Examination of Racial Bias in Alpha Omega Alpha Inductions: A Single-Center 15-Year Retrospective Study

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NOTE: This preprint reports new research that has not been certified by peer review and should not be used to guide clinical practice.
ABSTRACT

Importance: With USMLE Step 1 becoming pass/fail, subjective clinical evaluations will hold greater weight in residency applications. However, no longitudinal studies exist that examine the role of race in clinical success during medical training.

Objective: Utilizing Alpha Omega Alpha (AOA) as an objective marker of clinical achievement, I investigated the relationship between race and AOA membership at Northwestern University Feinberg School of Medicine over a span of 15 years.

Design, Setting, and Participants: To accomplish this retrospective, single center, multi-year cohort study, names of all Feinberg graduates between 2003 and 2018 were collected via the school's public website. Images for each student were gathered by social media, assigned an ethnic identity by a blind evaluator, and confirmed by an unblinded evaluator. Finally, each name was verified against the AOA database to determine membership status.

Main Outcomes and Measures: AOA membership among medical students of various racial groups at Feinberg.

Results: From a 2,466 student body, there were 546 (22.1%) Eastern/Southeastern Asian, 123 (5.0%) African-American, 102 (4.1%) Hispanic/Latino, 399 (16.2%) South Asian, 59 (2.4%) Other, and 1205 (48.9%) Caucasian students, with 32 (1.3%) exclusions. Within this collective group, 428 students were inducted to AOA: 62 (14.5%) Eastern/Southeastern Asian, 4 (0.9%) African-American, 10 (2.3%) Hispanic/Latino, 70 (16.4%) South Asian, 10 (2.3%) Other, and 270 (63.1%) Caucasian students, with 2 (0.5%) exclusions. By class/year, the percentage of Caucasians inducted into AOA were higher than the class percent in 15 out of 16 classes, compared to 1 by
Eastern/Southeastern Asians and 7 by South Asians. Odds ratio analysis demonstrated Eastern/Southeastern Asian (OR, 0.44; 99.67% CI, 0.28 – 0.69) and African-American (OR, 0.12; 99.67% CI, 0.03 – 0.53) students were at disadvantage relative to Caucasians for AOA membership.

**Conclusion:** I revealed Eastern/Southeastern Asian and African-American students were statistically less likely to be selected for AOA compared to Caucasian counterparts. Additionally, Eastern/Southeastern Asian students were under-represented almost every year despite being the most represented minority demographic. These results demonstrate subjective bias in AOA membership for both under- and over-represented minorities and suggests the recent Step I paradigm shift may disproportionately affect certain students over others.
KEY POINTS

**Question:** Which minority groups are disadvantaged compared to Caucasian counterparts for AOA membership?

**Findings:** In this longitudinal, retrospective cohort study spanning fifteen years at Northwestern Feinberg School of Medicine, I found Caucasian students were 2 and 8 times more likely to obtain AOA membership than Eastern/Southeastern Asian and African-American medical students respectively.

**Meaning:** Certain bias underlying AOA admission may exist and are possibly stable over time, which is concerning given the recent Step 1 policy changes and thus eventual shift away from objective evaluations in residency applications.
INTRODUCTION

Starting January 2022, USMLE Step 1 will become a pass-fail exam, thereby raising the value of subjective metrics in the residency application. As a result, non-cognitive disparities that have been traditionally entrenched within academia may become greater emphasized. For instance, racial inequality exists in many aspects of healthcare, including research funding\(^1\) and the workforce\(^2\). Yet how these racial barriers manifest and affect medical education is complicated and has been the subject of extensive investigation. Unfortunately, the sheer magnitude of diverse studies on this topic often complicates interpretation.

One underexplored area that may potentially serve as a simplified gestalt of these biases is the relationship between race and membership to Alpha Omega Alpha (AOA) – an exclusive honor society reserved for the best of each class. Members are highly sought after by all residencies and therefore possess innumerable career and income advantages\(^3,4\), making induction a competitive goal for many medical students. Although multiple factors exist in determining membership eligibility, by far the most important is clinical grades\(^5,6\). Since non-cognitive bias is most influential within this realm\(^7,8\), I believe an examination of ethnic trends in AOA membership can result in objective snapshots of racial disparity in medical education. Indeed, a recent study by Boatright et al. demonstrated significant bias against African- and Asian-American students\(^9\) and ultimately led to the closure of one AOA chapter\(^10\). While powerful, their study was only a one-year cross-sectional analysis, which precludes definitive conclusions about trends over time.
Here, I performed the first single-center, multi-year study to examine longitudinal AOA membership trends among major ethnic groups. I find that African-American and Eastern/Southeastern (E/SE) Asian students are over time consistently underperforming in AOA selection, strengthening Boatright et al.’s original observation and suggesting recent USMLE policy changes may be detrimental to certain ethnic groups.

**MATERIALS AND METHODS**

**Subjects.** I first accessed Feinberg’s public website\(^\text{11}\) to collect names of all matched MD graduates between 2003 to 2018 and categorized them by graduation year. Duplicate names of students matching simultaneously into preliminary and advanced programs were carefully vetted and eliminated.

To determine which MD graduates were selected for AOA, I found campus articles documenting medical graduate inductees each year between 2010-2018\(^\text{12}\). I searched Pharos magazine for similar lists between 2007-2009\(^\text{13}\). Because there were no public listing for inductees between 2003-2006, I verified each graduate from these respective classes with AOA’s membership database\(^\text{14}\). However, this database discloses name and inducted institution but not training stage (i.e. medical graduate vs. resident vs. faculty vs. alumni). To circumvent this issue, I screened all 2003-2006 AOA Feinberg inductees against 2007-2018 lists (which also show resident, faculty, and alumni inductees) to confirm the individual was indeed inducted as a Feinberg MD graduate (i.e. if a 2003-2006 inductee is also on the 2007-2018 resident induction list, I assume...
he/she became a member as resident rather than a medical graduate). This entire process yielded a total number of 2466 total students and 428 AOA inductees (eTable 1).

**Ethics.** I did not utilize an IRB approval form because all derived data for analysis were openly available within the public domain.

**Race Determination.** I performed ethnic assignments using a combination of subjective evaluation and genealogy confirmation rather than objective AAMC-based data primarily because the latter does not distinguish between South (S) Asian and E/SE Asian students. I believe the collective grouping of two over-represented (Figure 2, eTable 1) but culturally distinct minorities is inaccurate and does not reflect differences that may exist between the two groups15. For that reason, anonymized AAMC-based data would not be able to provide me with the appropriate information.

An evaluator blinded to the study’s purpose was instructed to utilize social media (Facebook, Linkedin, Doximity, and various medical websites) to search and assign each student by ethnicity (E/SE Asian, S Asian, African American, Hispanic/Latino, Caucasian, or Other) via subjective evaluation. Of note, Native Hawaiian and Pacific Islander were included in the “E/SE Asian” category (due to low total number) and all Middle-Eastern nationalities were designated as “Other”.

Another evaluator (unblinded to the study’s purpose) verified assignment accuracy via five consecutive iterations of subjective evaluation and confirmation with Forebears – a
genealogical search engine (http://Forebears.io). Students with any identification problems in this process were automatically excluded. Half-Caucasian students were assigned to their minority ethnicity (i.e. E/SE Asian-Caucasian students were assigned as E/SE Asian) as it is well documented children of white/non-white marriages tend to identify with the minority race\textsuperscript{16}. For the same reason, racially heterogeneous non-Caucasian students were excluded. The breakdown of these results by year is seen in eTable 2.

**Statistical Analysis.** For each class between 2003 to 2018, I measured and graphed the difference between the percentage of AOA members per ethnic group and the percentage per collective class (i.e. if in one specific year, 20% of an ethnic group were AOA versus 15% within the overall class, the difference for said ethnic group that year would be +5%).

To assess the association between race and AOA membership, I performed a series of odds ratio pair-wise comparisons with Bonferroni correction for multiple testing (15 unique tests). For all analyses, $p < 0.0033$ (0.05/15) was considered significant and all confidence intervals were set at 99.67%. Graphs were created with Graphpad Prism 7 while odds ratios were calculated using MedCalc.

**RESULTS**

Using publicly-accessible information from the Feinberg website\textsuperscript{11}, I reviewed the ethnicities of 2,466 students over the span of 15 years (and 16 classes) at the
Northwestern Feinberg School of Medicine (Figure 1). From the composite total, 546 (22.1%) were E/SE Asian, 123 (5.0%) were African-American, 102 (4.1%) were Hispanic/Latino, 399 (16.2%) were South Asian, 59 (2.4%) were Other, 1205 (48.9%) were Caucasian, and 32 (1.3%) were undetermined and excluded from the analysis. Thus, Caucasians compromised the majority of the collective student body, while E/SE Asian students were the most represented minority. Utilizing AOA’s public database, I determined 428 of these students obtained AOA membership. Parsing this information by ethnicity, 62 (14.5%) were Eastern/Southeastern Asian, 4 (0.9%) were African-American, 10 (2.3%) were Hispanic/Latino, 70 (16.4%) were South Asian, 10 (2.3%) were Other, 270 (63.1%) were Caucasian, and 2 (0.5%) were unknown (excluded). eTable 1 and Figure 2 respectively summarizes these results numerically and visually respectively.

I next granularized this information by year (2003-2018). Caucasians comprised the majority of students and AOA members in every class. E/SE Asians had the second most students in 12 classes and second most AOA members in 5. S Asians had the second most students in 4 classes and second most AOA members in 8. Additionally, there were 3 classes where E/SE and S Asians had equal numbers of AOA members. African-Americans, Hispanics/Latinos, and Others were the least represented minorities and consistently had the lowest AOA memberships each year (eFigure 1, eTable 1).

I normalized this information by calculating the difference between percentage of AOA members per ethnic group and overall percentage per class. I focused my analysis on
E/SE Asian, S Asian, and Caucasian students due to their strong demographic representations. My results show Caucasians were above the class percentage in 15 out of 16 classes. On the other hand, E/SE Asians were only above this normalized value 1 out of 16 years while South Asians were above for 7 (Figure 3). Of note, despite being under-powered, African-American students were below class average every year (eFigure 2).

Finally, I performed pairwise comparisons between all groups to determine the likelihood each has of obtaining AOA membership. I found that relative to Caucasian students, E/SE Asian (OR, 0.44; 99.67% CI, 0.28 – 0.69) and African-American (OR, 0.12; 99.67% CI, 0.03 – 0.53) – but not Hispanic/Latino (OR, 0.38; 99.67% CI, 0.14 – 1.02), S Asian (OR, 0.74; 99.67% CI, 0.48 – 1.14) or Other (OR, 0.71; 99.67% CI, 0.25 – 2.0) – students were statistically less likely to obtain AOA (Figure 4). All other pairwise comparisons can be found in eTable 3.

**DISCUSSION**

Using a multitude of highly stringent (i.e. CI of 99.67%) analytical approaches, I show that E/SE Asian and African-American students are most disadvantaged for AOA membership relative to their Caucasian counterparts at the Feinberg School of Medicine. Boatright *et al.* demonstrated from a multi-centered, single-year, specialty-focused study that significant bias exists against African- and Asian-American students for AOA membership⁹, while Wijesekera *et al.* largely confirmed these findings¹⁷. While informative and novel, such results are cross-sectional and do not examine trends over
extended periods of time. My single-centered, multi-year, and specialty-neutral study complements, confirms, and further expounds these previous findings by showing the temporal stability of these racial disparities.

With E/SE Asian and S Asian being over-represented minorities both at the Feinberg (Figure 2, eFigure 1, eTable 1) and within the national medical student population\textsuperscript{16,19}, my results question the validity of AAMC’s policy of aggregating E/SE and S Asians together under the umbrella term “Asian”, especially since the two ethnic groups are physically and culturally distinct\textsuperscript{15,20,21}. Thus, I intentionally segregated the two groups in my study and revealed that S Asians have more AOA members than E/SE Asians despite numerical inferiority (Figure 2-3, eFigure 1, eTable 1) and are statistically similar to Caucasians for likelihood of induction (Figure 4, eTable 3). My results also expound upon Boatright et al.’s study – given their utilization of AAMC’s standardized racial categorization – suggesting E/SE Asian students may be responsible for the overall negative bias against “Asians” in AOA selection\textsuperscript{9}. My findings therefore not only confirm previous trends but also shed light on alarming new ones that were previously unable to be ascertained with traditional AAMC self-reported data.

E/SE Asians comprise a huge proportion of the non-Caucasian student body at Feinberg while African-Americans are much less represented (eFigure 1, eTable 1), suggesting two distinct etiologies for the findings. African-Americans have well-documented disadvantages in medical education, including admission bottlenecks\textsuperscript{19,22}, lower exam scores\textsuperscript{23}, poorer clerkship evaluations\textsuperscript{7,17}, and weaker MSPE narratives\textsuperscript{24}. 
Their AOA disparity may thus be the manifestation of a combination of these barriers. On the other hand, much less is known about Asian American medical students’ performances in medical education, partially because over-representation may preclude serious reflection. One possible explanation for these results is that E/SE Asian students, by means of cultural habit, may have lower inclination for leadership activities and may lose nominations points because of it. However, Boatright et al. found no association between AOA membership and leadership. Perhaps more insidiously, both ethnic groups may be victims of subtle discrimination: while official criteria for AOA medical student membership require a conglomeration of scholastic achievement, leadership prowess, and consummate professionalism, many AOA chapters place disproportionately high emphasis on clinical grades as selection criteria. For example, Feinberg uses clinical performance as the sole criteria for determining the initial pool of eligible candidates. These subjective evaluations have consistently been shown to be influenced by a multitude of non-cognitive variables. Future studies correlating different aspects of subjective clinical grades (i.e. clinical performance evaluations and OSCEs) in different ethnic groups will be warranted to verify this theory.

A collective decision by the NBME, USMLE, and FSMB was recently made to alter USMLE Step 1 reporting from a three-digit score to a pass-fail outcome starting January 2022. The primary logic behind this change was to encourage more holistic evaluations from residency programs and to alleviate the student mental health burden associated with this examination. However, since scores have traditionally been markers of academic excellence, this well-intended action – in conjunction with growing numbers of
medical graduates vying for limited residency positions – inevitably pushes clinical 
grades as the de facto measurement of applicant competitiveness. Here, I provide 
进一步 evidence there is implicit racial bias against Asian (E/SE) and African-American 
students in the AOA selection process. I believe the recent Step I paradigm shift will 
cause such discrepancies to have increasing influence on downstream career paths. 
Hence, my observations must be investigated thoroughly and addressed honestly by all 
involved parties.

My study is not without limitation. Foremost, the longitudinal, single-center design 
precludes extrapolation to other institutions. However, it must be mentioned that my 
results complement and closely replicate Boatright et al.’s single-year cross-sectional 
study. Another weakness of this study was determining student ethnicity via subjective 
evaluation, which may be error-prone because it is not self-reported information. I 
employed this approach because I believed AAMC’s integration of S and E/SE Asian 
students as a collective group is inaccurate, considering their individual demographics 
at Feinberg. For the same reason, I was not able to control for other co-variables, such 
as Step I/II scores, extracurricular activities, or Gold Humanism membership (my 
analysis technique precludes anonymization), thus decreasing the accuracy of this 
study. Lastly, due to experimental design, some inferences may not be accurate and 
may skew results. For example, categorization of several students as Middle-Eastern 
(i.e. Other) versus S Asian presented some issue, given the proximity of both regions to 
one another. In addition, assignment of half-Caucasian students as minorities is another 
assumption that may be unfounded.
Given traditional institutional disadvantages with African-Americans\textsuperscript{22,27} and the recent evidence of racial discrimination against Asian-Americans at Harvard\textsuperscript{28} and other institutional settings\textsuperscript{29}, my study raises awareness and sets clear precedence for future investigation. Not only have I reproduced the well-known bias against underrepresented minorities\textsuperscript{9} but I also uncover inherent disadvantages for certain overrepresented minorities – trends that would not have been easily discerned using traditional analytical methods. These results demonstrate the need for AAMC and AOA chapters to acknowledge/address current demographic standards and implicit biases respectively moving forward.

**AUTHOR CONTRIBUTIONS**

R.G. designed the study, gathered the data, and wrote the manuscript. An external evaluator performed the initial assessment of the data while R.G. was responsible for the subsequent iterations. R.G. is responsible for the integrity of the entire study. Northwestern University's Biostatistics Collaboration Center provided statistical consultation.
REFERENCES

1. Ginther DK, Schaffer WT, Schnell J, et al. Race, ethnicity, and NIH research awards. *Science.* 2011;333(6045):1015-1019.
2. Osseo-Asare A, Balasuriya L, Huot SJ, et al. Minority Resident Physicians' Views on the Role of Race/Ethnicity in Their Training Experiences in the Workplace. *JAMA Netw Open.* 2018;1(5):e182723.
3. Grayson MS, Newton DA, Patrick PA, Smith L. Impact of AOA status and perceived lifestyle on career choices of medical school graduates. *J Gen Intern Med.* 2011;26(12):1434-1440.
4. Dorsey ER, Jarjoura D, Rutecki GW. Influence of controllable lifestyle on recent trends in specialty choice by US medical students. *JAMA.* 2003;290(9):1173-1178.
5. Teherani A, Harleman E, Hauer KE, Lucey C. Toward Creating Equity in Awards Received During Medical School: Strategic Changes at One Institution. *Acad Med.* 2020.
6. Northwestern Feinberg School of Medicine: Alpha Omega Alpha. [https://www.feinberg.northwestern.edu/md-education/current-students/student-outcomes/awards-honors/alpha-omega-alpha.html](https://www.feinberg.northwestern.edu/md-education/current-students/student-outcomes/awards-honors/alpha-omega-alpha.html). Accessed May 10, 2020.
7. Lee KB, Vaishnavi SN, Lau SK, Andriole DA, Jeffe DB. "Making the grade:" noncognitive predictors of medical students' clinical clerkship grades. *J Natl Med Assoc.* 2007;99(10):1138-1150.
8. Isaac C, Chertoff J, Lee B, Carnes M. Do students' and authors' genders affect evaluations? A linguistic analysis of Medical Student Performance Evaluations. *Acad Med.* 2011;86(1):59-66.
9. Boatright D, Ross D, O'Connor P, Moore E, Nunez-Smith M. Racial Disparities in Medical Student Membership in the Alpha Omega Alpha Honor Society. *JAMA Intern Med.* 2017;177(5):659-665.
10. Lynch G, Holloway T, Muller D, Palermo AG. Suspending Student Selections to Alpha Omega Alpha Honor Medical Society: How One School Is Navigating the Intersection of Equity and Wellness. *Acad Med.* 2019.
11. Feinberg Match Results. [https://www.feinberg.northwestern.edu/md-education/current-students/career-development/residency-application-process/match-results/](https://www.feinberg.northwestern.edu/md-education/current-students/career-development/residency-application-process/match-results/). Accessed June 5, 2019.
12. Feinberg School of Medicine News Center. [https://news.feinberg.northwestern.edu/](https://news.feinberg.northwestern.edu/). Accessed June 6, 2020.
13. Alpha Omega Alpha Honor Medical Society: The Pharos. [https://alphaomegalaalpha.org/pharos](https://alphaomegalaalpha.org/pharos). Accessed February 7, 2020.
14. Alpha Omega Alpha Honor Medical Society. [https://alphaomegalaalpha.org/search.php](https://alphaomegalaalpha.org/search.php). Accessed June 6, 2019.
15. Gordon NP, Lin TY, Rau J, Lo JC. Aggregation of Asian-American subgroups masks meaningful differences in health and health risks among Asian ethnicities: an electronic health record based cohort study. *BMC Public Health.* 2019;19(1):1551.
16. Herman M. Forced to choose: some determinants of racial identification in multiracial adolescents. *Child Dev.* 2004;75(3):730-748.
17. Wijesekera TP, Kim M, Moore EZ, Sorenson O, Ross DA. All Other Things Being Equal: Exploring Racial and Gender Disparities in Medical School Honor Society Induction. *Acad Med.* 2019;94(4):562-569.

18. Total U.S. Medical School Graduates by Race/Ethnicity (Alone) and Sex, 2014-2015 through 2018-2019. [https://www.aamc.org/system/files/2019-11/2019_FACTS_Table_B-4.pdf](https://www.aamc.org/system/files/2019-11/2019_FACTS_Table_B-4.pdf). Accessed March 12, 2020.

19. Lett LA, Murdock HM, Orji WU, Aysola J, Sebro R. Trends in Racial/Ethnic Representation Among US Medical Students. *JAMA Netw Open.* 2019;2(9):e1910490.

20. Data-Driven Diversity and Inclusion Change. [https://www.aamcdiversityfactsandfigures2016.org/report-section/section-2/](https://www.aamcdiversityfactsandfigures2016.org/report-section/section-2/). Accessed March 12, 2020.

21. Anand SS, Yusuf S, Vuksan V, et al. Differences in risk factors, atherosclerosis, and cardiovascular disease between ethnic groups in Canada: the Study of Health Assessment and Risk in Ethnic groups (SHARE). *Lancet.* 2000;356(9226):279-284.

22. Capers Qt, Clinchot D, McDougle L, Greenwald AG. Implicit Racial Bias in Medical School Admissions. *Acad Med.* 2017;92(3):365-369.

23. Edmond MB, Deschenes JL, Eckler M, Wenzel RP. Racial bias in using USMLE step 1 scores to grant internal medicine residency interviews. *Acad Med.* 2001;76(12):1253-1256.

24. Ross DA, Boatright D, Nunez-Smith M, Jordan A, Chekroud A, Moore EZ. Differences in words used to describe racial and gender groups in Medical Student Performance Evaluations. *PLoS One.* 2017;12(8):e0181659.

25. Riese A, Rappaport L, Alverson B, Park S, Rockney RM. Clinical Performance Evaluations of Third-Year Medical Students and Association With Student and Evaluator Gender. *Acad Med.* 2017;92(6):835-840.

26. Phelan SM, Burke SE, Cunningham BA, et al. The Effects of Racism in Medical Education on Students' Decisions to Practice in Underserved or Minority Communities. *Acad Med.* 2019;94(8):1178-1189.

27. Nunez-Smith M, Ciarleglio MM, Sandoval-Schaefer T, et al. Institutional variation in the promotion of racial/ethnic minority faculty at US medical schools. *Am J Public Health.* 2012;102(5):852-858.

28. McGurn W. The Attack on Asian-Americans. 2019. wsj.com/articles/the-attack-on-asian-americans-11574121785. Accessed November 30, 2019. Accessed November 18, 2019.

29. McMurtry CL, Findling MG, Casey LS, et al. Discrimination in the United States: Experiences of Asian Americans. *Health Serv Res.* 2019;54 Suppl 2:1419-1430.
FIGURE LEGENDS

Figure 1. Work-flow of information acquisition and processing. “Forebears” is a genealogy web database. “Evaluation” refers to the subjective determination of ethnicity by an evaluator.

Figure 2. Total students per ethnic group at Feinberg from 2003-2018, granularized by AOA membership. Abbreviations: “E/SE Asian”, Eastern/Southeastern Asian; “AA”, African-American; “H/L”, Hispanic/Latino; “S Asian”, South Asian.

Figure 3. Yearly AOA membership rate for E/SE Asian, S Asian, and Caucasian students normalized to class average. Abbreviations: “E/SE Asian”, Eastern/Southeastern Asian; “S Asian”, South Asian.

Figure 4. Odds ratios showing likelihood of collective AOA membership in non-Caucasian versus Caucasian students. Black bars represent groups with no statistical differences while red bars demonstrate statistical significance. Confidence intervals were 99.67%. Significance was $p < 0.0033$ (Bonferroni correction). Abbreviations: “E/SE Asian”, Eastern/Southeastern Asian; “AA”, African-American; “H/L”, Hispanic/Latino; “S Asian”, South Asian.
WITHDRAWN

AOA Database, Pharos, Newsletters (2003-2018)

Feinberg Match Results (2003-2018)

2466 total students
428 AOA

2377 students
420 AOA

24 (ambiguous)
2 AOA

89 students
8 AOA

8 (ambiguous)
0 AOA

2434 students
426 AOA

546 E/SE Asian
123 African American
102 Hispanic/Latino
399 S Asian
59 Other
1205 Caucasian

546 E/SE Asian
123 African American
102 Hispanic/Latino
399 S Asian
59 Other
1205 Caucasian

Figure 1
### Table 1 – Demographic breakdown of each major ethnic group at Feinberg from 2003-2018.

Abbreviations: “E/SE Asian”, Eastern/Southeastern Asian; “AA”, African-American; “H/L”, Hispanic/Latino; “S Asian”, South Asian.
| Year | 2003  | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Image, ID<sup>a</sup> | 141   | 135   | 150   | 139   | 145   | 149   | 147   | 143   | 160   | 150   | 155   | 151   | 156   | 143   | 135   | 154   |
| Image, ?<sup>b</sup> | 1     | 0     | 0     | 1     | 2     | 1     | 4     | 0     | 1     | 2     | 0     | 2     | 4     | 0     | 1     | 5     |
| No Image, Id<sup>c</sup> | 12    | 11    | 6     | 4     | 8     | 4     | 6     | 2     | 5     | 5     | 3     | 9     | 4     | 1     | 0     | 1     |
| No Image, ?<sup>d</sup> | 1     | 0     | 3     | 0     | 0     | 0     | 1     | 0     | 0     | 0     | 1     | 1     | 1     | 0     | 0     | 0     |
| Total | 155   | 146   | 159   | 144   | 155   | 154   | 157   | 146   | 166   | 157   | 158   | 163   | 165   | 145   | 136   | 160   |

<sup>a</sup>Image available, identifiable
<sup>b</sup>Image available, ambiguous
<sup>c</sup>No image available, identifiable
<sup>d</sup>No image available, ambiguous

**eTable 2** – Analytical categorization of Feinberg students by year from 2003-2018. “Identifiable” represents successful identification of student’s ethnicity while “ambiguous” is the inability to definitively do so.
eTable 3 – Odds ratio pair-wise comparisons of all ethnicities. Each cell represents the odds ratio of the horizontal variable relative to the vertical variable. Significance (in bold) is $p < 0.0033$ (with Bonferroni correction). Confidence intervals are 99.67%. Abbreviations: “E/SE Asian”, Eastern/Southeastern Asian; “AA”, African-American; “H/L”, Hispanic/Latino; “S Asian”, South Asian.
eFigure 1 – a). Total number of students and b). total number of AOA members for each ethnicity by year.
eFigure 2 – Yearly AOA membership rate for African-American, Hispanic/Latino, and Other students normalized to class average. Abbreviations: “AA”, African-American; “H/L”, Hispanic/Latino.