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# APS task force on ethics: what is the origin of research misconduct?

“By far the highest response rate and the most extensive and heartfelt answers .. came from the junior members of APS”

- Tenure review boards need to stop rewarding the Science/Nature culture above all else
- Our scientific community promotes the search of the surface and superficiality [to the] detriment of content and deepness
- Many breaches of ethics arise from **the pressure to publish** ...
- The researcher .. will be judged [by] the number of articles .. appearing on the CV. He or she will not be judged [by] the work spent on each paper, how many backup checks were performed to confirm the results and so on. ... for many people it **is more important to publish spectacular results than to publish true results**

# Drivers of Fabrication/Falsification

- APS Report: the emergence, over the past 15 years, of a "research system [that] stimulates continuously the competition in fashionable subjects in search of spectacular results,"
- "there is enormous pressure to do quality work in a short period of time" that is difficult or impossible to live up to.
- Some physicists may not be equipped to handle the pressure if they feel that their careers are at stake.

# Treatment of subordinates

Abuse of graduate students by advisers:

- Threatening not to write letter of recommendation
- Students not getting credit for research
- Unreasonable expectations (work hours)

“Particularly shocking to the task force was how often the words ‘abuse’ and ‘**exploitation**’ were used to describe the treatment of graduate students”.

## APS Statement 04.1

Subordinates should be treated with respect and with concern for their well-being. Supervisors have the responsibility to .. provide a safe, supportive working environment and fair compensation, and to promote the timely advance of graduate students and young researchers to the next stage of career development. In addition, supervisors should ensure that subordinates know how to appeal decisions without fear of retribution.

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# What is missing?

- Impact on the wider community, the people who's land you're using
- Early entry to the field – how do we train folks & those already in the field to understand the factors contributing to research misconduct → Cultural Values that drive Scientific Excellence
- Action plan?? How do we make change?
- Emphasizing the value in the process, null results, find other ways to give value to other results that support the flashy way. Code development. Value confirmation of results – replication of results.
- Communication with the public – respectful and truthful (Sci Communication)
- Equity in access to resources/opportunities/education

# What is missing?

- Sexual Harassment
- Racial Discrimination
- Land Use & Relationships with Indigenous Communities
- Equity of access to resources: facilities, education, training (leadership/technical)
- Accountability??
- Assessment ? (Data Collection ) ?
- Acknowledgement of people/culture – shared goals and values?



# Astro2020: Decadal Survey

- Every 10 years (white papers year before)
- Six astronomy and astrophysics decadal surveys have been produced by the National Academies of Sciences, Engineering, and Medicine to date.
- While each discussed the state of the profession and societal impacts, Astro2020 is the first to feature a formal panel devoted to these concerns.

# Panel of the State of the Profession and Societal Impacts

## Appendix N

### CHARGE:

The Panel on State of **the Profession** and Societal Impacts will gather information on the health and demographics of the astronomy and astrophysics community and **make actionable suggestions** to the Astro2020 committee on the topics of demographics, diversity and inclusion, workplace climate, workforce development, education, public outreach, and relevant areas of astronomy and public policy. The panel's suggestions will be incorporated into a program for all of astronomy and astrophysics by the Astro2020 committee.

# The Profession: N.2.1

The community of scientists, engineers, technicians, and nontechnical people engaged in the production and instruction of astronomical knowledge, as well as learners on the path to joining their ranks.

# Who is the audience? N.2.2

## Funding & Accountability: Investments and their Impact

# Who is the audience? N.2.2

- Funding Agencies: NASA, NSF, DOE
- The Community:
  - Institutions:
    - Academic (R1, MSIs, Primarily Undergraduate)
    - Research Facilities/Governmental Labs
    - Private Foundations
  - Individuals:
    - Researchers
    - Students
    - Educators
  - Stakeholders?

# Panel of the State of the Profession and Societal Impacts: APPENDIX N

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# Panel Membership

Gurtina Besla (Arizona)  
Patricia Boyd (NASA)  
Kate Daniel (Bryn Mawr)  
Margaret Hanson (Cincinnati)  
Martha Haynes (Cornell)  
Jedidah Isler (Dartmouth)  
Rachel Ivie (AIP)

Kathryn Johnston (Columbia)  
Casey Miller (RIT)  
Jesus Pando (DePaul)  
Julie Posselt (USC)  
Enrico Ramirez-Ruiz (UCSC)  
Jane Rigby (NASA)  
Willie Rockward (Morgan State)  
Keivan Stassun (SC liaison)

## Progress on Astro2010 Findings & Recommendations

<b>RECOMMENDATION:</b> Make undergraduate and graduate students aware of the wide variety of rewarding career opportunities enabled by their education and be supportive of students' career decisions that go beyond academia.	<b><i>Unchanged, and...</i></b> The “weed out” mentality of the undergraduate curriculum eliminates the vast majority of students (two-thirds of all, 90% of URM)s)
<b>CONCLUSION:</b> Little progress has been made in increasing the number of minorities in astronomy. Agencies, astronomy departments, and the community as a whole need to refocus their efforts on attracting members of underrepresented minorities to the field.	<b><i>Unchanged</i></b>
<b>CONCLUSION:</b> The gender gap in astronomy has diminished significantly, although women still occupy only a small percentage of the most senior positions.	<b><i>Unchanged</i></b>



## From 2016 Mid-Decadal Report - State of the Profession

... <b>lacked the resources</b> to explore <b>demographic</b> questions extensively but there is <b>little evidence the situation of underrepresented has improved</b> .	<b><i>Unchanged</i></b> Data from agencies were not made available to enable an assessment.
Critical issues remain, as highlighted by multiple recent news items about <b>sexual harassment</b> in academic research institutions	<b><i>Unchanged</i></b>
The Astronomy and Astrophysics Advisory Committee (AAAC) is engaged in studying the reasons for the <b>low grant success rate</b> , though no single cause was identified. Seen as <b>significant issue</b> for the field, reduces tenure chances, <b>funding needed for training the next generation of scientists</b> as graduate students and postdocs	<b><i>Worse</i></b> NSF/AST and NASA SMD funding rates were 30-35% in the early 2000's; investigators submitting strong (VG to E) proposals had risk of ~30% of no funding after three attempts. Today, a proposal rated "very good" three times has a ~60% chance of no funding.
The <b>health of the profession</b> is an important consideration in the planning for the next decadal survey	<b><i>Improved</i></b> as evidenced by this State of the Profession Panel and our full report to the SC

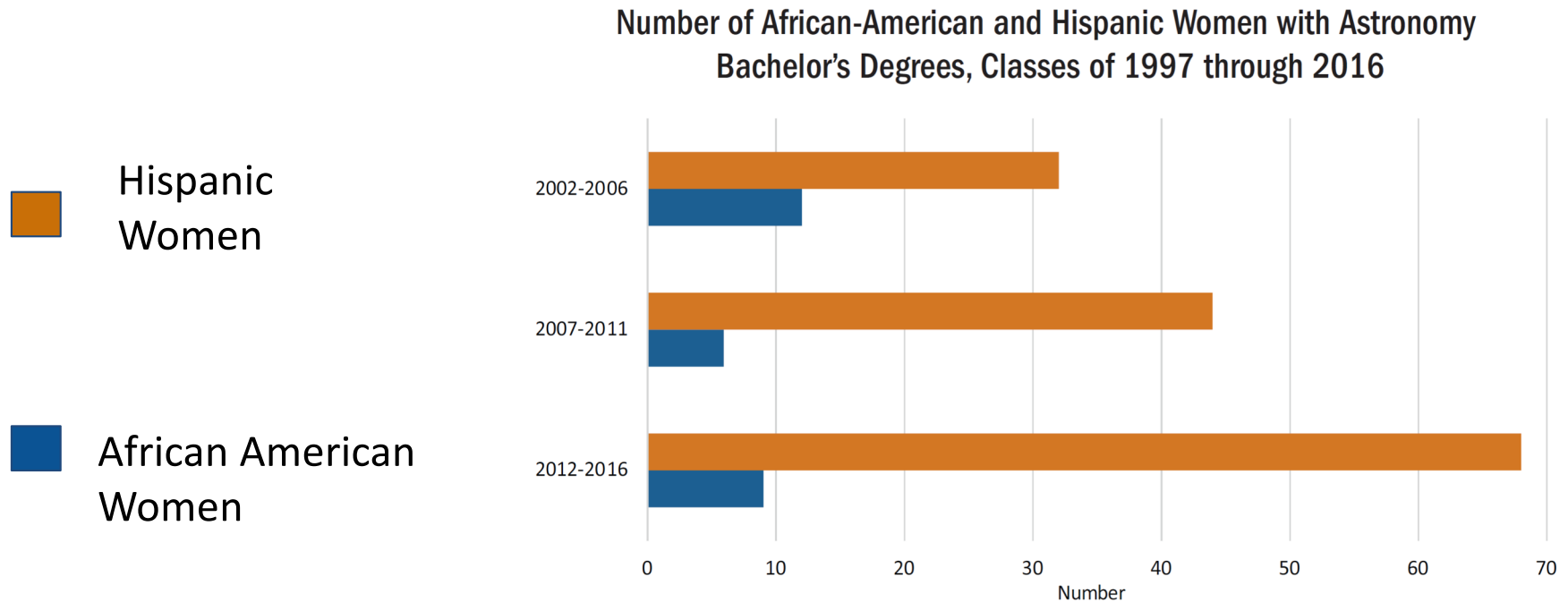
## Landscape. Section N.3

Demographic trends reveal a systemic failure of the Profession to attract, retain, and advance diverse talent.

<b>Physics &amp; Astronomy simulated cohort from college freshman to PhD</b>			
	US Citizens	White	URM
Freshman entering first-year, first-time undergraduate (2008) <sup>1</sup>	2,415,743	1,454,734	657,928
... of whom, ___% are interested in Physics & Astronomy <sup>2</sup>	0.70%	0.75%	0.73%
Freshman intending to earn a BS in Physics or Astronomy (2008)	16,814	10,969	4,770
... of whom, ___% are retained in the major	39.6%	41.9%	9.9%
Bachelors degrees in Physics and Astronomy (2012) <sup>3</sup>	6,664	4,596	473
... of whom, ___% are admitted to graduate programs	29.1%	??	??
Students matriculating into a graduate program* in Physics or Astronomy (2012) <sup>4</sup>	1,937	??	??
... of whom, ___% complete the PhD within 6 years	59.4%	??	??
PhD degrees in Physics and Astronomy (2018) <sup>5,6</sup>	1,151	805	76
<b>Overall retention from Freshman to PhD</b>	<b>6.8%</b>	<b>7.3%</b>	<b>1.6%</b>
* Includes MS and PhD students			

# Landscape: Academic & Career Pathways

- Within the professoriate, African Americans comprise a mere 1% of astronomy faculty, Hispanics 2%, and currently there are two indigenous faculty members, one of whom we were fortunate to have on our panel.
- Of the 38 astronomy departments, **ONE** has both African American and Latinx faculty, and 21 departments have neither any African American nor Latinx.



Source: NSF, NCSES; Compiled by AIP Statistical Research Center

# **Landscape: Impact of Facilities on Engagement of URM Scholars in Astronomy**

- Engagement of American Indian/Alaska Native people in astronomy at the undergraduate level is the lowest of all physical sciences, with an average of 2 individuals receiving bachelor's degrees per year
- Since astronomical first light on Maunakea 50 years ago, there have been a total of three Ph.D.s in astronomy or astrophysics awarded to