarify explicit vs. implicit bias & give examples.

     "Some instances of bias are overt, while others are subtle. This short video defines and gives examples of implicit bias.
     - Possible examples of implicit bias:
       - Assuming national origin based on physical characteristics
       - Assuming that people from certain backgrounds have different intellectual abilities
       - Assuming that someone who speaks with an accent is a poor writer or communicator
       - Assuming that someone possesses certain characteristics based on clothing
       - Assuming that someone possesses certain characteristics based on their gender
       - Assuming something about a person of a certain group based on a stereotype of that group
       - Disregarding or devaluing ideas proposed by people from certain backgrounds

       Sources: Yale Poorvu Center for Teaching and Learning https://poorvucenter.yale.edu/ImplicitBiasAwareness,
       She Can Code
       https://shecancode.io/blog/5-examples-of-unconscious-bias-we-take-for-granted"
   - Have you personally experienced bias in the department? (Yes/No)
   - Have you personally witnessed bias in the department? (Yes/No)
   - Do you think you have ever been biased towards someone in the department

based on race/ethnicity, national origin, gender, sexual orientation, disability, social class, religious beliefs, or political beliefs? (Yes/No)
    - Do you think DAS as a whole should do more to address and combat discrimination and racism in our department?
        - If yes, ask to elaborate & to provide suggestions to address and combat discrimination and racism within DAS (e.g., teaching methods, graduate school application guidelines, etc.).
    - Would you like more educational material and/or opportunities in the areas of discrimination and racism than what is/are currently provided by our department?
        - If yes, ask to elaborate & to provide suggestions of educational materials and/or opportunities that DAS could provide to address/combat discrimination and racism within our department (e.g., Materials: articles, books, video clips, television shows, movies, music; Opportunities: outreach, clubs, events within Champaign-Urbana).

2. Edit the Annual Graduate Student Survey (in collaboration with Professor and Associate Head Nicole Riemer) to include the questions given above. The goal of this would be to gather information on student viewpoints related to racism/discrimination from year to year to inform subsequent action.

3. Require all faculty, staff, graduate students, and academic professionals to periodically attend an anti-bias training course *hosted* by the department starting in Fall 2020. Graduate students should be required to take this training once as an M.S. student and once as a Ph.D. student. Faculty should be required to take this training every three years.
    - Implicit bias training has been shown to be an effective tool *when coupled with other diversity initiatives* over long periods of time.[9] Studies have shown that participants in training courses leave intending to mitigate bias[10] and that *mandatory participation* was more effective.[9]
    - This training should be provided in person/virtually in an *interactive session led by a facilitator* (as opposed to providing an online self-learning course).
    - This training should be outsourced to an institution or group that is uniquely suited for addressing and running such courses (i.e. UIUC Racial Justice Allies and Advocates Training, UCAR|NCAR Equity and Inclusion training series, or the UIUC Bias Assessment & Response Team [BART] - January Boten).
    - Any potential training should only be added after a thorough review & approval process is completed to ensure that it is distinct from the EverFi training mandated by the University. This review should also confirm that the additional training will not impose an undue burden on students, faculty, and staff. If additional training is implemented, a review of the training should occur at least every year to confirm that the training remains relevant and beneficial.

4. Incorporate topics relating to diversity, equity, and inclusion (DEI) in the curriculum for Professional Development (ATMS 571) starting in Fall 2020.
    - At least 2 classes should be dedicated to these topics. A core curriculum of DEI topics should be developed by DAS faculty and provided each year to the ATMS

571 instructor. The list of resources at the end of this document may prove especially helpful.
    - A guest lecturer could be invited from the UIUC School of Social Work (a possible person to ask is Dr. Carter-Black) or the UIUC Office of Inclusion & Intercultural Relations.
    - We strongly encourage a self-reflection assignment at the end of this unit for students to process what they've learned and commit to behaviors that reduce bias throughout their career.

5. Regularly compile and present demographic information (including race/ethnicity, gender identity, national origin, and type of institution) of graduate student *applicants, admits, and new enrollees* to graduate students on an annual basis to 1) ensure transparency, 2) better understand the reasons for lower representation of non-white* and non-male students in DAS, and 3) better isolate any "pipeline" issues. If there are few non-white applicants, then increased outreach could help with their inclusion in the long-term (e.g., AGU Bridge Program, Mentoring365, increased outreach to minority-serving institutions, or MSIs, see point below on recruitment). Alternatively, this information could be compiled for faculty viewing only in order to protect student anonymity.

6. Include one seminar per semester devoted to the intersection of atmospheric science and impacts on marginalized groups starting in Fall 2020. Marginalized groups are disproportionately impacted by environmental risks.[11, 12, 13] Understanding this link is crucial for responsible scientific research which strives to benefit society as a whole. Potential speakers could be atmospheric scientists or members of other fields (e.g. public health, emergency management, political science, social science, or geography).

7. Require the ATMS 591 faculty coordinator to review the demographic composition of invited seminar speakers each semester.
    - The faculty coordinator should facilitate inclusion of non-white and non-male speakers. This spreadsheet has been created as a resource (can be moved to another platform if necessary). *Note that these speakers should not be selected solely based on their gender or racial/ethnic minority status.*
    - Set a *target* to diversify invited seminar speakers such that
        - (1) At least 40% are non-white, including 35% URM, when using a race/ethnicity breakdown.
        - (2) At least 50% are non-male when using a gender breakdown.
            - Note: These targets should be used to *measure progress* and **not** as quotas or similar requirements.
            - These targets were chosen to represent current demographics of the U.S. population (2019 U.S. Census Estimates).

*For the purposes of this document, non-white refers to any person who is not solely of European descent, including those who identify as Asian/Asian-American, including South Asian; Hispanic/Latino, Black/African-American, American Indian/Alaskan Native, and Native Hawaiian or Pacific Islander. Multiracial persons are also included in this definition.

8. Review the process(es) of award selection for DAS awards (i.e., graduate Ogura awards), identify necessary changes to make the process(es) equitable, and promptly implement such changes.
    - Ensure there is diversity in the group of people *selecting* award recipients **when possible**.
    - DASSO should be tasked with increasing graduate student awareness of these awards, soliciting feedback on the award selection process, and encouraging applications and nominations for these awards.
    - The award selection process could be standardized via adoption of a rubric.

9. Review all DAS documentation (e.g., DAS website, resource material distributed to students, award nomination forms) by Spring 2021 to verify there is appropriate gender pronoun usage (he/him, she/her, they/their) and gender identification options (male, female, non-binary, other) to promote inclusion of all gender identities.

10. Organize events exclusively for female DAS graduate students separately from the Society of Women and Allies in the Geosciences (SWAG), which includes all SESE departments. The goal of these events would be to empower these students and provide a supportive environment. **Events can also be added/modified in the future to accomodate non-binary, gender non-conforming, and other gender minority students.**
    - Hold a workshop every semester on the basic rights of female students in DAS and provide them with a working knowledge of laws that protect them and tools at the department and university level to fight against any sort of workplace discrimination.
    - Hold workshops on career development, leadership, and communication skills to help female students in DAS reach their professional goals.
    - Offer informal social events for female students in DAS to foster community and create a supportive network for these students.
    - Provide group events for female students with invited female seminar speakers to share experiences on life and career balance.

11. Organize lunch meetings during early fall and late spring for international students (undergraduates and graduates) and other international personnel (research scientists, postdocs, academic professionals) to discuss issues relating to international status.
    - International students face a unique set of challenges, including the changing paradigm of visa status. The problems faced by international students are not unique to any particular administration, and they can include sudden travel bans and an extended visa application/renewal process.
    - These lunch meetings can give all international personnel in DAS a space to discuss these issues and learn about various resources available to them. Faculty can be unaware at times regarding these issues, thus this platform can be helpful for them as well.
    - If possible, these lunch meetings can be done in conjunction with a representative from ISSS who can help guide a constructive discussion.

- The spring semester meeting would be focused on adjustment to UIUC for international students and an assessment of the effectiveness of the lunch meetings.

12. In the annual ethics presentation given to graduate students, state that harassment, bullying, intimidation, and discrimination are considered scientific misconduct.
    - The AGU Code of Conduct can be used for reference.

13. Create a DAS Diversity, Equity, and Inclusion (DEI) Committee
    - This committee should comprise multiple faculty members and graduate students from the department. It is recommended that faculty members serve a 2-year term and graduate students serve a 1-year term with the option of a 1-year renewal for a maximum term of 2 years. How best to appoint faculty members and graduate students (i.e. volunteer basis, application, etc.) is left up to the department.
    - The responsibilities of this committee are envisioned (but not limited to) as follows:
        - Create a report that assesses the culture of inclusion, diversity, and equity across the department, addresses the diversity efforts of the department, and ultimately conceives of a new set of guidelines to accelerate diversity and inclusion to help guide the department in recruiting, retention, and support. Ideally, this report should be ready to present to the department within 1 year of committee formation and should occur annually.
        - Give feedback on departmental funding, travel, scholarships, and awards to ensure that non-white, female, and gender minority candidates are fairly included and considered, including at the undergraduate level.

DASSO-related Changes

14. Strive to elect non-white and non-male students as DASSO officers in order to ensure diverse leadership starting for Fall 2021. This ensures 1) that non-white and non-male students are involved in decision-making and 2) heightened visibility of non-white and non-male students in DAS.
    - As part of this, outgoing DASSO officers should encourage non-white and non-male students to run for DASSO officer positions. *Note that potential officers should not be selected solely based on their gender or racial/ethnic minority status.*

15. Create two DASSO co-officers responsible for fostering domestic-international student relations to achieve inclusivity of all graduate students regardless of national origin. One co-officer should be an international student and one co-officer should be a domestic student.

16. Increase availability of social events open to all DAS graduate students starting in Fall 2020. Examples of possible events are listed below:

- More food-related events at area restaurants (once COVID-19 restrictions are lifted) to increase student interaction outside of normal departmental functions and to support minority-owned local small businesses. A channel within the DAS Illinois Slack should be created as a place to develop a list of restaurants, or these restaurants could be added to the recently created list of places in C-U provided to incoming students.
- DAS movie nights in the 2nd Floor Auditorium, with movie choices in different languages and featuring different cultures (within and outside the U.S.) to foster greater interaction between students and provide a learning opportunity in an informal setting. DASSO Officers should strive to have a diverse set of chosen movies in terms of language and culture. Since the auditorium schedule is controlled by the university, room reservations will have to be made with the university well in advance. All selected movies should have English subtitle capability. As needed, movies with the "Audio Description" feature should be selected to accommodate those students with a visual impairment.
- DAS game nights (perhaps in the 1st floor Instrumentation Lab), with games from different cultures. Games could be provided by students.
- Annual department-wide hiking and/or camping trips (beyond the SESE Annual Field Trip). If DASSO officers as a group (along with others) perform planning duties, these outdoor trips should be more feasible to organize than in the past. Careful consideration should be given to choosing campsites, hiking trails, and associated outdoor activities to accommodate students with disabilities.
    - *Note: These do not have to be DASSO-sponsored trips.*

MSCAR-related Changes

17. Invite students from atmospheric science and related programs at MSIs [including Historically Black Colleges and Universities (HBCUs), Hispanic-Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs), and Asian American and Pacific Islander Serving Institutions (AAPISIs)] and junior/community colleges to increase the diversity of MSCAR attendees.
    - Throughout the planning process, MSCAR co-chairs should think of additional ways to increase participation of non-white and non-male attendees.

SESE-related Changes

18. Require that the first round of poster judging for the SESE Research Review be *name-blind* by masking names on judging forms and posters. This judging practice strives to reduce unconscious bias in terms of race and gender in the first round and will likely increase the diversity of students advancing into the second round of judging.
    - This is motivated by the following studies:
        - Blind auditions for orchestras have noticeably contributed to improved gender diversity amongst symphony orchestra members (Orchestrating Impartiality Study).

- Non-blind evaluation of resumes resulted in ~50% more callbacks for "white-sounding" names (Labor Market Discrimination Study).

19. Strive to diversify SESE Research Review poster judges. Increasing the diversity of the judges will likely have a positive effect on student diversity for both rounds of poster judging, especially in combination with first round name-blind judging.
    - Below are *suggested targets* for *future* use. These should only be considered when more non-male and non-white faculty have been hired in SESE. Actively striving for these targets before then could result in an undue burden on non-male and non-white faculty.
        - (1) At least 40% of judges are non-white, including 35% URM, when using a race/ethnicity breakdown.
        - (2) At least 50% are non-male when using a gender breakdown.
            - Note: These targets should be used to *measure progress* and **not** as quotas or similar requirements.
            - These targets were chosen to represent current demographics of the U.S. population (2019 U.S. Census Estimates).

20. Review the process(es) of award selection for the Schlesinger Travel Grant, identify necessary changes to make the process(es) equitable, and promptly implement such changes.
    - Ensure there is diversity in the group of people *selecting* award recipients **when possible**.
    - Faculty should make a *concerted* effort to encourage non-white and non-male undergraduate students to apply.
    - The award selection process could be standardized via adoption of a rubric.

LONG-TERM CHANGES (beyond 1 year)

***Note: These changes are not listed in order of significance.*

DAS-related Changes

1. Remove the Graduate Record Examinations (GRE) as a *required* part of the DAS graduate application for Fall 2021 applicants, as the cost of the test and test preparation classes disadvantage lower-income students.[14] Moreover, studies of GRE performance have shown notable disparities based on race/ethnicity and gender,[15, 16] as well as a relative lack of correlation between high GRE scores and success in a PhD program.[17, 18, 19] Therefore, removing the GRE would likely contribute to increased numbers of URM and non-male students in the applicant pool and accepted students.
    - *Note:* The UIUC Graduate College *does not* require the use of GRE scores in admissions; each department sets its own GRE guidelines. Thus, department faculty can decide to require or not require the GRE.
    - *Note*: The Colorado State University and University of Washington Atmospheric Science departments announced on June 19, 2020 that they will no longer consider GRE scores as part of

their graduate applications. Some UIUC departments have done the same, including Geography and GIS, Chemistry, and Molecular and Cellular Biology.

2. Expand DAS recruitment practices to increase the number of non-white, female, and gender minority students in the graduate program.
    - Connect with faculty at MSIs to facilitate undergraduate & graduate student recruitment (see Increasing the Diversity of Your Graduate Program: Translating Best Practices into Success).
    - Connect with faculty at junior and community colleges to facilitate undergraduate recruitment and work to increase the number of credits that can be transferred.
    - Send DAS representatives to national conferences for organizations such as the National Society of Black Engineers (NSBE), Society for the Advancement of Chicanos and Native Americans in Science (SACNAS), American Indian Science and Engineering Society (AISES), and the Society of Asian Scientists and Engineers (SASE). Both faculty and students could attend these conferences and act as DAS ambassadors. Efforts should be made to investigate possible funding sources for these trips.
    - Encourage DAS faculty to attend receptions for non-white (Colour of Weather) and LGBTQ+ (Coriolis) members of the atmospheric science community at the AMS Annual Meeting.
        - Note: These receptions are usually open to all who are committed to diversity & inclusion, including white and non-LGBTQ+ individuals. However, these individuals should monitor announcements for these events before attending to ensure they are not entering spaces specifically designated for non-white or LGTBQ+ communities.
    - Provide more information regarding application fee waivers from the UIUC Graduate College explicitly on the department website.
    - Continue to offer URM students admission to the Sloan University Center of Exemplary Mentoring (UCEM) program and the Summer Predoctoral Institute (SPI) at UIUC. These programs provide additional support to URM graduate students and act as incentives for these students to choose UIUC.
    - Continue efforts to join the AGU Bridge Program.
    - Set a target to diversify DAS graduate students such that
        - (1) At least 40% of domestic students are non-white, including 35% URM, when using a race/ethnicity breakdown.
        - (2) At least 50% are non-male when using a gender breakdown.
            - Because our department has the largest discrepancies in the numbers of female, Black/African-American, and Asian-American students (compared to the U.S. population overall), *efforts should be focused on increasing representation of these groups in particular*.
            - These targets should be used to *measure progress* and **not** as a quota or similar requirement.
            - These targets were chosen to represent current demographics of the U.S. population (2019 U.S. Census Estimates).

3. Strive to increase the number of non-white and non-male senior undergraduate Capstone research participants through continued encouragement of non-white and non-male students as well as prominently and regularly providing resources for undergraduate

research and career opportunities throughout the academic year, including at MSCAR and the SESE Research Review.
    - Faculty should strive to publicize undergraduate research and career opportunities on research group and/or faculty websites, in communication with SCAMS officers, and conveyed to Jessie Choate for undergraduate advising purposes.
    - When needed or requested, undergraduate students could be assisted in finding opportunities outside of departmental research areas to allow for greater Capstone participation overall.

4. Regularly compile and present the *number* of DAS-specific bias incidents to graduate students on an annual basis to ensure transparency and state the actions that have been initiated in response to the bias incidents.
    - DAS-specific bias incidents are reported to the DAS department head by BART upon request of the bias incident reporter.
    - In doing this, reporter anonymity should be preserved and incident details should ***not*** be divulged.
    - Related to this, bias reporting information (BART) and a link to the Bias-Motivated Incident Reporting Form (BART Bias Reporting Form) should be added to the DAS website.

DASSO-related Changes

5. Create a new DASSO Officer responsible for Community Outreach by Fall 2021 to 1) increase DAS participation in *existing* community outreach programs (e.g., Engineering Open House, SESE Girls Camp, SESE Outreach Committee, C-U One-to-One, SCAMS activities) and 2) develop *new* DAS connections with the surrounding community. When possible, such outreach should attempt to increase interest in STEM among non-white and non-male students in an effort to improve STEM diversity in the long-term.
    - As part of this, faculty should urge their students to participate in outreach activities. Doing so would make it clear to students that *outreach is an important aspect of one's graduate career* (in addition to research and coursework).

6. Expand the existing DASSO Mentorship program to also include incoming graduate students as mentees who would in-turn be mentored by more senior graduate students. Pairing of mentors and mentees could be based on gender and/or national origin if requested.
    - This can be done by tuning the application forms accordingly. It is anticipated that this would be highly useful for incoming graduate students, especially international students who would find it relatively easier to navigate through a different culture and lifestyle in a new country with the help of a mentor.

MSCAR-related Changes

7. Encourage appointment of non-white and non-male students as MSCAR Co-chairs each year in order to facilitate diverse leadership. This ensures 1) that non-white and non-male

students are involved in decision-making and 2) heightened visibility of non-white and non-male students in DAS. *Note that potential officers should not be selected solely based on their gender or racial/ethnic minority status.*

8. Strive to increase the number of non-white and female oral presenters (both keynote and student) at MSCAR.
    - Recent studies have shown that women, specifically women of color, are less likely to be selected for oral presentations and invited presentations. [20, 21]
    - With this in mind, MSCAR should strive to diversify the Abstracts and Submissions subcommittee, which selects the abstracts and finalizes the presentation type.[20]
    - Set a target to diversify presenters such that
        - (1) At least 40% are non-white, including 35% URM, when using a race/ethnicity breakdown.
        - (2) At least 50% are non-male when using a gender breakdown.
            - This could require race/ethnicity and gender identity to be added as responses on the MSCAR registration form.
            - These targets should be used to *measure progress* and **not** as a quota or similar requirement.
            - These targets were chosen to represent current demographics of the U.S. population (2019 U.S. Census Estimates).

9. Investigate the feasibility of *permanently* accommodating virtual attendance to allow for conference participants with financial need who can not travel to MSCAR. This could increase overall attendance, while possibly allowing for a reduced registration fee for in-person attendees due to the reduction in food and refreshments. As a result, this could possibly make the conference more self-sustaining.

10. Consider waiving the MSCAR registration fee for students with financial need, (including DAS and outside students).
    - To this end, DAS faculty and MSCAR co-chairs could explore the possibility of submitting a proposal to NSF (or similar entity) to allow MSCAR the ability to provide waived registration fees or travel to students with demonstrated financial need. Doing so will allow MSCAR to not be completely reliant on registration fees in order to operate, helping keep registration fees low and increasing attendance.

SESE-related Changes

11. Create the SESE Diversity and Inclusion Oversight Committee in partnership with the Department of Geology, Department of Geography, and the Earth, Society, and Environmental Sustainability Program.
    - This committee should comprise a faculty member and 2 graduate students from each of the entities within SESE.

        - It is recommended that faculty members serve a 2-year term, with each SESE entity deciding for themselves how to appoint members (volunteer basis, appointment by department head, vote of the faculty, etc.).
        - It is recommended that graduate students serve a 1-year term with the option for a 1-year renewal for a maximum term of 2 years. Each SESE entity can decide how to appoint members (volunteer basis, application process, appointment by faculty member, etc.).
    - The responsibilities of the committee are envisioned as follows:
        - Create a report that assesses the culture of inclusion, diversity, and equity across the departments and SESE as a whole, addresses the diversity and diversity efforts of the departments, and ultimately conceives of a new set of guidelines to accelerate diversity and inclusion to help guide SESE and the departments in recruiting, retention, and support. Ideally, this report should be ready to present to SESE and the departments within 1 year of committee formation and should occur annually.
        - Create a set of guiding principles focused on creating safe and inclusive field work/trips.
        - Work with the SESE department heads regarding any reports or statistics provided by BART.
            - Committee members that work in the department where the incident occurred will not be involved with discussing those incidents.
        - Give feedback on SESE funding, travel, scholarships, and awards to ensure that non-white, female, and gender minority candidates are fairly included and considered, including at the undergraduate level.

CONCLUSION

DAS has a responsibility to promote *science and solidarity*. For this reason, DAS must set in place necessary frameworks and resources to combat racism, discrimination, xenophobia and related intolerance in the atmospheric sciences.

We ask DAS faculty to thoroughly consider enacting the proposed DAS-related actions and policy changes outlined above. DASSO-related changes will be the responsibility of the graduate students to consider and possibly enact. MSCAR-related changes will be the responsibility of the MSCAR Core Team to consider and possibly enact. Further consultation with the SESE Executive Committee and other SESE departments will be conducted to proceed with consideration of the SESE-related changes.

Moreover, we ask the DAS faculty to view the following petition put forth by geoscientists (Call for a Robust Anti-Racism Plan for The Geosciences) and consider publicly acknowledging the action steps contained within.

Lastly, we ask each governing entity (DAS, DASSO, MSCAR, SESE) to be transparent regarding the implementation of their respective changes by doing the following:

1. Provide a response to each change proposed in this document. In the case of DASSO and MSCAR, reports should be generated by the officers/co-chairs and then compiled with the DAS report by the DAS Department Head.
2. Provide DAS students with annual progress reports to gauge where our efforts are initiating concrete changes and where we need to increase our efforts.
3. Provide a mechanism for DAS students to propose additional changes in the future not contained herein.

ENDORSEMENTS (40)

Alex Adams
Anonymous
Anonymous
Anonymous
Anonymous
Arka Mitra
Ben Vega-Westhoff
Carolina Bieri
Chu-Chun Chen
Chuan-Chieh Chang
David Lafferty
Devin Chehak
Divyansh Chug
Dongwei Fu
Douglas Miller
Geoffrey Marion
Holly Mallinson
Itinderjot Singh
Javier Villegas Bravo
Jeffrey Curtis
Jeffrey Thayer
Jiacheng Ye
Joseph Finlon
Jun Zhang
Kevin Gray
Lina Rivelli Zea
Luke Allen
Max Grover
Megan Varcie
Michael Sessa
Piyush Garg
Prateek Sharma
Puja Roy
Randy J. Chase
Rose Miller
Sarah Szymborski
Swarnali Sanyal
Troy Zaremba
Tzu-Shun Lin
Yu Yao

RESOURCES

Statistics on diversity in the geosciences/STEM:

- **Race and racism in the geosciences**, Nature Geoscience
- **No progress on diversity in 40 years**, Nature Geoscience
- **Women, Minorities, and Persons with Disabilities in Science and Engineering: 2019 | NSF - National Science Foundation**
- **Status and Trends in the Education of Racial and Ethnic Groups 2018**

Regarding Implicit Bias:

What is Implicit Bias?

- **Implicit Bias, Ethics Unwrapped Series by the McCombs School of Business at the University of Texas**
- **How to Think about "Implicit Bias", Scientific American**
- **What is Anti-Bias Education, Anti-Defamation League**

Implicit Bias in Society

- **A Field Experiment on Labor Market Discrimination, National Bureau of Economic Research**
- **Biases in Artificial Intelligence , Harvard Business Review**
- **Google on Raising Awareness of Unconscious Bias, Google**

Impact of Implicit Bias Trainings

- **When They Say "Implicit Bias Trainings Don't Work", Diverse Issues in Higher Education, Diverse Issues in Higher Education**
- **Don't Give Up on Unconscious Bias Training, Harvard Business Review**
- **A Meta-Analytical Integration of Over 40 Years of Research on Diversity Training Evaluation, American Psychological Association**

Statistics on the GRE:

- **U.S. Geoscience Programs without the GRE Requirement**

Relevant articles:

- **Deep Biases Prevent Diverse Talent from Advancing,** Eos
- **What Black scientists want from colleagues and their institutions**, Nature
- **How #BlackInTheIvory put a spotlight on racism in academia**, Nature
- **Why Don't the Geosciences Have More Diversity?** Scientific American
- **NCAR/UCAR Diversity and Inclusion Statement**, NCAR/UCAR
- **How Implicit Bias and Lack of Diversity Undermine Science**, Scientific American
- **Gender differences in recommendation letters for postdoctoral fellowships in geoscience**, Nature Geoscience
- **Increasing the Diversity of Your Graduate Program: Translating Best Practices into Success**, BAMS
- **10 Simple Rules for Building an Anti-Racist Lab**, PLOS
- **What does it mean to be Asian-American in the geosciences?**, Stanford Earth
- **Women from some under-represented minorities are given too few talks at world's largest Earth-science conference**, Nature

Websites:

- **A Call to Action for an Anti-Racist Science Community from Geoscientists of Color: Listen, Act, Lead**
- **#ShutDownAcademia #ShutDownSTEM**
- **GeoReadingForEquity**
- **Talking About Race in the Earth and Space Sciences**
- **Racism in Research and Academia**
- **#blackintheivory hashtag on Twitter**
- **Picture a Scientist**
- **Can We Talk? Difficult Conversations with Underrepresented People of Color: Sense of Belonging and Obstacles to STEM Fields**
- **Project Implicit**
- **AMS Webinar Directory** - Look for webinars hosted by the Board on Women and Minorities (BWM) or Board on Representation, Accessibility, Inclusivity, and Diversity (BRAID) in later 2020 or 2021 when the name change will take effect
- **AMS Culture and Inclusion Cabinet**
- **Racism Scale**
- **List of Geoscientists of Color**

Books:

- **Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy** by Cathy O'Neil (Broadway Books, 2016); *Addresses the ethics of big data and artificial intelligence and how implicit bias may affect the creation of algorithms and data analysis*
- **Blind Spot: Hidden Biases of Good People** by Mahzarin R. Banaji and Anthony G. Greenwald (Delacorte Press, 2013); *Written by two of the academics behind Harvard's Project Implicit*
- **The Race Awakening of 2020**: A 6-Step Guide For Moving Forward by Dr. Marshall Shepherd (Independently Published, 2020); *Meaningful actions to take in your homes, local communities, and beyond to move the needle*

Audio/Visual Media:

- **Floodlines Podcast** (especially episodes 3 & 4)
- Science Friday Episode from 7/3/2020: **Making The Outdoors Inclusive For All**
- **Weather Geeks Podcast** Episode 119 "Highlighting Racial Challenges in STEM"
- **United States of Anxiety Podcast** July 10, 2020 "Zoned for Resistance"

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