# Towards an Inclusive Physics

Edmund Bertschinger, MIT

U. Michigan Physics Colloquium

January 16, 2019
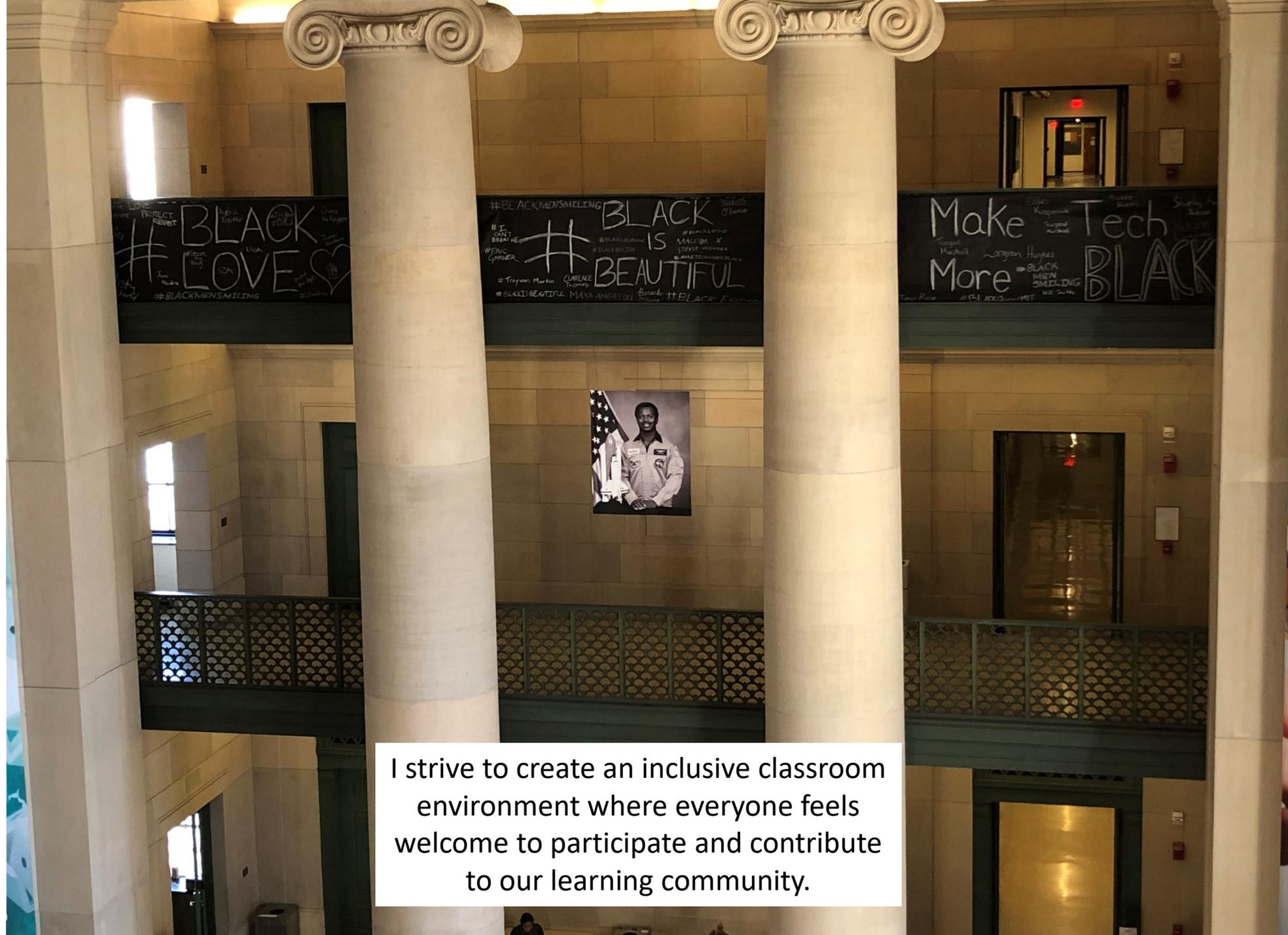
I strive to create an inclusive classroom environment where everyone feels welcome to participate and contribute to our learning community.

Context: Why this, why now, why me?

MENU ∨

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NEWS · 02 OCTOBER 2018

Physics Nobel won by laser wizardry — laureates include first woman in 55 years

Donna Strickland, Gérard Mourou and Arthur Ashkin share the prize for inventing intense beams that can capture fast processes and manipulate tiny objects.

Davide Castelvecchi, Elizabeth Gibney & Matthew Warren

Arthur Ashkin, Donna Strickland and Gérard Mourou. L-R: Nokia Bell Labs; Univ. Waterloo; CTK/Alamy

PDF version

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What the Nobels are — and aren't — doing to encourage diversity

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DOES SCIENCE HAVE A BULLYING PROBLEM?

A spate of bullying allegations have rocked some high-profile science institutions. Here's how researchers, universities and funders are dealing with the issue.

BY HOLLY ELSE

Gender matters

Evidence shows that patterns of inequity in physics drive talented women out of the field. Here's what physicists can do to overcome them.

Jennifer Blue is an associate professor of physics at Miami University in Oxford, Ohio. **Adrienne Traxler** is an assistant professor of physics at Wright State University in Dayton, Ohio. **Ximena Cid** is an assistant professor of physics at California State University, Dominguez Hills, in Carson.

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9 COMMENTS

6.8K SHARES

In a seminar for teaching assistants, one male and one female TA stand up; the professor in

diversity and inclusion

DIVERSITY AND INCLUSION | **NEWS**

Thousands of physicists sign letter condemning 'disgraceful' Alessandro Strumia gender talk

08 Oct 2018 Michael Banks

Delegates at the first workshop on high-energy theory and gender held at CERN last month. (Courtesy: CERN)

Sexual Harassment of Women

Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine

15 Jun 2018 in Politics & Policy

Culture change is key to reducing sexual harassment in academia, report says

Increasing diversity and avoiding students' dependence on a single adviser are among the recommendations to improve what's currently a toxic work environment.

Toni Feder

0 COMMENTS	0 SHARES	〈 PREV NEXT 〉

Sexual harassment is pushing researchers out of science and medicine, says a new report by the National Academies of Sciences, Engineering, and Medicine, and combating the problem

Fact Sheet

NSF: Next steps against harassment

NSF is committed to ensuring the safety and security of the people its awards support.

Credit and Larger Version

September 19, 2018

For more information, see NSF's press release.

What NSF is doing:

The National Science Foundation (NSF) will release a term and condition requiring awardee organizations to report findings of sexual harassment. It will be posted in the Federal Register Sept. 21, 2018 and go into effect Oct. 21, 2018.

Why NSF is doing this:

As the primary funding agency for fundamental science and engineering research in the United States, NSF is committed to promoting safe, productive research and education environments for current and future scientists and engineers.

APS physics BRIDGE PROGRAM

ENHANCING DIVERSITY IN PHYSICS GRADUATE EDUCATION

The 2018 Bridge and NMC Conference was a huge success! Thank you to everyone who attended.

Information For...

Students

Faculty: Bachelor Institutions

Faculty: Graduate Institutions

Donors

Announcements

The 2019 Bridge Student Application is open.
Student Applications will close on March 15, 2019. Learn more.

Meet the Bridge Students!
Hear what Bridge Students have to say about the program. Learn more.

APS Bridge Graduate Student Induction Manual is now available.
The APS Bridge Program has developed a guide of best practices for inducting new graduate students into physics graduate programs.

Get Involved!

Become a Partnership Institution
The APS-BP is developing a national network of doctoral granting institutions where bridge and other students, if admitted, will receive mentoring and assistance in making the transition into a doctoral program.

Join the Bridge Program as a Member Institution
Becoming a Bridge Program Member Institution is the best way to plug into a network of institutions and organizations committed to

Program Goals

About the Program Goals
The program aims to increase the number of physics Ph.D.'s awarded to underrepresented minority students.

Percentage of Physics Degrees Awarded to Underrepresented Minorities in the U.S.

Bachelor's Degrees: ~375 degrees
Doctoral Degrees: ~40 degrees, ~30 more PhDs
- Project Goals
- Current Situation
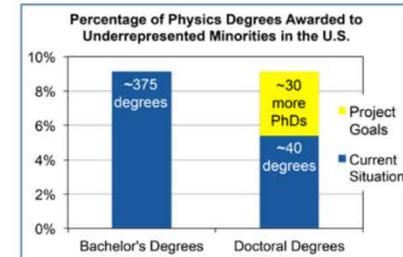
AIP TEAM-UP Diversity Task Force

@AIP_TEAMUP Follows you

Task Force to Elevate the Representation of African Americans in Undergraduate Physics & Astronomy looking at persistent underrepresentation of these students

Joined April 2018

Tweet to   Message

Professor addresses diversity issues in aerospace field during lecture series

Emphasis placed on implicit biases, stereotypes and aggregation of disadvantage

PARNIA MAZHAR
Daily Staff Reporter

Ken Powell, Arthur F. Thurnau Professor, Professor of Aerospace Engineering and Diversity, Equity and Inclusion faculty liaison at the University of Michigan, held a lecture regarding the issue of diversity within the aerospace field, focusing on implicit biases, stereotype threats and the accumulation of disadvantage. About 50 students and faculty attended the lecture Thursday afternoon.

Powell used social science research to discuss the hiring process of faculty within the STEM fields, as well as statistics about the general diversity and its challenges within the U-M Aerospace Engineering Department. He further encouraged students to properly respect professors and to also hold professors to the same standards.

"Each of your professors are experts and there's no question about that, trust me ... so treat them accordingly and try to take them as experts in their fields first," Powell said. "On the flip side, I think you need to hold us as faculty at a similarly high professional standard."

Powell gave students further

Why me?

Born in Oakland, California.
Second half of childhood: only white family in Latino neighborhood.

Proud son of a Finnish mother.

Outline

A department leadership experience, 2007-2013

Demographic data: diversity in degrees

The climate in physics and related fields

Two STEM departments, different worlds

The role of departments and professional societies

MIT Physics DEI* effort, 2007–2013

* Diversity, Equity, and Inclusion

# *Diversity, Equity, and Inclusion are not synonyms*
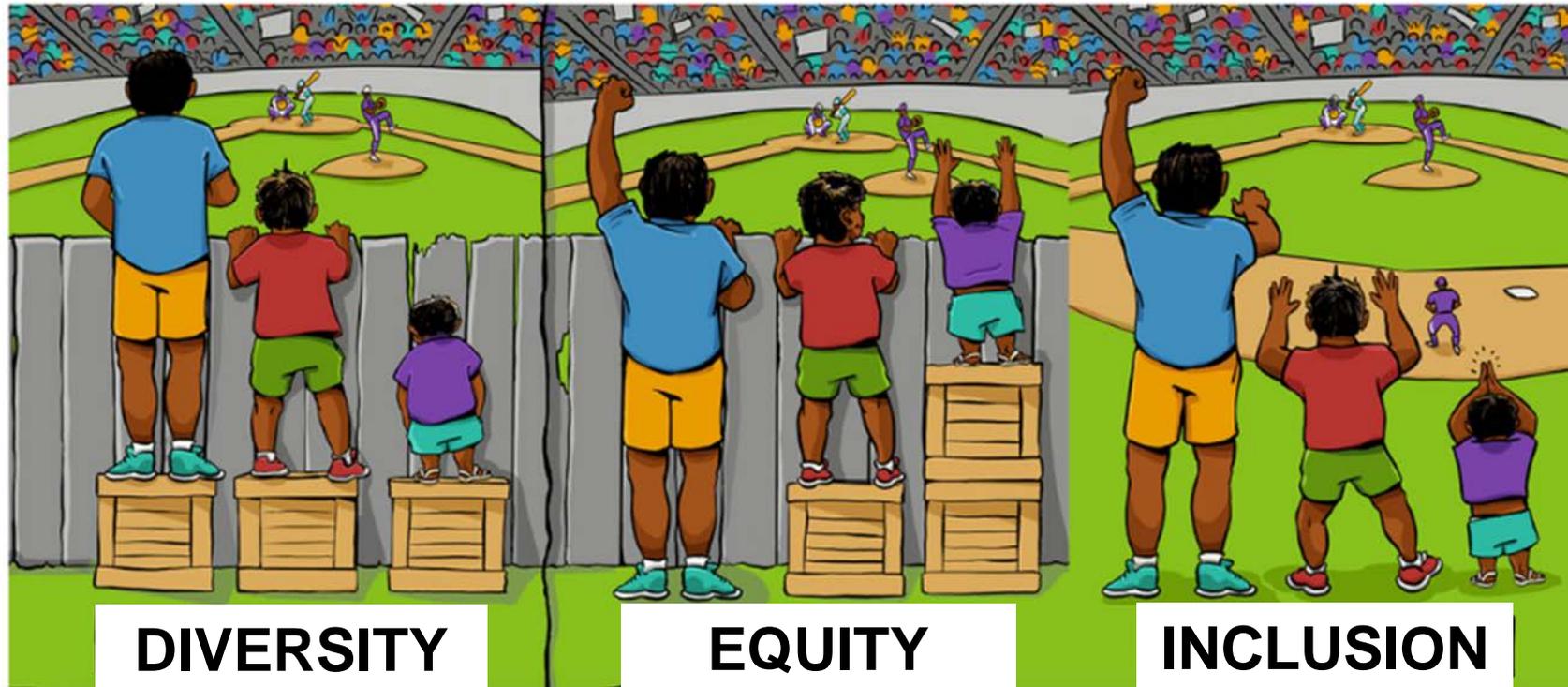
image credit: Angus Maguire/IISC
Labels added by E. Bertschinger

MIT Physics, July 2007

10% of Physics grad students were women, compared with 18% nationwide

6% of Physics faculty were women, compared with 10% in US PhD-granting departments in 2006 (18% in astronomy depts)

Enrollment of African American and Hispanic students was near zero

Morale was good among senior faculty, less so for others

Competition for graduate students
(2007 compilation by MIT students)

School	Percent women graduate students
Princeton	12.4
MIT	13.7
UIUC	13.7
U. Chicago	15.8
UCSB	16.4
Cornell	16.8
Stanford	18.2
Caltech	22.8
Columbia	35.8
Harvard	37.3

Competition for graduate students
(2007 compilation by MIT students)

School	Percent women graduate students	
Princeton	12.4	
MIT	13.7	I first met with women
UIUC	13.7	graduate students even
U. Chicago	15.8	before starting as head.
UCSB	16.4	
Cornell	16.8	They told me, "You have to
Stanford	18.2	create a culture of caring.
Caltech	22.8	We know you can do it,
Columbia	35.8	and we will help you."
Harvard	37.3	

A Vision shared with the Department in 2008

By 2012, women comprise more than 10% of the faculty and they join several underrepresented minority* faculty. Women make up 40% of our undergraduate majors and 25% of our graduate student body. Underrepresented minority graduate students have doubled. There is an air of excitement about our recruitment, mentoring, and retention of diverse talent.

*URM: Native American, Hispanic/Latino, Black+African American (excluding international)

A Vision shared with the Department in 2008

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MIT Women in Physics

Faculty (primary only)	Bachelors degrees	PhD degrees
2007: 4, 6%	2007: 25, 29%	2007: 1, 3%
2013: 6, 9%	2011: 36, 38%	2011: 7, 21%
2017: 8, 12%	2017: 20, 29%	2017: 2, 8%

What we do well at MIT: undergraduate education and diversity

Peer comparison of physics bachelors degrees 2007-2011 (IPEDS)

Department	% **Women**	Department	% **URM**
Yale	31.8%	MIT	12.8%
MIT	30.5%	UCSB	12.2%
Cornell	25.8%	UC Berkeley	8.1%
Harvard	23.6%	Princeton	6.7%
UPenn	23.5%	Harvard	6.7%
UMichigan	22.5%	Caltech	6.4%
UC Berkeley	21.9%	Stanford	6.3%
UChicago	20.2%	UPenn	5.9%
UIUC	19.1%	UChicago	4.7%
Stanford	19.0%	Yale	4.5%
Caltech	18.5%	UMichigan	4.5%
Princeton	16.0%	UIUC	3.3%
UCSB	9.0%	Cornell	1.6%

PhD student and postdoctoral scholars:
Coalition for Next-Generation Life Science
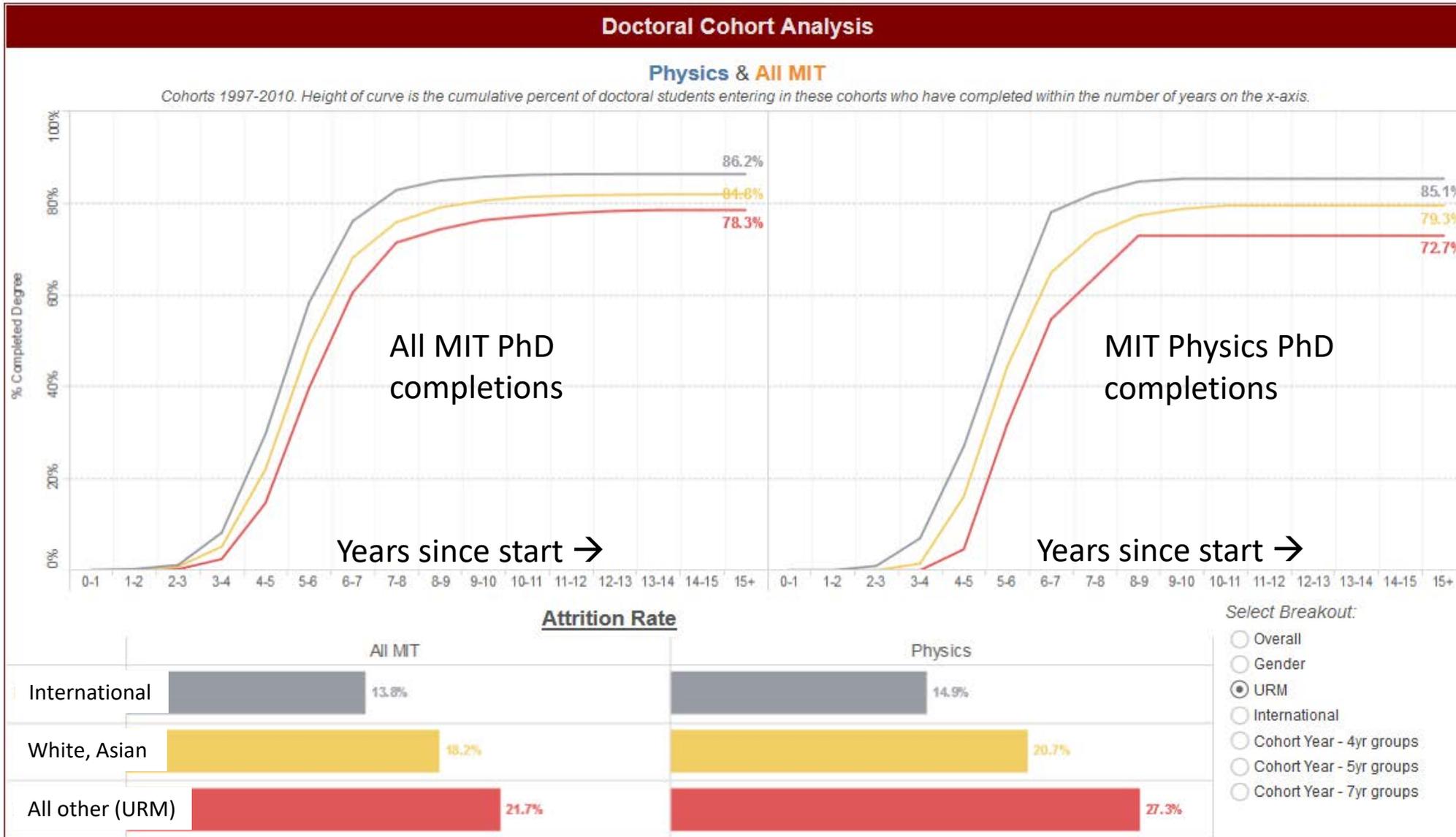
MIT Graduate Education Statistics, Department level

CNGLS is a coalition of 9 US research universities including UMichigan and a research institution

How can one make sense of all such data?

Outline

Find the stories in the data;
Recognize the data in the stories.

Fraction of Physics Degrees Awarded to Women
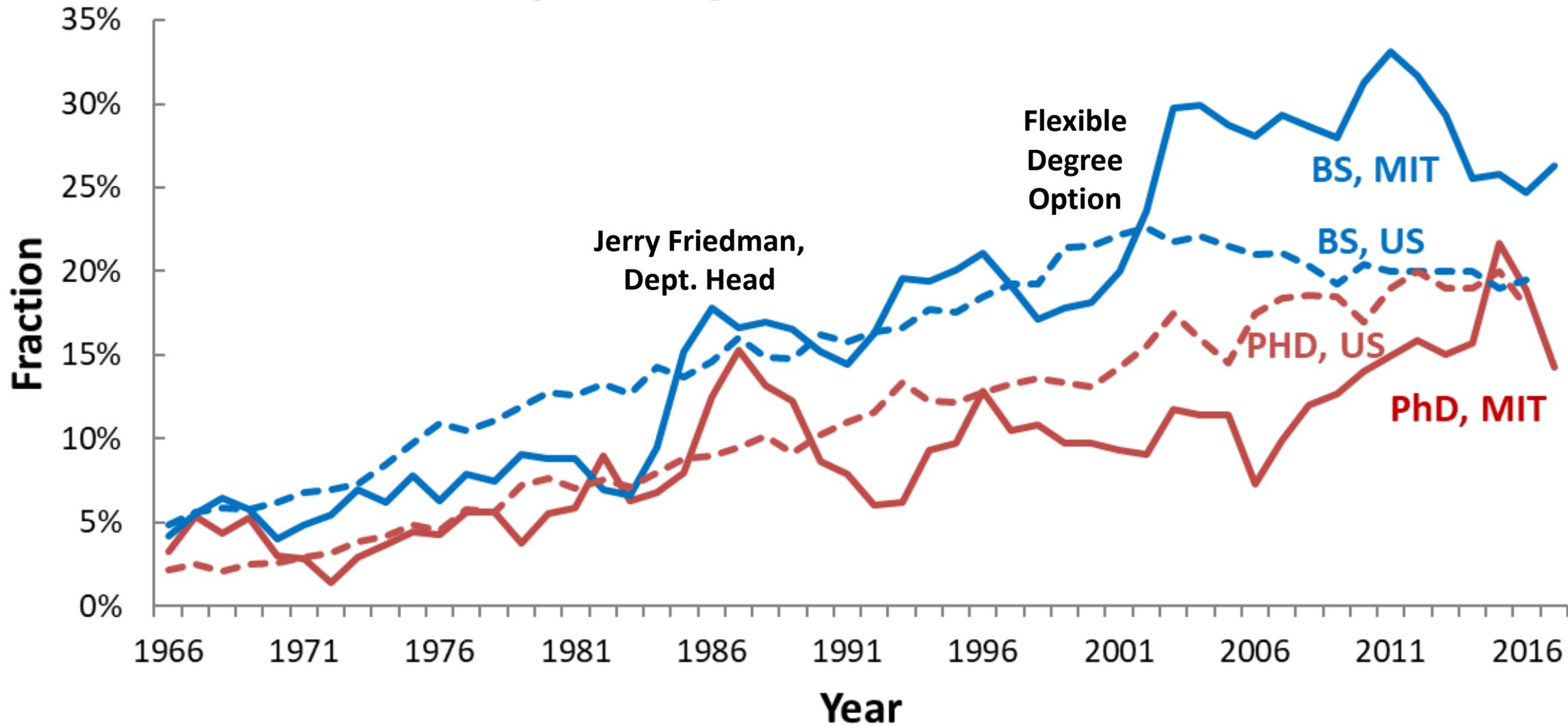
Fraction of Physics Degrees Awarded to URM
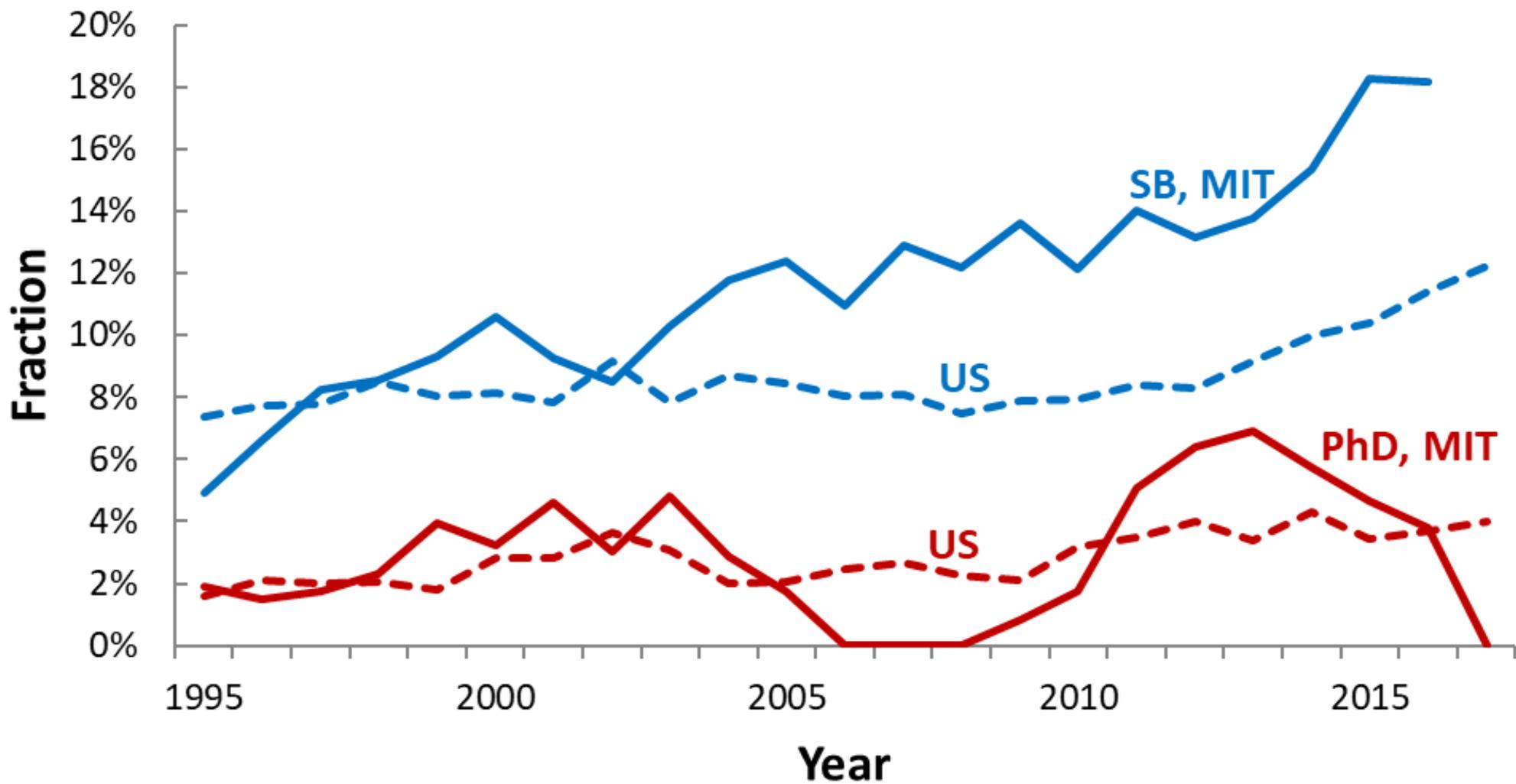
Compare Michigan:

Fraction of Physics Bachelors' Degrees
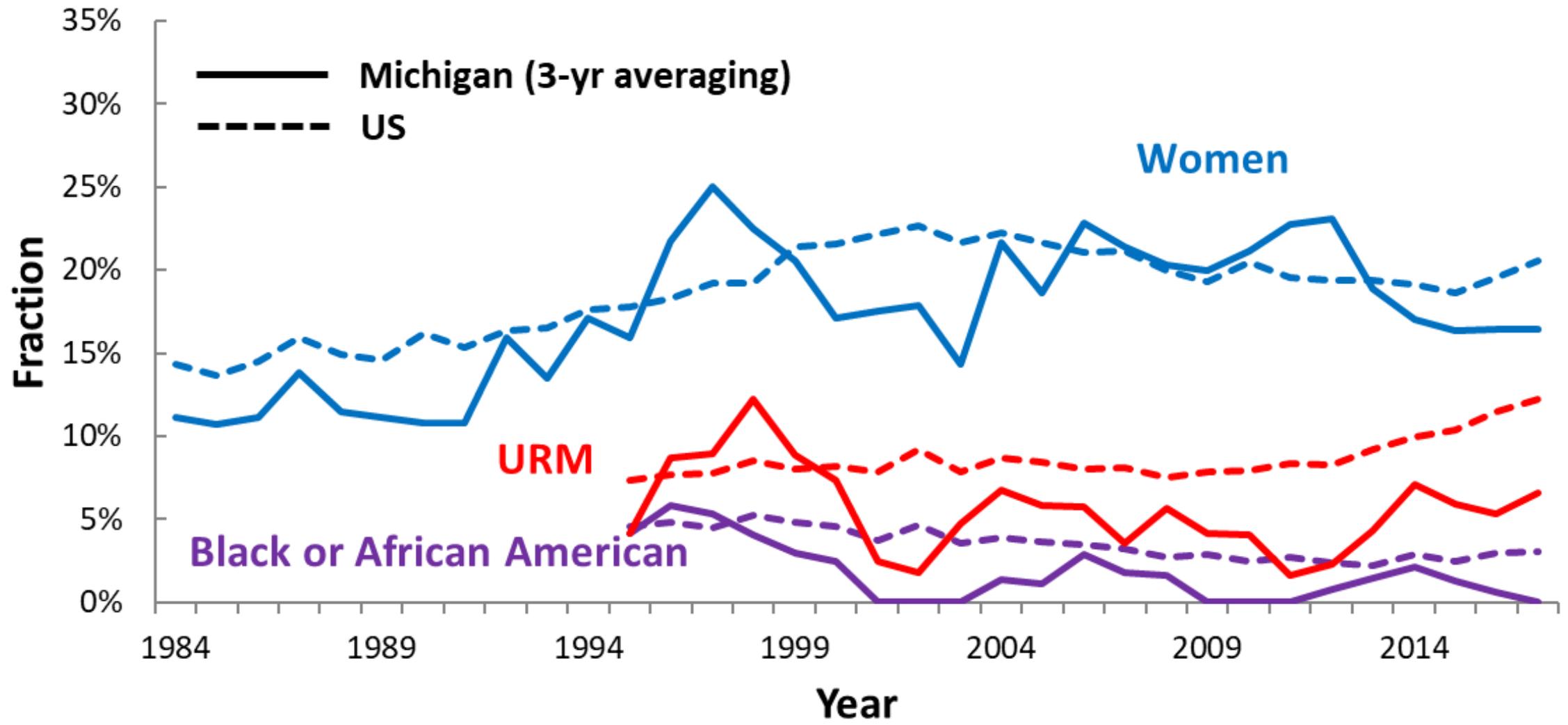
Why are more MIT physics undergraduates women and minorities?

Dashed curves are now ALL physical sciences, math and engineering from the SAME university.

Fraction of Physics Bachelors' Degrees

MIT (3-yr averaging)

MIT PSTEM (3-yr averaging)

Women

URM

Black or African American

Fraction

Year
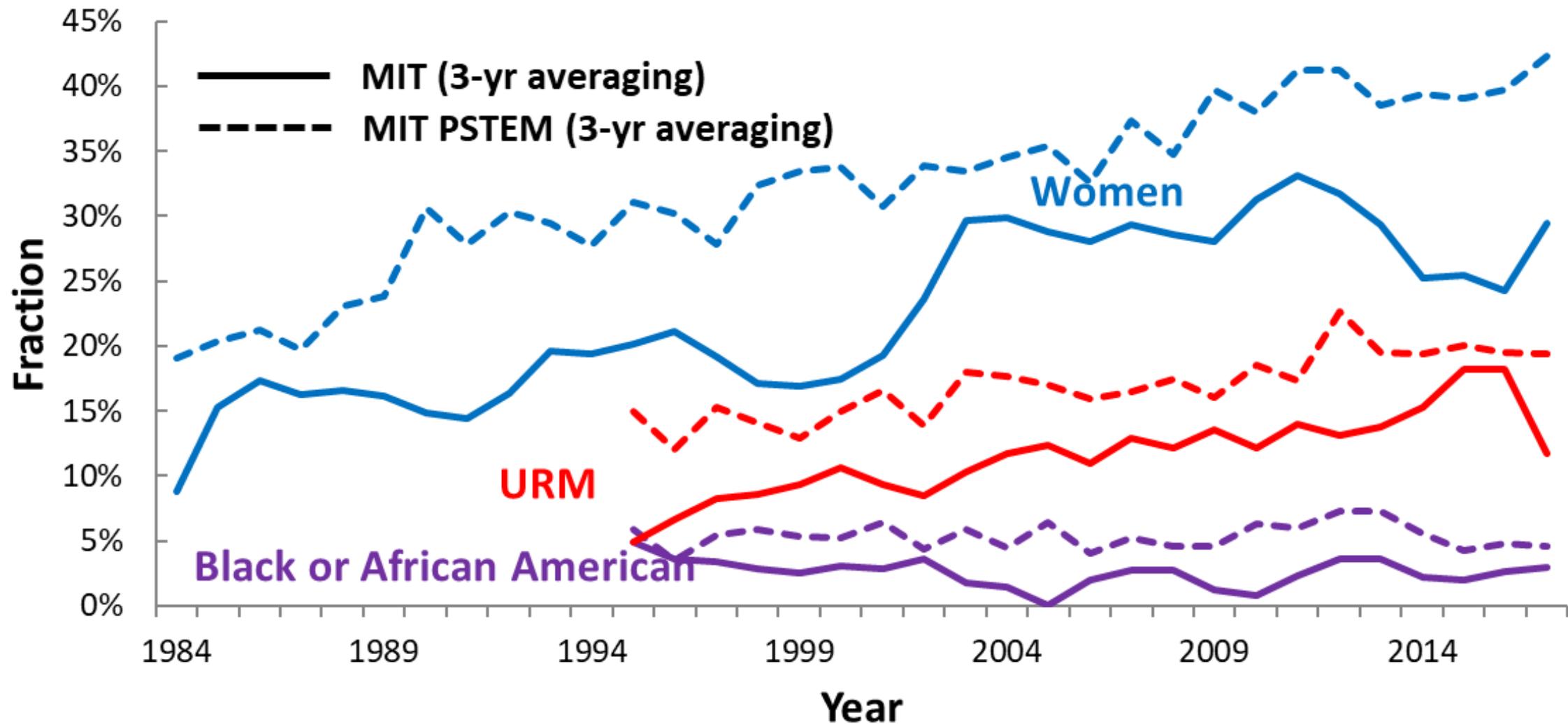
Dashed curves are now ALL physical sciences, math and engineering from the SAME university.

Fraction of Physics Bachelors' Degrees
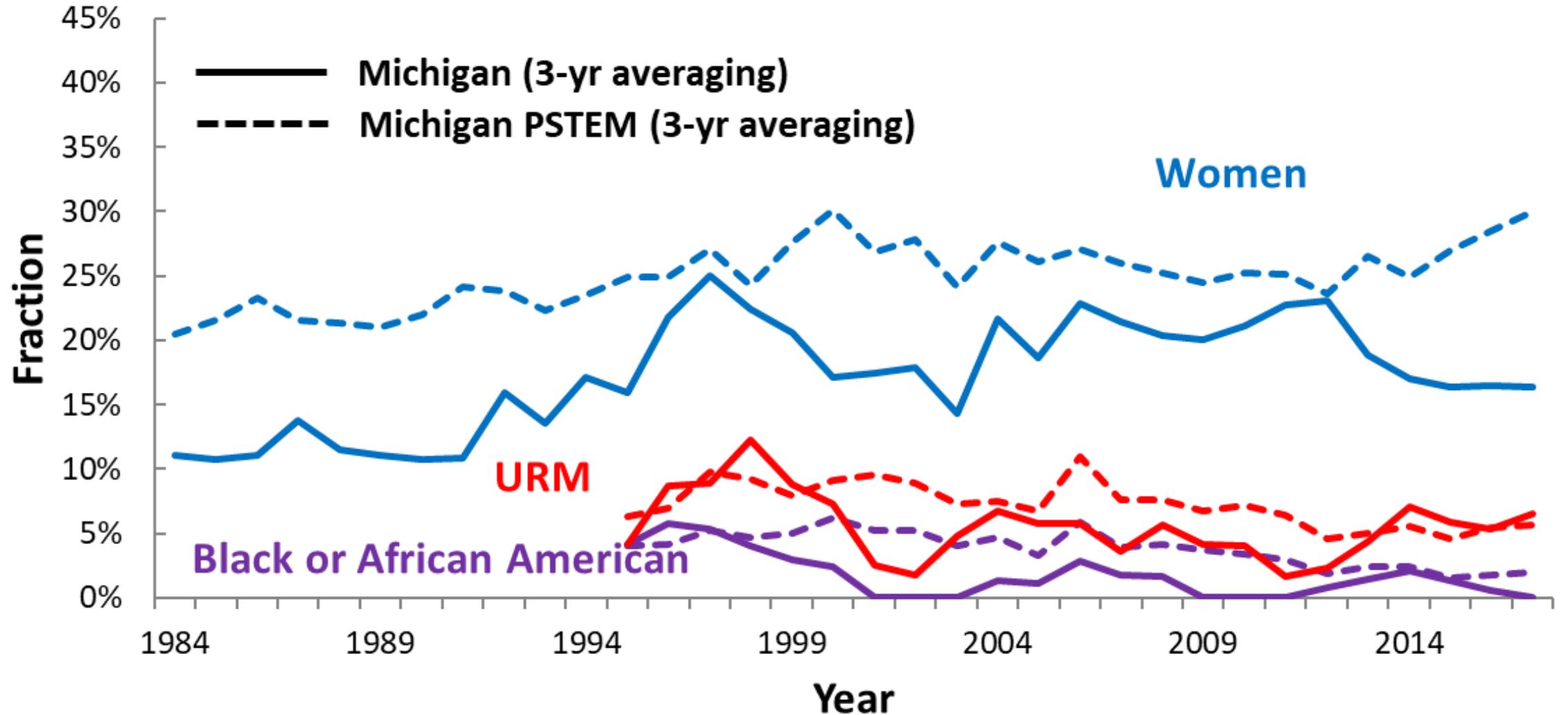
Michigan cannot use affirmative action in undergraduate admissions, it has less financial aid to offer each student, and it is less competitive for the best prepared STEM majors.

But this is not the whole story...

Find the stories in the data;
Recognize the data in the stories.

Fraction of Physics Bachelors' Degrees

Legend:
— UC Berkeley (3-yr averaging)
--- US

Y-axis: Fraction (0% – 30%)
X-axis: Year (1984 – 2014)

Labels: Women, URM, Black or African American
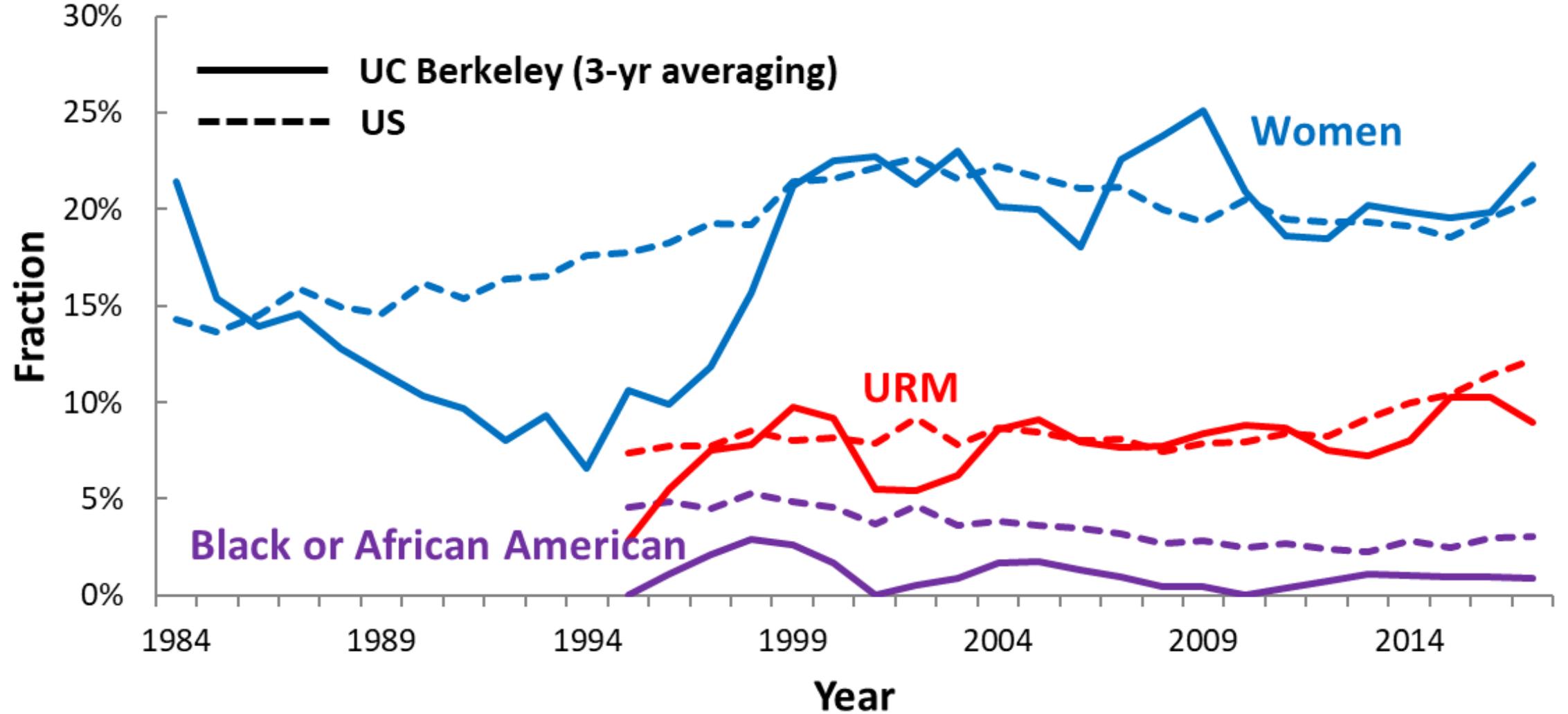
Graduate degrees tell a different story. Departments recruit, not university or college.

Fraction of Physics PhD Degrees
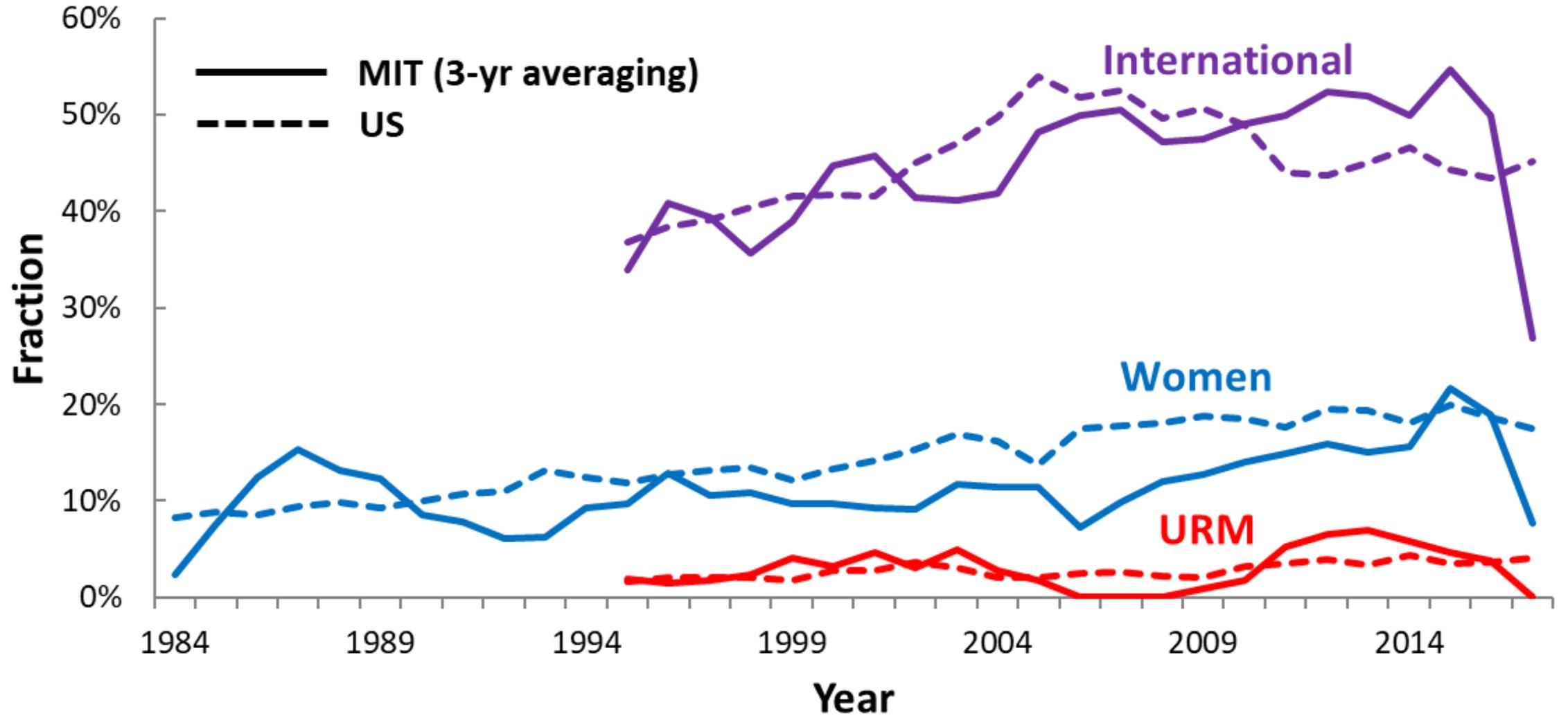
Fraction of Physics PhD Degrees

Fraction of Physics PhD Degrees

Yale (3-yr averaging)

US

International

Women

URM
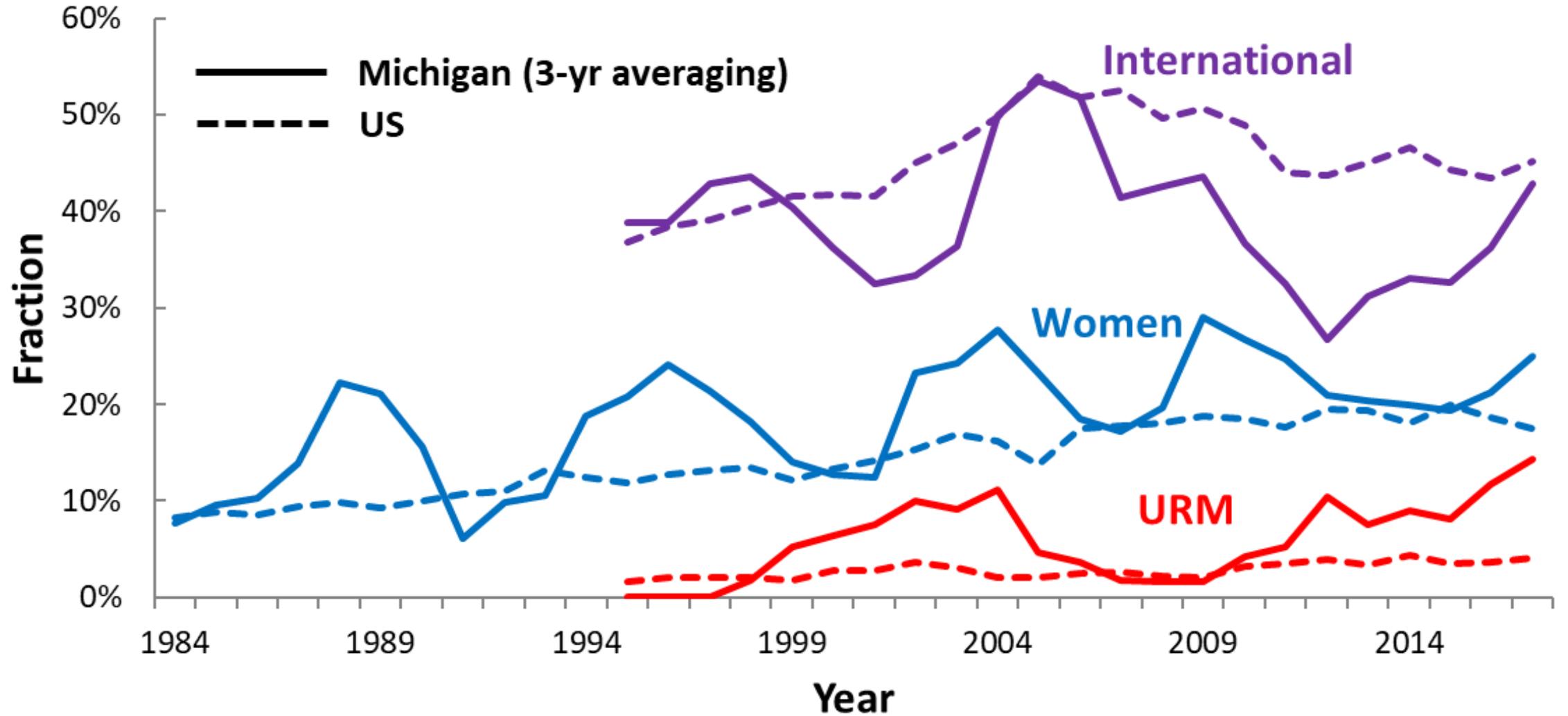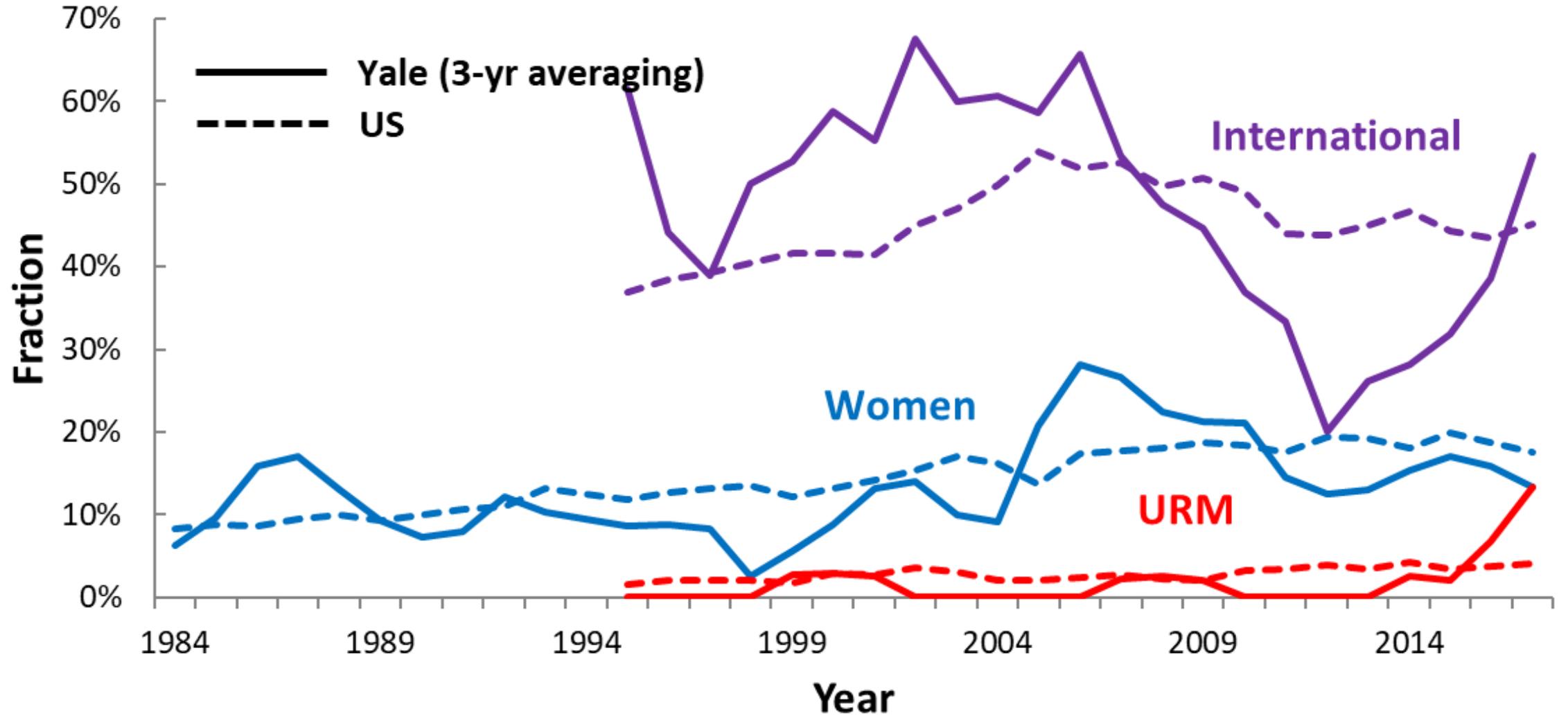
Fraction of Physics PhD Degrees
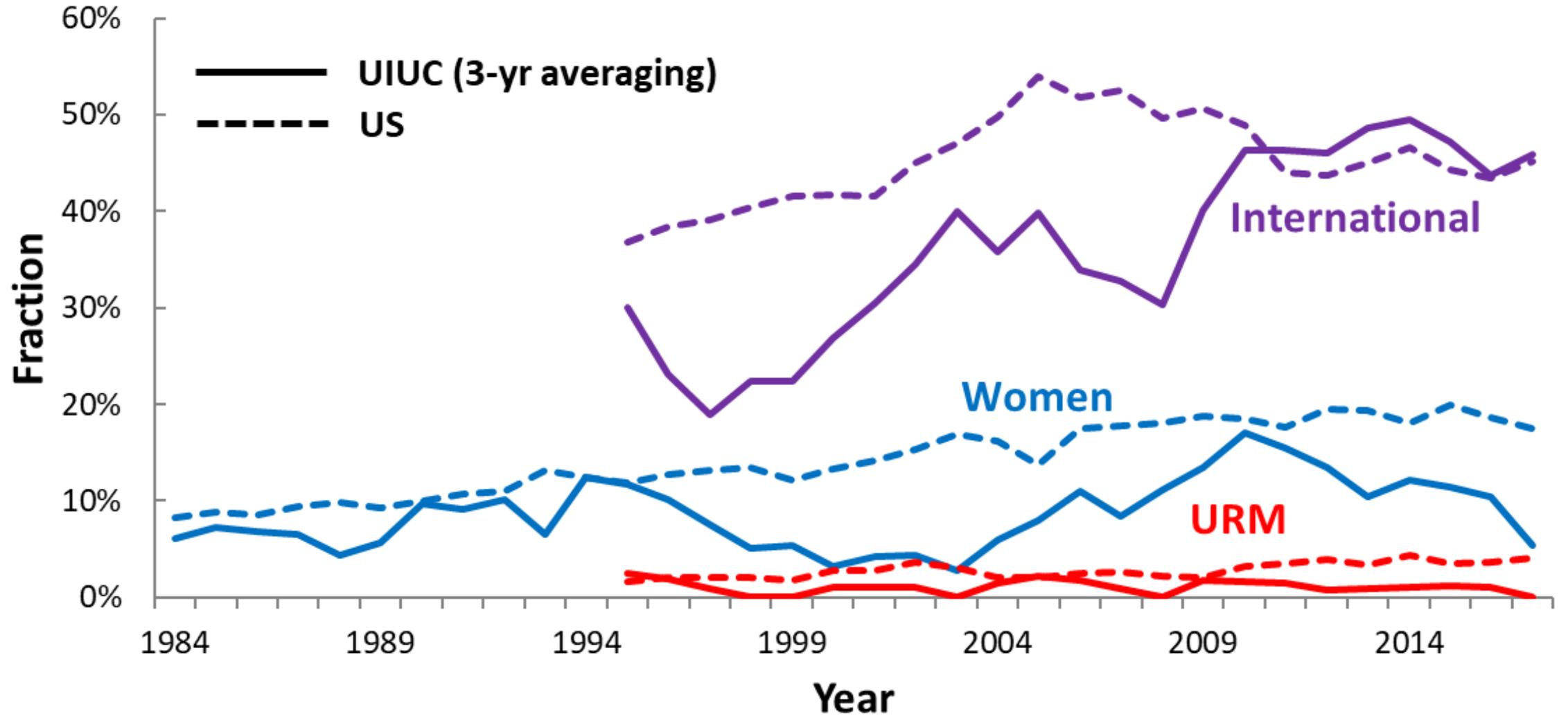
Physics Diversity in Degrees Awarded (2013–17)
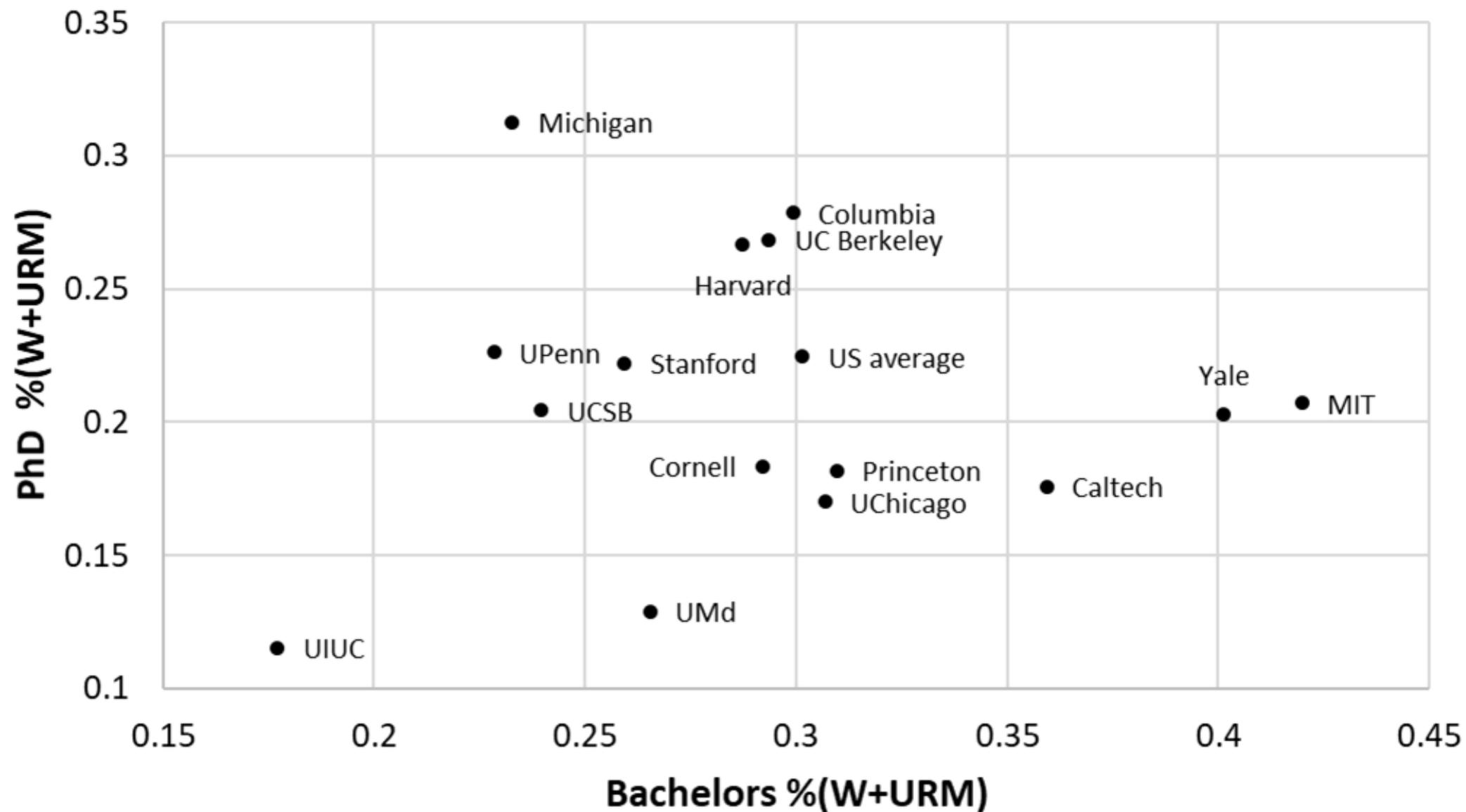
Some departments excel in undergraduate diversity (e.g., MIT); others excel at the graduate student level (e.g., Michigan).

Why?

Departmental climate and culture may be part of the story.

Culture

A system of symbols and meaning

A set of beliefs and practices associated with a group

The unspoken rules of behavior

Outline

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RESULTS OF THE
2016 UNIVERSITY OF MICHIGAN STUDENT
CAMPUS CLIMATE SURVEY ON DIVERSITY, EQUITY AND INCLUSION

59% response rate of 3500 invites

Students reporting experience discrimination:

• LGBTQ+ students are 123% more likely than heterosexual students.

• First-generation students are 86% more likely than non-first-generation students.

• African American/Black (519%), Hispanic/Latino/a (132%), Asian American/Asian students (86%), and Other students (63%) are all more likely than White students to report experiencing discrimination.

Students experiencing at least one identity-based discriminatory event last year:

• 37% of female undergraduate and 28% of female graduate students.

• 30% of students not born in the U.S.

• 31% of LGBTQ+ students.

• 48% of students with a disability.

• 44% of underrepresented minority students.

From the Executive Summary:

While there are instances where no group differences exist, in general, members of traditionally marginalized groups across race, sex, sexual orientation, age, ability status, and national origin experience the campus significantly less positively than students from traditionally majority groups.

RESULTS OF
THE 2016 UNIVERSITY OF MICHIGAN FACULTY
CAMPUS CLIMATE SURVEY ON DIVERSITY, EQUITY AND INCLUSION

71% response rate of 1500 invites

Faculty experiencing at least one identity-based discriminatory event last year:

- 6% of male faculty.

- 41% of female faculty.

- 23% of faculty not born in the U.S.

- 28% LGBTQ+ faculty.

- 25% of faculty with a disability.

- 40% of underrepresented minority faculty.

- 24% of Asian/Asian American faculty.

From the Executive Summary:

Together the findings clearly reinforce the need for a systematic institutional effort to address issues of diversity, equity, and inclusion if all members of the U-M faculty are to experience the same positive experiences that are enjoyed by the majority of faculty.

Finally:

Staff report experiencing similar rates of identity-based discrimination, especially African American/Black staff.

What factors affect experience in higher education? What can be measured from climate surveys?

2016–17 MIT climate survey analysis considered:

- Role/rank (11 categories of staff, students, postdocs, faculty)
- Sex (binary only: male/female)
- Race/ethnicity
- LGBTQ+ status (self-reported in survey)
- Tenure status

Averages computed for respondents based on selecting up to 2 of these: intersectionality is built in!

6 or 8 different climate measures summarized.

For more information see iceoblog.mit.edu

Quantifying climate survey data: **MIT Climate dashboard**

Dark blue = "good", Brown/dark orange = "bad", * = highly statistically significant (p<0.001)

	Satisfied	Supportive	Fair	Taken seriously	No bias	Relaxed	No bigotry	Well-being	Average
Admin (MC)			*	*	*	*	*		*
Support (MC)			*	*	*	*	*		
Service (MC)	*					*			
Faculty (MC)	*	*		*		*			
Other Instructional (MC)						*			
Postdoc (MC)	*			*			*		
Research (MC)		*		*		*	*		
Admin/Support/Service (LL)			*	*		*	*		
Research (LL)		*		*		*			*
Undergraduate Student	*	*	*	*	*	*	*	*	
Graduate Student			*	*		*	*	*	

Asterisk (*) indicates statistically significant difference (compared to overall population) at 0.001 level.

Overall response rate about 50% based on 13,000 and 11,500 responses in 2012-13 and 2016-17, respectively

Major findings from the MIT climate dashboard

1. Gender is the largest source of variation in experience among all variables tested (race/ethnicity, sexual orientation, role, department or work unit)

2. Students feel more fairly treated than others do; hourly support staff feel least well treated.

3. Compared with men, women consistently report having to work harder to be taken seriously.

4. Gender, role, sexual orientation, and race/ethnicity are the largest factors differentiating experience, in that order. **Gender > Class > Orientation > Race**

5. Intersectionality of marginalized identities leads to large effects: LGBTQ+ graduate women have the worst experience; men have the best.

6. Differences between demographic groups grew between 2012-13 and 2016-17.

For more information: iceoblog.mit.edu

Find the stories in the data;
Recognize the data in the stories.

Qualitative data: Interviews and focus groups

Environment

"My initial impression [of MIT was] very positive. Over the next years, I became more aware of the struggles of being a female at MIT. What are some of the factors [that influence this] and why don't I see more people like me [in my classes]? My younger sister is 16 and she's starting to look at colleges. I'm trying to put myself in her shoes. What does she see in a science career? What is appealing for her there?"

-Class of 2014, Mechanical Engineering

A positive and equitable school climate is crucial for a satisfied and productive student body. Females are significantly less likely to agree that, "The climate and opportunities for female students at MIT are at least as good as those for male students" (SQL, 2013) (Fig. 2.1). The data suggest that more than half of undergraduate students have at least some reservations about whether MIT has equal opportunities for men and women. This chapter explores aspects of MIT's environment that may contribute to the disparity in climate and opportunities by gender.

From the

Report on the Status of Undergraduate Women at MIT, 2016

Qualitative: interviews and bias incident reports

Undergraduate Rasheed Auguste, MIT MLK Celebration, 2017

Outline

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Demographic data: diversity in degrees

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Lessons from two STEM departments at MIT

Mechanical Engineering has reached undergraduate gender parity in a field where only 14% of bachelors degrees go to women. URM students are almost twice the national average percentage.

Another STEM department has a demanding, harsh culture. In early 2014, graduate students wrote an anonymous letter to MIT senior leaders complaining about serious mistreatment of graduate students and postdocs by faculty. Women at all levels have reported a toxic culture.

Fraction of MechE Bachelors' Degrees

Legend:
- MIT MechE (3-yr averaging) — solid line
- US — dashed line

Series labeled: Women, URM, Black or African American

Y-axis: Fraction (0% to 50%)
X-axis: Year (1984 to 2014)
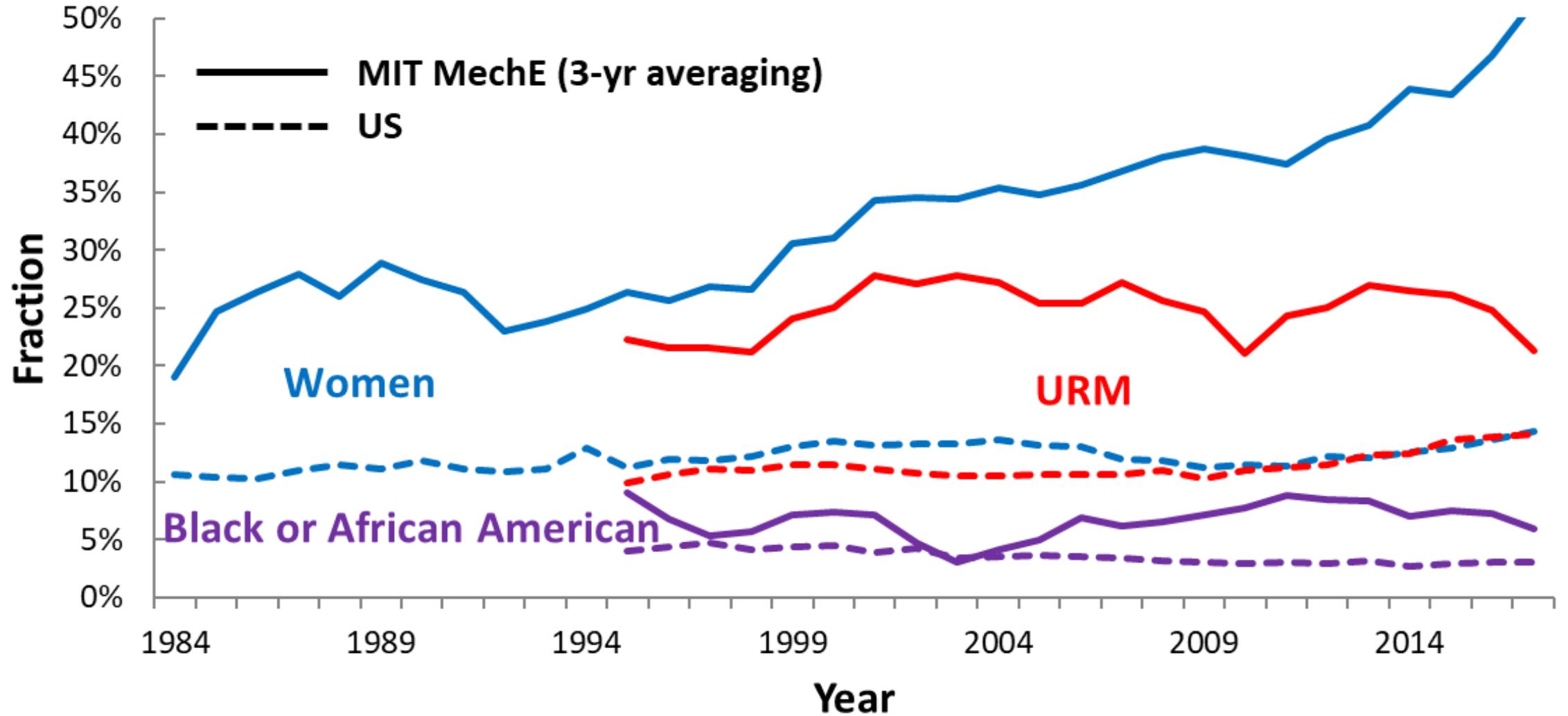
Fraction of MechE PhD Degrees

Legend:
— MIT MechE (3-yr averaging)
- - - US

International
Women
URM

X-axis: Year (1984, 1989, 1994, 1999, 2004, 2009, 2014)
Y-axis: Fraction (0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%)
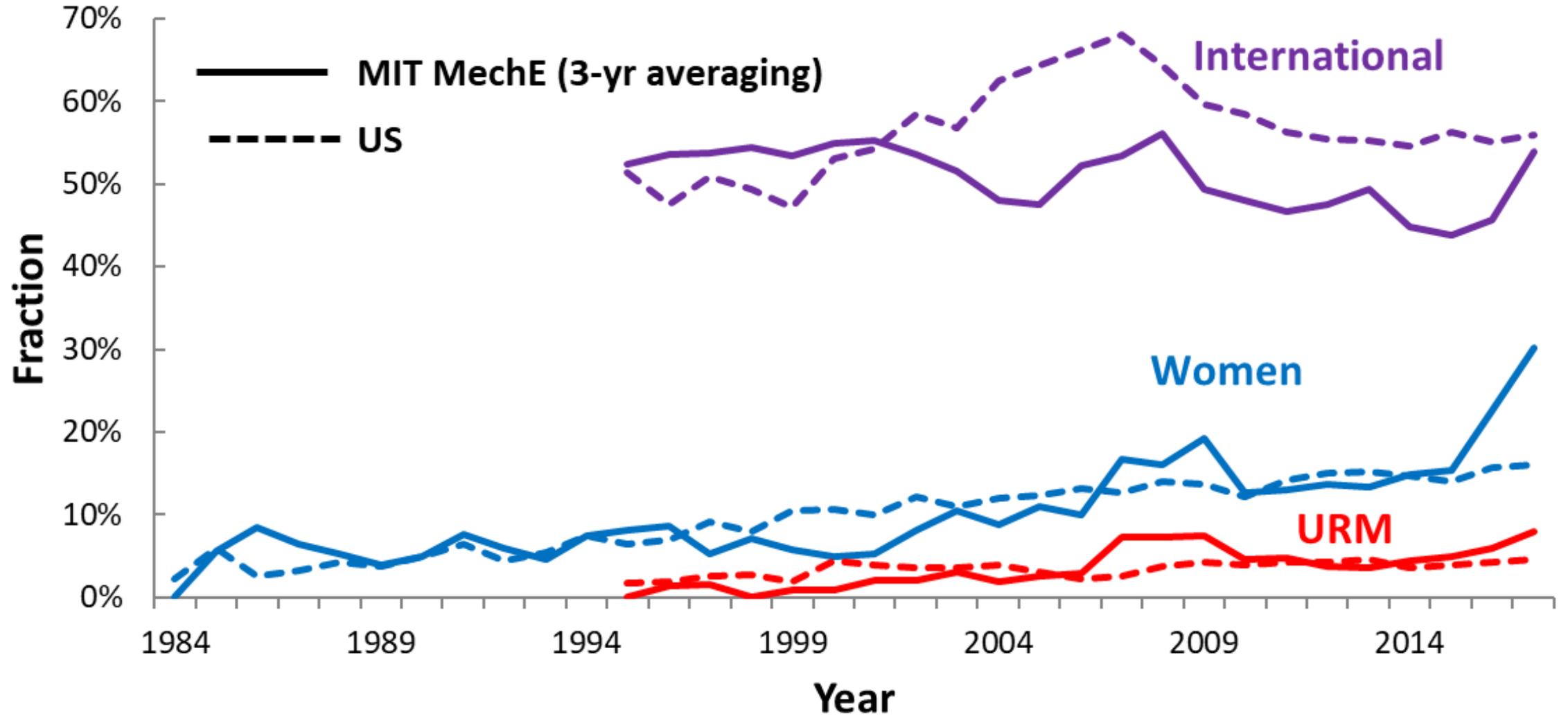
Undergraduate admissions helped, but department-level efforts are the most important factor.
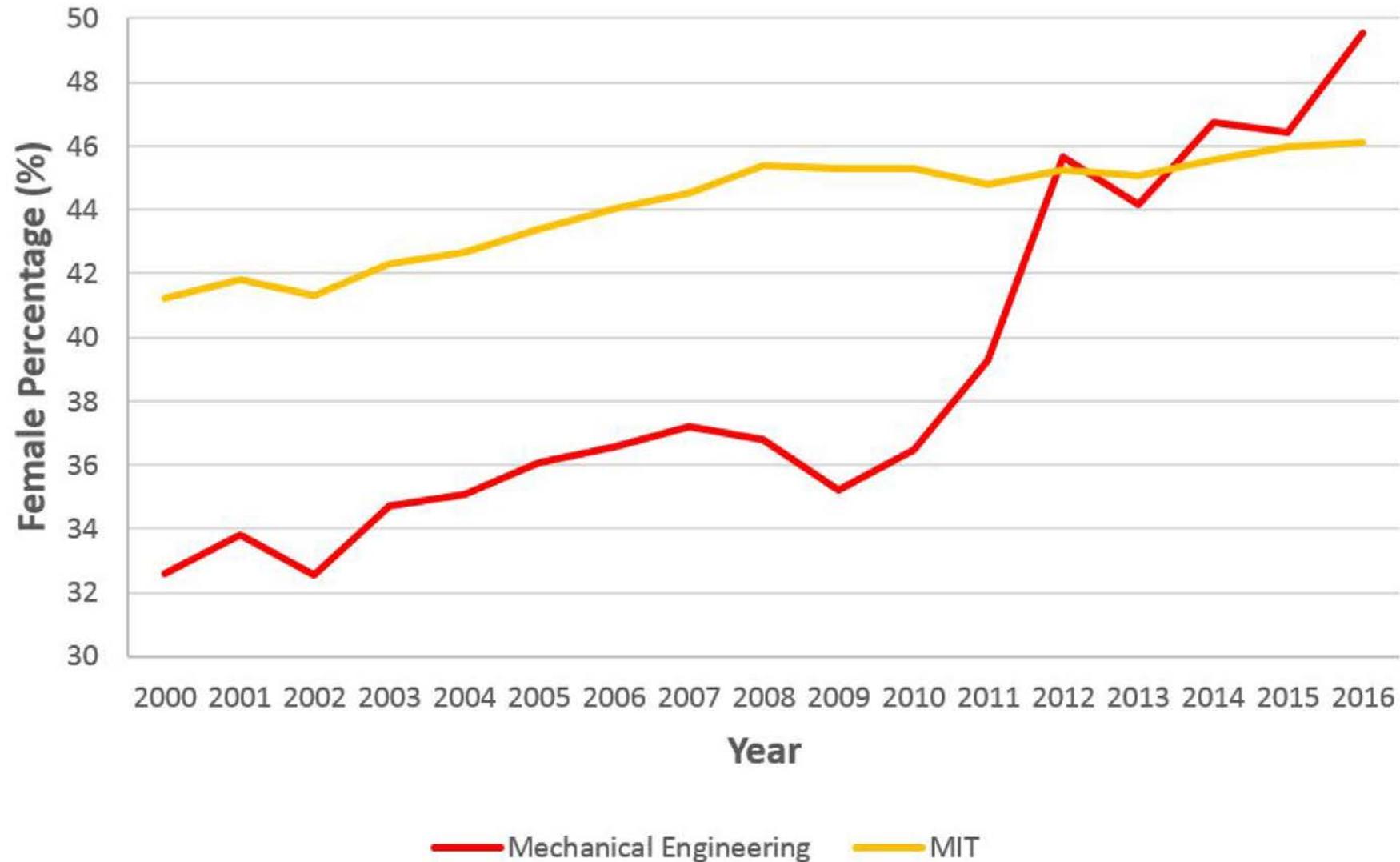
How did MechE do it?

Xu, K., Wendell, D., and Walsh, A. S. 2017, "Getting to Gender Parity in a Top-Tier Mechanical Engineering Department: A Case Study," ASEE Annual Conference paper ID #19081. Based on the senior thesis of Kath Xu.

From the abstract:

"Thematic analysis of interviews reveals that the gender equality so far achieved by the department has been a result of very deliberate, enduring structural changes, (e.g., hiring processes), and a strong representation of proactive department members with high levels of self-efficacy. These members are aware of gender equity issues, believe in their ability to enact change, and are willing to devote the time and energy to do so."

What worked to diversify MechE

- Aggressive recruiting of women faculty: broad searches, proactive calls, cluster hires, male department head and dean committed to increasing the number of women faculty (from 1 of 70)
- Influential faculty (men and women) promote gender equity in the department
- A female senior lecturer teaches popular design and manufacturing classes and gives strong encouragement to women and URM.
- Students support and recruit each other. This is especially important for groups that haven't yet reached critical mass (e.g., URM).

Note: Women and URM students still face a more challenging environment than white males, but they have support and encouragement to persist.

At the PhD level, MechE is now almost double the national average for women and URM.

A very different STEM department:

Fraction of Bachelors' Degrees

Women

URM

Black or African American

— a MIT STEM Dept (3-yr averaging)

Fraction

Year

Fraction of PhD Degrees

a MIT STEM Dept (3-yr averaging)

Women

International

URM
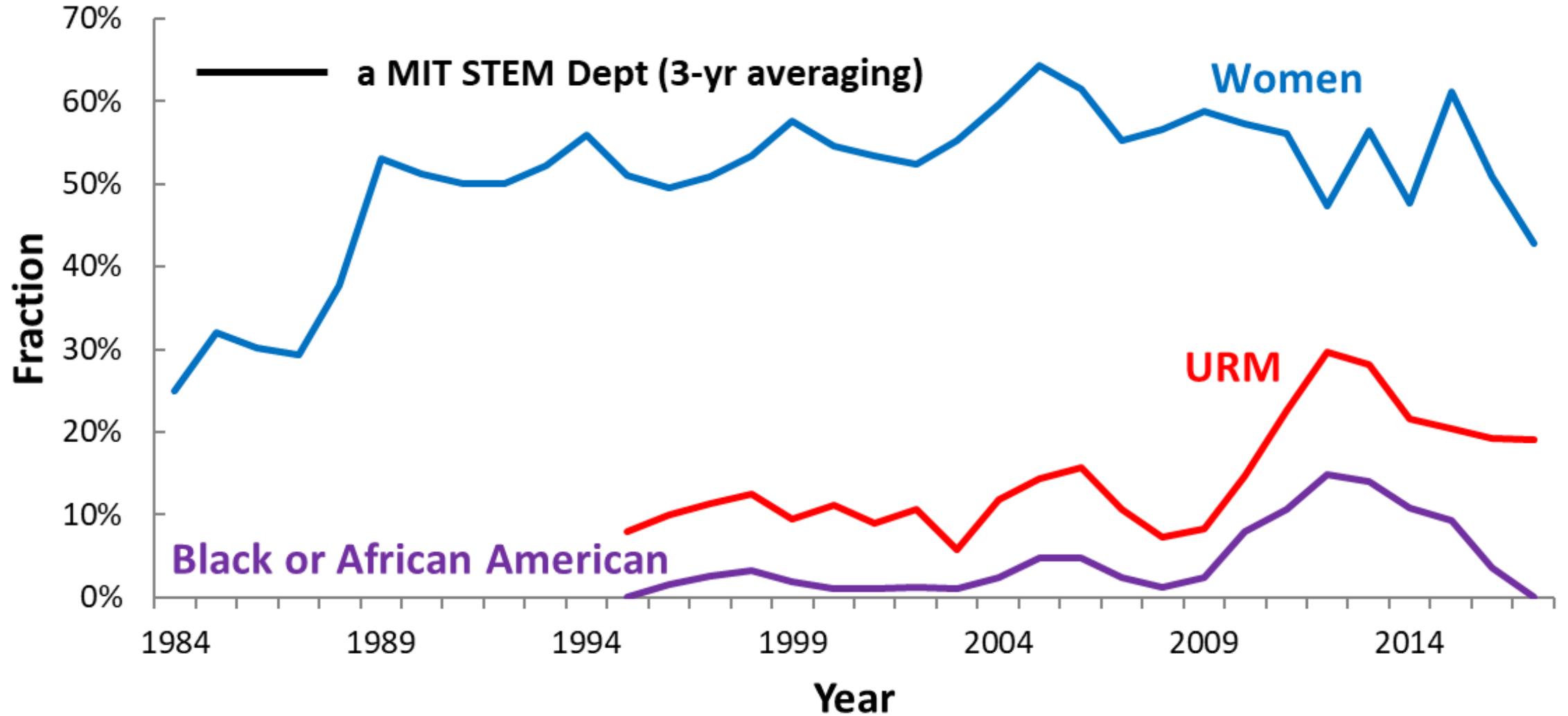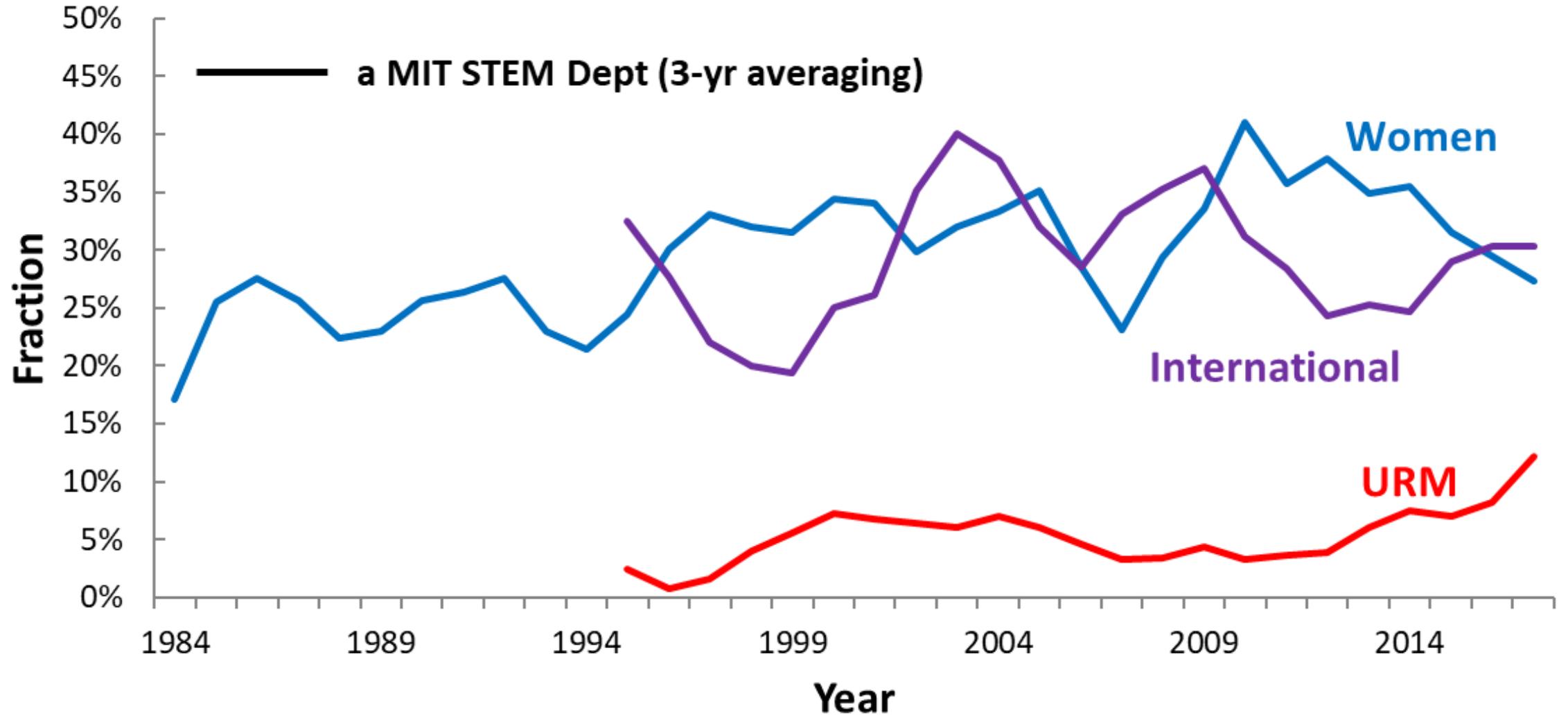
Figure 5a. Students' responses to questions regarding community and equity at MIT, averaged into academic majors or programs with five or more responses.
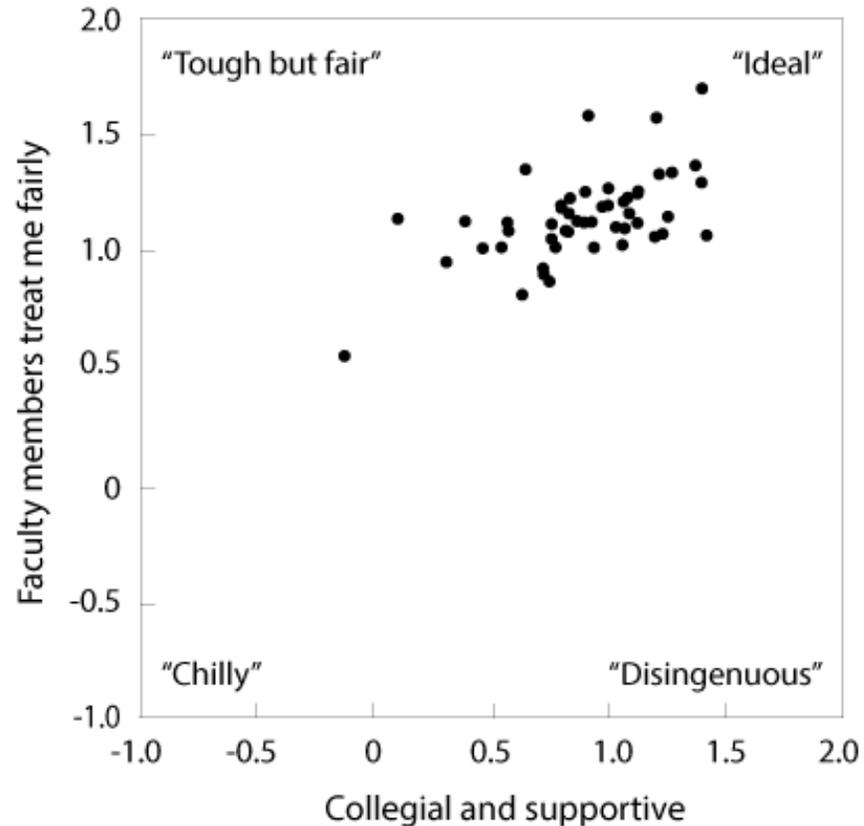
Source: 2013 Student Quality of Life Survey, Institutional Research, Office of the Provost.

Note: Descriptive labels are shown for each of the extremes.

What finally convinced the administration of an actionable problem:

Departmental analysis of a campus climate survey, in a public report

Themes raised by students

- Faculty are highly demanding and individualistic in this department: "sink or swim" is the rule
- Faculty compete for space more than they collaborate for the department
- Belittling comments
- Pressure to avoid family time or other personal needs in order to work
- Sexual harassment

Traditional masculinities

- Disproportionate emphasis on personal achievement and control ("dog-eat-dog")
- Conflict between work and family relations ("put work first")
- Eschewal of the appearance of weakness ("show no weakness")
- Displays of power ("strength and stamina")

Sources:

1. *Guidelines for Psychological Practice with Boys and Men*, American Psychological Association, August 2018;
2. *Work as a Masculinity Contest*, J. L. Berdahl, M. Cooper, P. Glick, R. W. Livingston, and J. C. Williams, J. Soc. Issues, 74:3, 422 (2018).

Sexual harassment is widespread in STEM fields

NASEM Consensus Study Report 2018:

Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine

Three levels of sexual harassment:

1. Gender harassment (verbal and nonverbal behaviors that convey hostility, objectification, exclusion, or second-class status about members of one gender)
2. Unwanted sexual attention
3. Sexual coercion

Outline

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2018 National Academies Recommendations to combat sexual harassment in STEMM

1. **Create diverse, inclusive, and respectful environments.**
2. **Address the most common form of sexual harassment: gender harassment.**
3. **Move beyond legal compliance to address culture and climate.**
4. **Improve transparency and accountability.**
5. **Diffuse the hierarchical and dependent relationship between trainees and faculty.**
6. **Provide support for the target.**
7. **Strive for strong and diverse leadership.**

2018 National Academies Recommendations to combat sexual harassment in STEMM

8. **Measure progress.**

9. **Incentivize change.**

10. **Encourage involvement of professional societies and other organizations.**

11. **Initiate legislative action.**

12. **Address the failures to meaningfully enforce Title VII's prohibition on sex discrimination.**

13. **Increase federal agency action and collaboration.**

14. **Conduct necessary research.**

15. **Make the entire academic community responsible for reducing and preventing sexual harassment.**

Report of the 2018 AAS Task Force on Diversity and Inclusion in Graduate Astronomy Education

The Task Force was convened in response to a series of recent events:

- The 2015 Inclusive Astronomy meeting held in Nashville*
- The 2016 AAS GRE statement
- Changes in GRE policies and introduction of holistic admissions at a number of departments => momentum for change
- Membership included astronomers, physicists, and social scientists
- Final report presented at plenary session of the American Astronomical Society winter meeting last week in Seattle

*The Inclusive Astronomy conference held at Vanderbilt University in 2015. The IA2015 meeting brought together about 170 astronomers, social scientists, policy makers, and community leaders to discuss current barriers to success in astronomy.

Recommendations: Admissions

1. **Partnering with and recruiting from programs that produce large numbers of graduates from underrepresented groups**

   a. Establish relationships
   b. Develop programs that grow talent from within
   c. Open pathways into graduate programs
   d. Address disconnect with our graduate programs
   e. Increase visibility of a diversity of astronomers

Recommendations: Admissions

2. Implementing evidence-based, holistic approaches to admissions

Attribute	Rating: High	Rating: Medium	Rating: Low
Positive self-concept	Expresses confidence they can complete challenging goals, makes positive statements about abilities	Shows confidence and independence but may be unsure about adequacy or skills	Exhibits low self-esteem and low confidence in their abilities
Realistic self-appraisal	Can clearly and realistically delineate strengths and weaknesses, works on self development	Has trouble identifying strengths and weakness but appreciates/seeks both positive and negative feedback	Over or understates abilities, does little to no self-assessment, does not appear to have learned from experiences
Research experience	Able to articulate both the science of their specific research and how it fits into the bigger scientific picture	Able to describe the specific science in their own research but little to no ability to articulate how it fits into the bigger picture	Only able to articulate a superficial understanding of their own work, and little to no understanding of the bigger picture

Sample rubric (UMd)

Recommendations: Admissions

2. Implementing evidence-based, holistic approaches to admissions

    a. Programs should

        i.   reduce reliance on standardized tests

        ii. structure information gathered via recommendation letters

        iii. incorporate assessment of socioemotional competencies

    b. Reviewers should approach prospective students as learners

    c. Programs should work to mitigate inequalities

    d. Reviewers should use evaluation rubrics

Recommendations: Admissions

3. Ensuring that program-level policies and practices are supported and amplified at institutional level

Examples:

a. fee waivers

b. demographics of applications, enrollment, and degree attainment

c. application contents and admissions practices

d. GRE policies

e. funding opportunities

Recommendations: Retention

Strategic planning and implementation steps:

1) Engage in genuine, open, and sometimes difficult conversations

2) Conduct assessments to identify areas of need or opportunities

3) Create short- and long-term actionable department plans

4) Incentivize and support professional development

5) Take actions based on plan and monitor progress toward outcomes

6) Encourage ongoing improvements toward inclusiveness by iterating through the process represented in steps 1-5

Example: Retention

Area C: Provide effective mentoring through evidence-based practices and expanded networking opportunities

1. Provide mentoring structures that give students more than one person as a close advisor
2. Provide/require mentoring training for faculty and other parties involved in mentoring, such as postdocs, research scientists, staff, etc.
3. Provide mentee training to help mentees be more proactive in their mentoring relationships
4. Create and support near-peer mentoring structures
5. Provide access to mentors of color and mentors from other marginalized groups
6. Increase networking opportunities for students, including marginalized students
7. Establish a positive culture around non-academic careers
8. Establish a non-judgmental culture around time to degree

Sample Toolkits and Resources:

CIMER training, curricula, and resources to improve mentoring relationships :
www.cimerproject.org

Recommendations:
Data and Metrics

1) Participate in the recommended AAS/AIP national demographic and climate survey

2) Regularly collect and analyze data relevant to graduate education

3) Assess the success of steps to improve the educational experience of graduate students using an evidence-based rubric

4) Report results on progress in implementing the recommendations of this Task Force on the platform provided by the AAS, and on departmental websites

Sample Self-Assessment Rubric

Departmental climate	Stage 1: Emerging	Stage 2: Developing	Stage 3: Transforming
Communications	Department website provides information on policies and procedures and points to university-wide resources. Departmental communications use minimal language around equity and inclusion	Department chair communicates the importance of equity and inclusion in person and in writing shared with all department members. The department website provides details on family-friendly policies, mentorship, inclusive teaching, and responding to harassment and bullying	The department has adopted a values statement and a code of conduct. The department chair advises other departments on how to improve the climate for all people. The department chair periodically hosts colloquia on topics related to diversity, equity, and inclusion in academia
Training	Department members participated in mandatory university trainings on lab safety, Title IX, etc.	New faculty receive training on teaching, mentoring, and on university resources to support the success of all people. Faculty search committee members receive training on implicit bias and best practices for inclusive searches	Department chairs receive training on diversity, equity, and inclusion, and on mediation and conflict management. They receive regular coaching. The department hosts trainings for all members on topics such as "being an ally", responding to microaggressions and harassment, and inclusive teaching practices. The majority of faculty attend these trainings

Example of excellent departmental communication: Michigan DEI Committee pages

You Belong At Michigan.
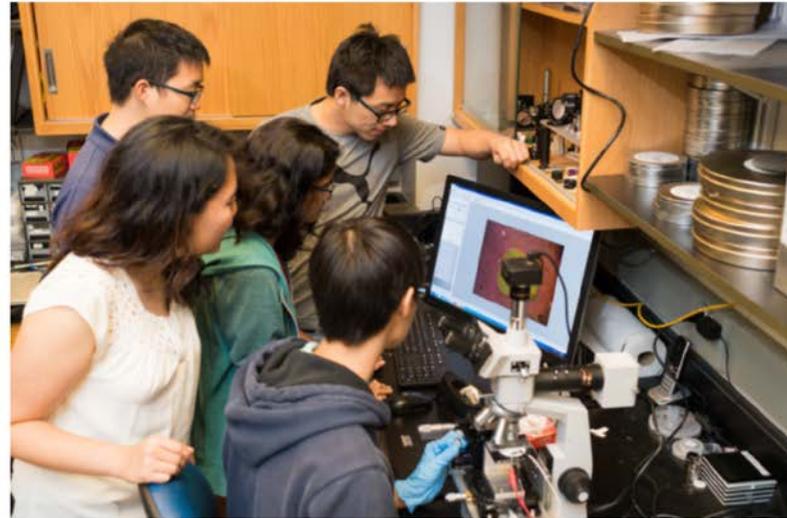
Our Vision Statement

The field of Physics lacks diversity with respect to gender and underrepresented minorities (**URM**). The situation has not improved significantly with time; in fact, the number of degrees earned by African Americans has decreased in the last decade. Leaders at physics organizations and universities have recognized the demand for improved diversity. This has prompted official statements from the American Physical Society (**APS**) and the American Association of Physics Teachers (**AAPT**). The University of Michigan Physics Department has also acknowledged this and formed a committee on Diversity, Equity, and Inclusion (**DEI**) in order to address these and related issues. The university president's diversity charge states it is central to the mission as an educational institution to ensure that each member of our community has full opportunity to thrive.

The committee aims to improve diversity, equity, and inclusion in the University of Michigan's Physics Department such that the representation of traditionally underrepresented and marginalized groups, within the department, is more reflective of our society, and work towards a sustainable, diverse and thriving physics community. The committee is dedicated to contributing to the department in such a way that the University of Michigan becomes a leading example in diversity initiatives. Lastly, in order to demonstrate that the Physics Department is aligned with the goals outlined in University of Michigan LSA college-wide strategic plan for Diversity, Equity, and Inclusion it is imperative that the

Recommendations to AAS: Measurement of Practices & Climate

Contract with AIP to create a web-accessible survey for participating departments, centering on a small set (~10) of standardized climate questions

○ Key demographic variables would also be surveyed

○ Departments will be asked to encourage participation

○ Only aggregated results would be made public

○ Departments could negotiate to receive more detailed results (with careful protection of privacy at both ends)

Recommendations to AAS: Recognition of progress

Maintain a platform to let departments share their practices and metrics. Serves as a resource for prospective graduate students looking for the most inclusive departments. Encourage participation in this effort

- Encourages adoption of practices outlined in "Recommendations to Departments"

- Provides public recognition for participating departments

- Provides information about those departments for prospective graduate student

- Over time, provides a measuring tool of national progress for the the field

Recommendations to AAS: Fostering of progress

○ Invest in the continued development, sharing, and curation of research- and best-practice based toolkits to implement evidence-based recruitment, admissions, and mentoring practices

○ Encourage participation by the AAS equity committees and working groups in the AAAS SEA Change initiative

AAS Diversity Task Force final report URL:

https://tinyurl.com/AASDiversityTFReport
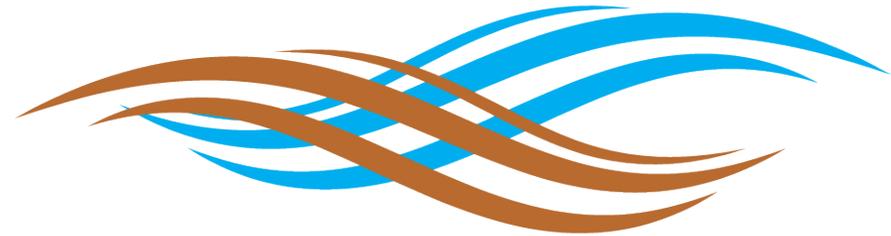
seachange.aaas.org

What is STEM Equity Achievement Change?

- A national diversity-equity-inclusion rating system for research universities led by the AAAS

- Modeled after the highly successful UK Athena SWAN system

- Similar to a LEED rating for buildings; bronze, silver and gold ratings last for 5 years and can be renewed.

- Physics societies (APS, AAPT, AIP, …) are already planning department-level certification, similar to UK Project Juno

Outline

A department leadership experience, 2007-2013

Demographic data: diversity in degrees

The climate in physics and related fields

Two STEM departments, different worlds

The role of departments and professional societies

Why participate in any of this? (you pick)

- Because you care about these issues
- Because you are a national leader
- Because you want to contribute ideas and examples
- Because you want to attract the full talent pool
- Because you don't want to be left behind
- Because it is fully aligned with the National Academies
- Because it is the right thing to do
- Because the future demands it
- Because…

What you can do

1. Show up: Participate in activities of your DEI offices and student groups

2. Educate yourself: Read, form discussion groups, invite DEI speakers

3. Know your departmental data: demographics, climate, advancement

4. Let your students know you value DEI–**you** will benefit

5. Practice discomfort—it's an essential part of learning

6. Tell your own DEI story

For further information:

1. "What I learned as a department head," http://web.mit.edu/fnl/volume/285/bertschinger.html

2. "Climate and Accountability," http://web.mit.edu/fnl/volume/311/bertschinger.html

3. Community and Equity Blog, http://iceoblog.mit.edu/

4. https://aas.org/education/aas-task-force-diversity-and-inclusion-graduate-astronomy-education

5. http://seachange.aaas.org/

Backup slides

Fraction of Physics Bachelors' Degrees

Fraction of Physics Bachelors' Degrees

Princeton (3-yr averaging)

US

Women

URM

Black or African American
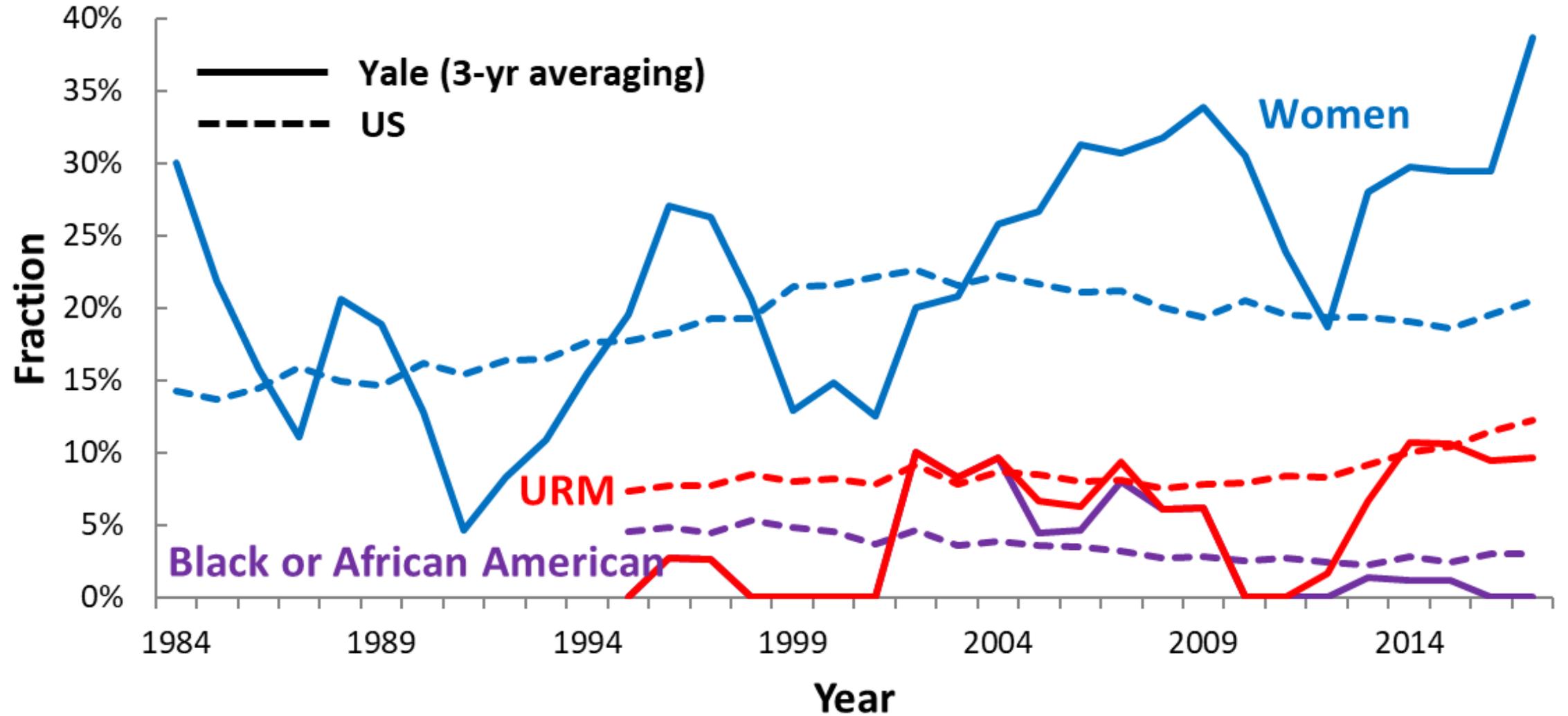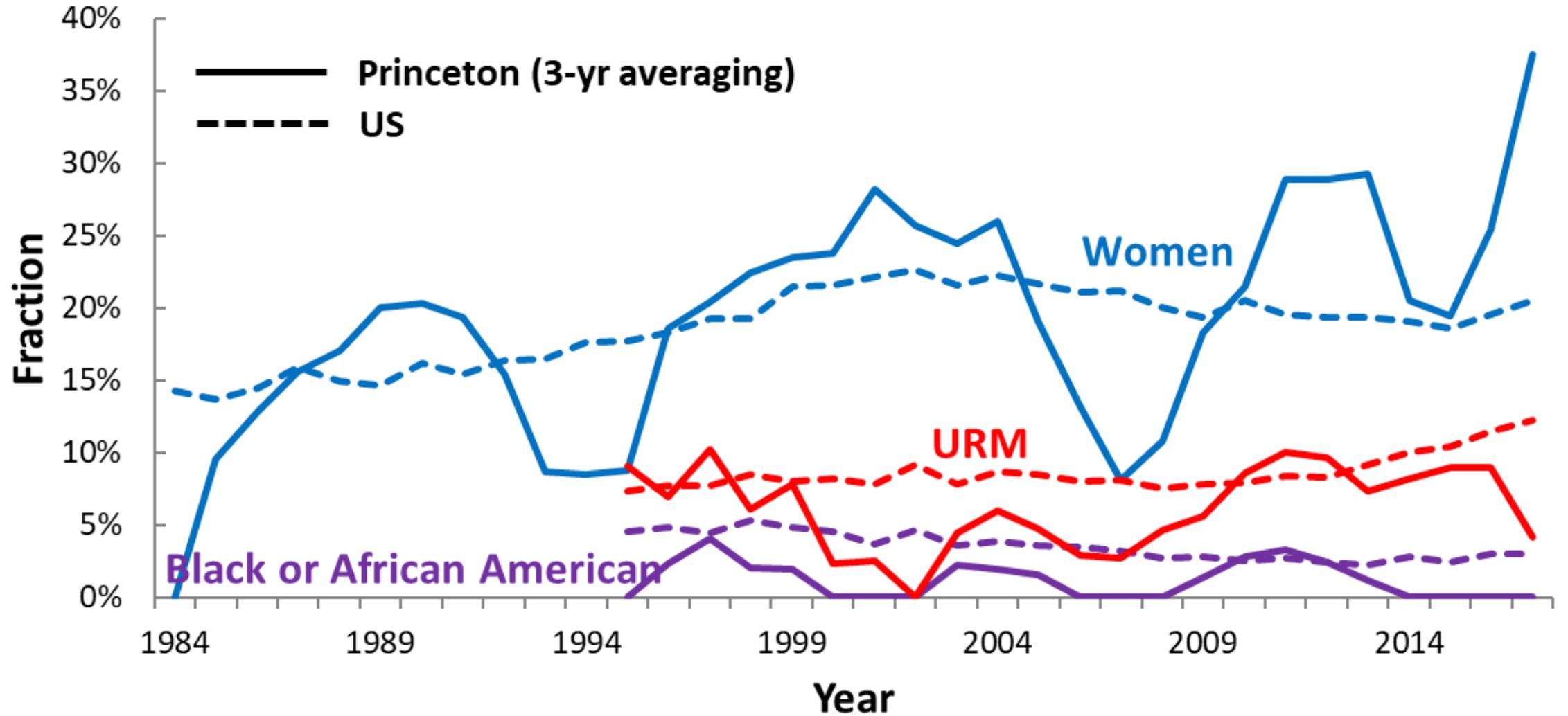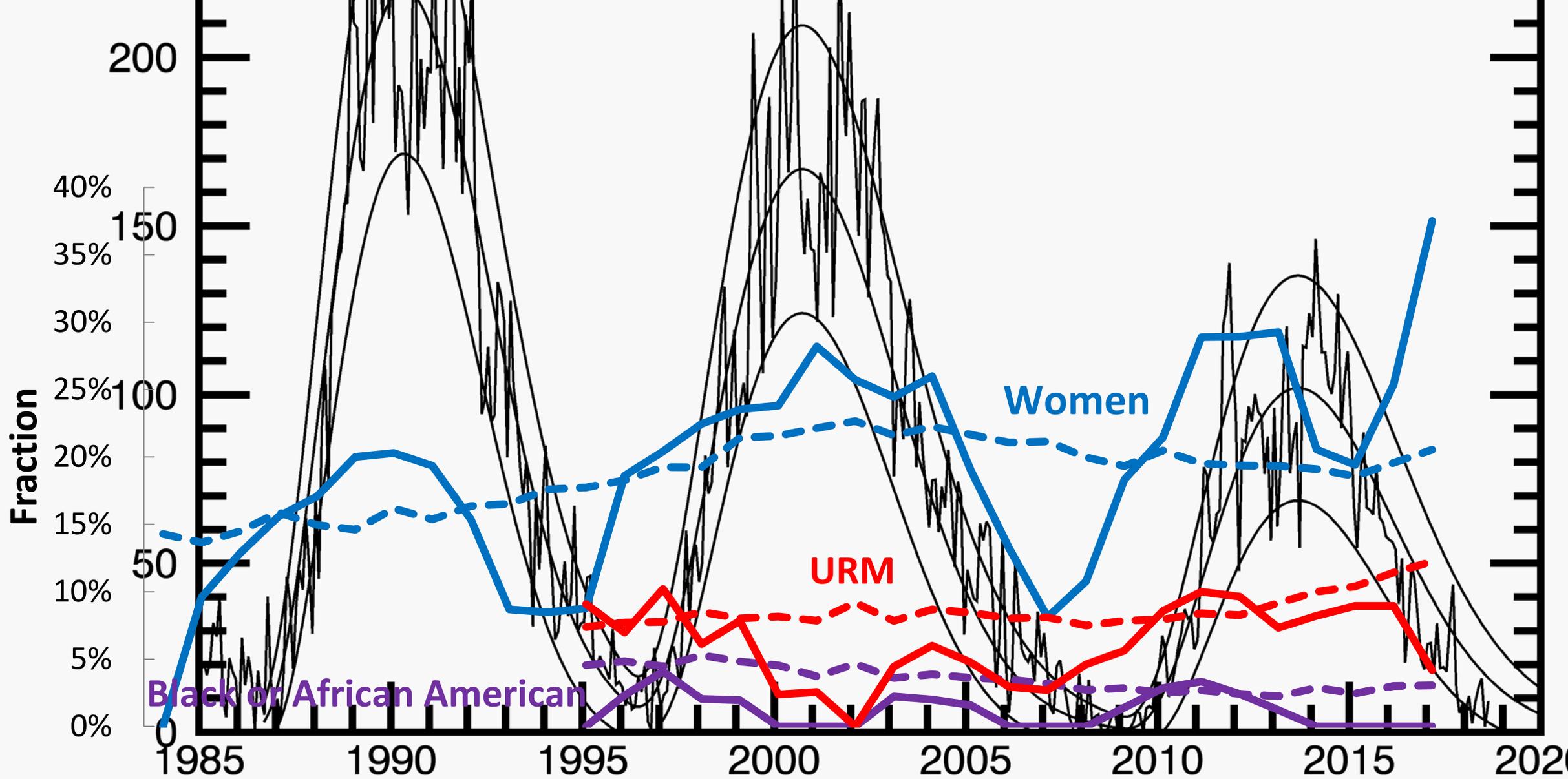
Could Princeton be influenced by sunspots?

MIT climate dashboard methodology

- 2013-14 interviews/focus groups identified themes
  - unconscious bias
  - micro-inequities (micro-aggressions)
  - discrimination or harassment based on social identity
  - abrasive conduct (bullying)
  - sexual harassment
  - excessive stress
- Sexual harassment excluded because of separate student-only projects (Title IX)
- Questions/items from 2012-13 climate surveys used which addressed remaining themes with largest variance across demography and department
- New survey items added 2016-17
- Sexual orientation obtained from survey itself (about 2/3 of respondents)
- Overall survey response rates about 50% based on 13,000 and 11,500 responses in 2012-13 and 2016-17, respectively

Meritocracy

"a system in which the talented are chosen and moved ahead on the basis of their achievement" -- Merriam Webster dictionary

This is problematic! How is talent identified and fostered? How does systematic discrimination hinder talent development?

"Researchers in the social psychological tradition have suggested that merit justifies beliefs that help legitimize the (unequal) *status quo* in society. Such beliefs may allow individuals and groups at the top of the status hierarchy to use "merit" to justify and sustain their privileged status and reduce resistance from lower-status groups."

- Emilio J. Castilla in *The SAGE Encyclopedia of Political Behavior*, chapter on *Meritocracy*

Privilege

"the advantages and immunities enjoyed by a small usually powerful group or class, especially to the disadvantage of others."

https://educalingo.com/en/dic-en/privilege

Racism = Prejudice + Power