Equity, Diversity and Inclusion in Astronomy

Talk & Discussion

by Maria Jose Rain

- She/her/Ella
- Latina
- Chilean accent
- I'm of
  Mapuche heritage
- Outdoor activities
- Coffee, wine and beer

8va region, Curanilahue

- ESO Fellow
- Duties in Paranal UT12
- IS2 of FLAMES
- IF of FORS2

Very large telescope (VLT) - Paranal

ACTIVIST
- Fellow representative of the EDI committee
- Member of DCP group
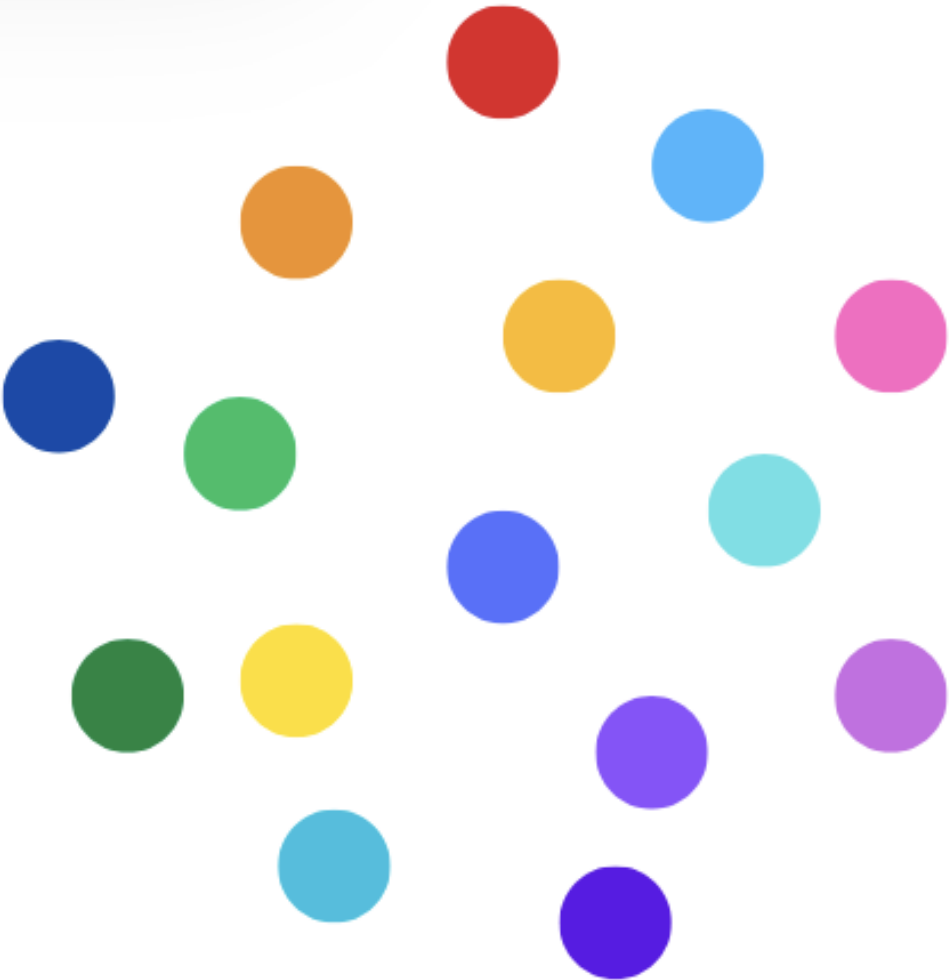- Chair EquiTea meetings

SCIENTIST:
- Stellar astrophysics, oddities of stars in open clusters
- First generation PhD student

Santiago de Chile

I'm not an EDI expert
Not free of biases
Latino/Chilean

DIVERSITY

- Diversity simply describes the many ways in which people differ from one another.

- Recognizes that everyone is unique, and that each person may have different personal needs, values and beliefs (CIPD, 2017; Diversity Best Practices, 2009)

Identity	Cognitive	Neuro
Demographic differences	How you think about the world	Neurological variation
Often but not always visible (assumptions can be problematic)	Tools, resources, knowledge, and models	Part of natural and "normal" genetics

| Identity		Cognitive		Neuro	
Gender	Sexuality	Education & training	Risk tolerance	Autism spectrum	Depression
Race	Nationality	Hobbies & interests	Intro- or extraversion	ADD/ADHD	Anxiety
Age	Size	Work & life experience	Values & biases	Dyslexia	Addiction

I hope it is obvious that these are not the only ways to conceptualize diversity, nor are these categories mutually exclusive. I imagine it's also obvious I am not a graphic designer.

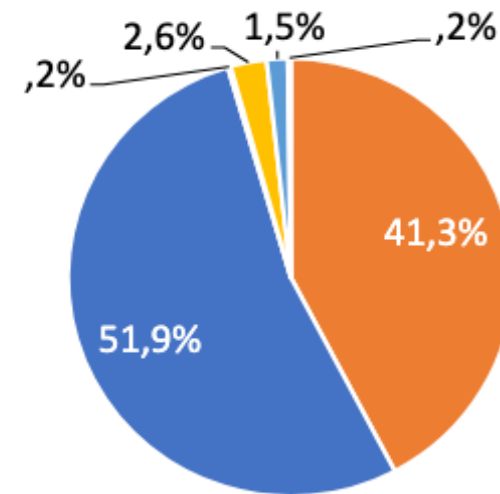# Chilean astronomical Community

SOCHIAS, J. Carballo Bello 2023

Sex

From the survey respondents (n=470)

1,9%

54,5%

43,6%
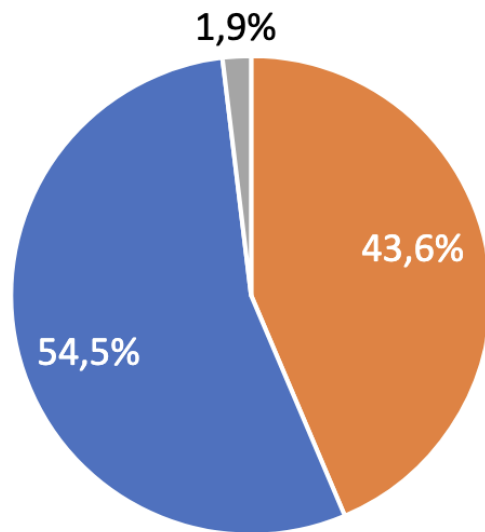
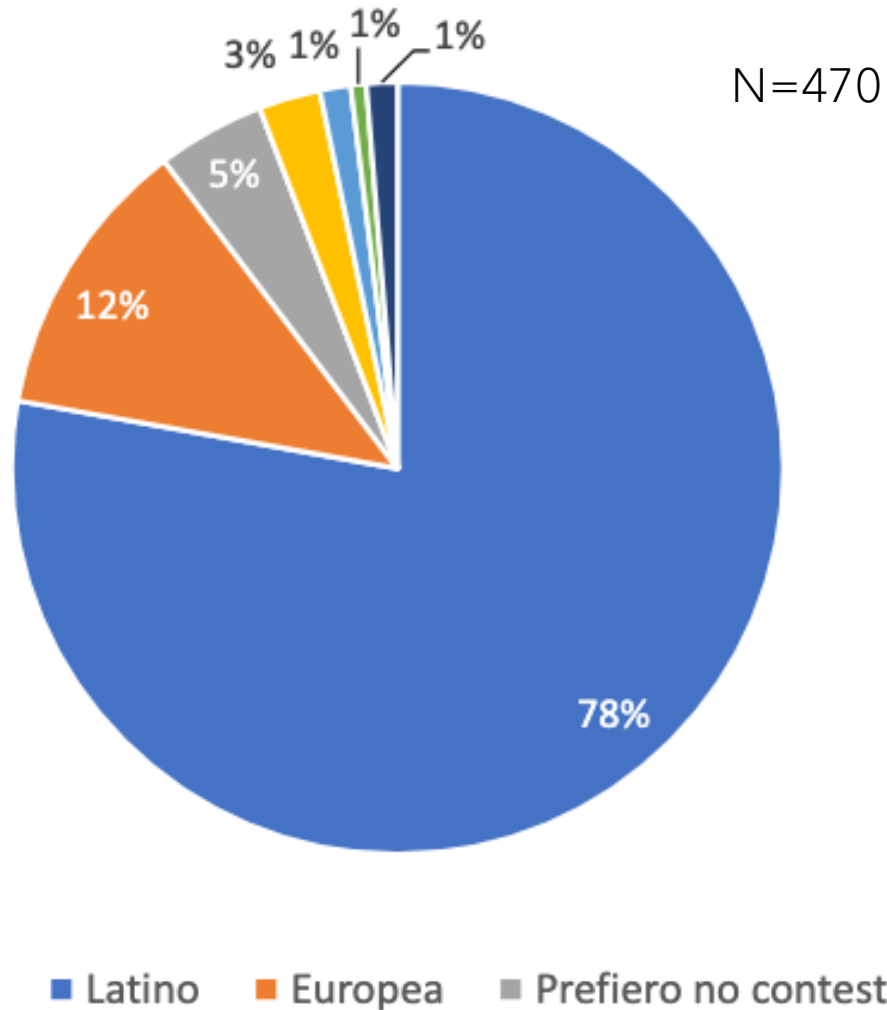■ Femenino   ■ Masculino   ■ Prefiero no contestar

Gender identity

According to gender identity, 94.2% self-identify with usual categories of

,2%   2,6%   1,5%   ,2%

51,9%   41,3%

■ Mujer   ■ Hombre
■ Homosexual   ■ No binario
■ Prefiero no contestar   ■ Sin importancia

Chilean astronomical Community

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N=470

Ethnicity and Nationality

In terms of ethnicity, the respondents self-identify, mainly, as

- "Latin" (78%), followed by
- 12% of "European"

Pie chart percentages: 78%, 12%, 5%, 3%, 1%, 1%, 1%

Legend: Latino, Europea, Prefiero no contestar, Americano, Asiático, Africa, Ninguna
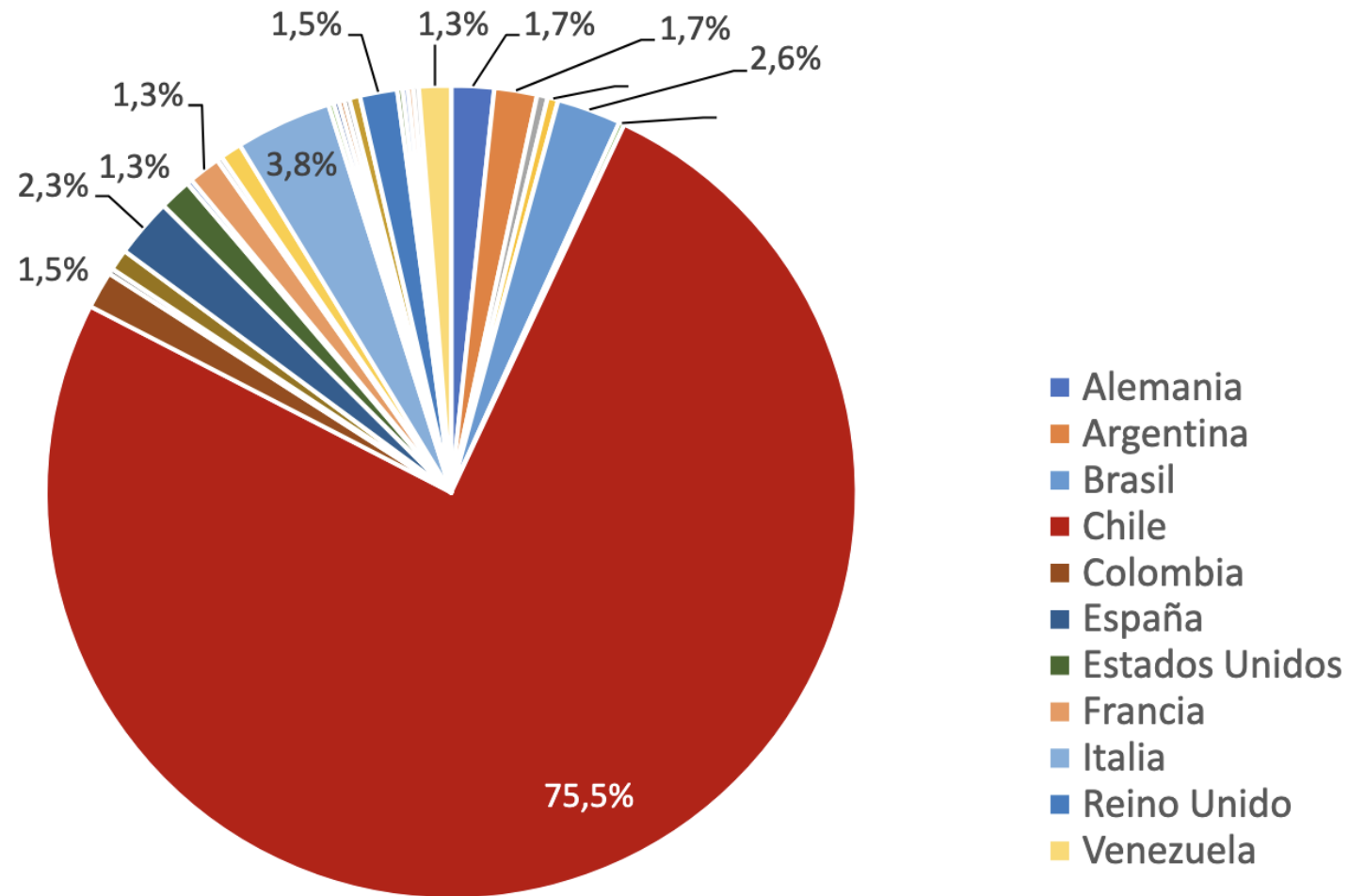
Chilean astronomical Community

SOCHIAS, J. Carballo Bello 2023

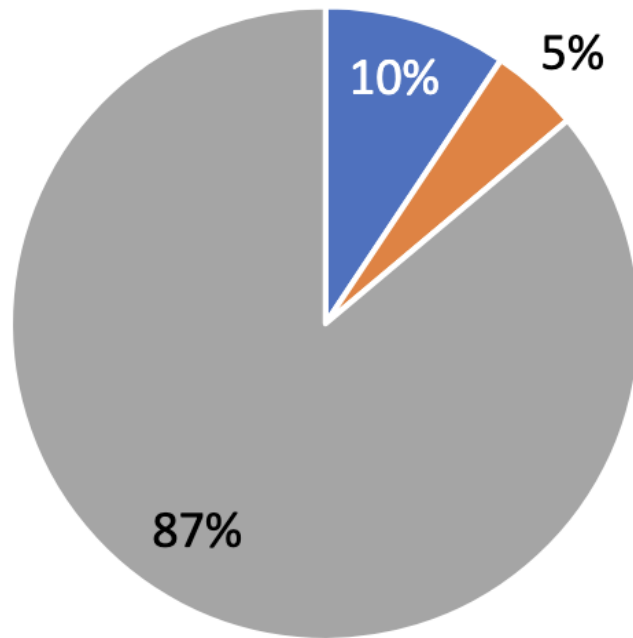## Ethnicity and Nationality

The main nationalities are as follows:
Chile (75.5%), Italy (3.8%), Brazil (2.6%), Spain (2.3%), Germany (1.7%), Argentina (1.7 %), United Kingdom (1.5%), United States (1.3%), France (1.3%) and Venezuela (1.3%).

Legend:
- Alemania
- Argentina
- Brasil
- Chile
- Colombia
- España
- Estados Unidos
- Francia
- Italia
- Reino Unido
- Venezuela

Pie chart values: 1,5%, 1,3%, 1,5%, 1,3%, 1,3%, 3,8%, 1,3%, 1,7%, 1,7%, 2,6%, 2,3%, 75,5%

Chilean astronomical Community

SOCHIAS, J. Carballo Bello 2023

Disability

Type of disability	N°	%
Visual	16	4%
Mental	13	3%
Physical	7	2%
Hearing	5	1%
Visceral	3	1%
Not sure	21	5%
No	398	87%
Total	**463**	**100%**

Chilean astronomical Community

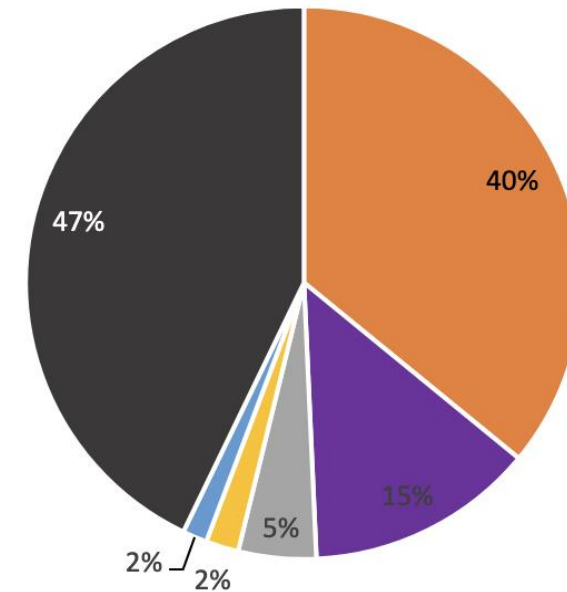*SOCHIAS, J. Carballo Bello 2023*

Underrepresented groups

Within the SOCHIAS community, there is less identification with some underrepresented groups compared to the general population, but in other cases is higher. Among the groups in which there is lower representation
- are women with 40% in SOCHIAS (vs. 51% of the general population
- Indigenous people with 5% of identification (vs. 12,8%)
- and disabled people with 2% (vs. 5.8% mild or moderate disability, and 7.2% severe)

On the contrary, the group with the higher representation
- is the LGBT+ community with 15% vs. 8% present in society – according to the IPSOS survey, 2023

Pie chart percentages: 40%, 47%, 15%, 5%, 2%, 2%

- ■ Mujeres
- ■ Comunidad LGBT+ (lesbiana, gay, bisexual, transgénero)
- ■ Pueblos originarios
- ■ Persona con discapacidad
- ■ Prefiero no contestar
- ■ No

Chilean astronomical Community

SOCHIAS, J. Carballo Bello 2023

Would you say that you belong to any of the following groups considered underrepresented in the scientific community? (multiple)

n=385
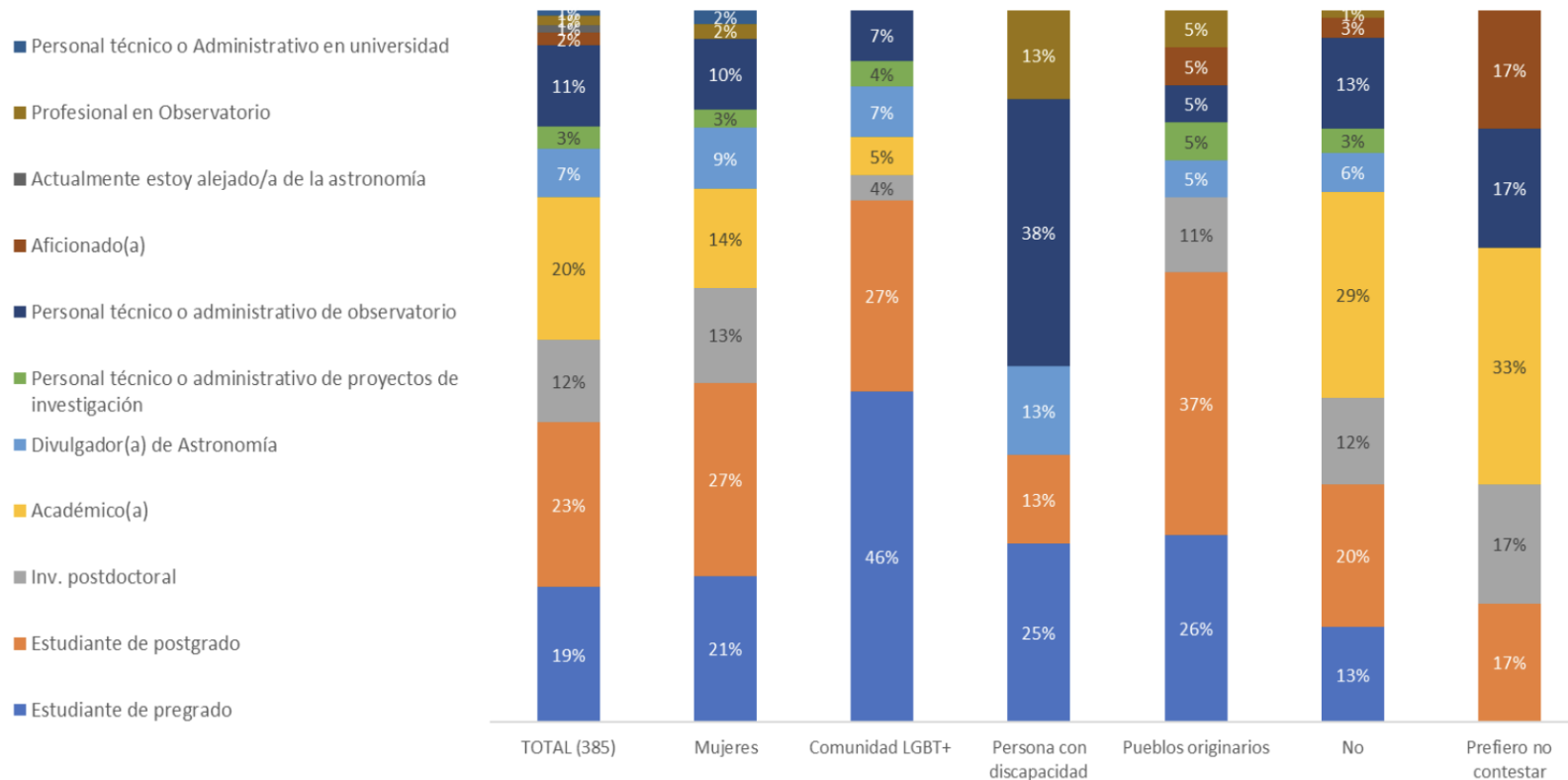
Among people who self-identify with the LGBT+ community, 46% are undergraduate students. Those who self-identify with an indigenous tribe are postgraduate students. For disability, the administrative and professional staff from Observatories are the prominent one. Academics are predominant in those groups of people who do not feel they belong to any underrepresented group or who prefer not to answer.
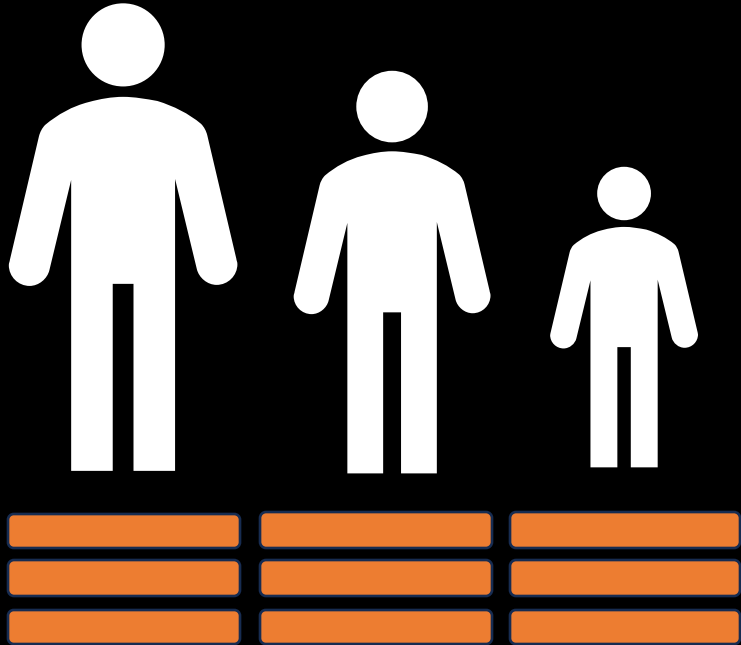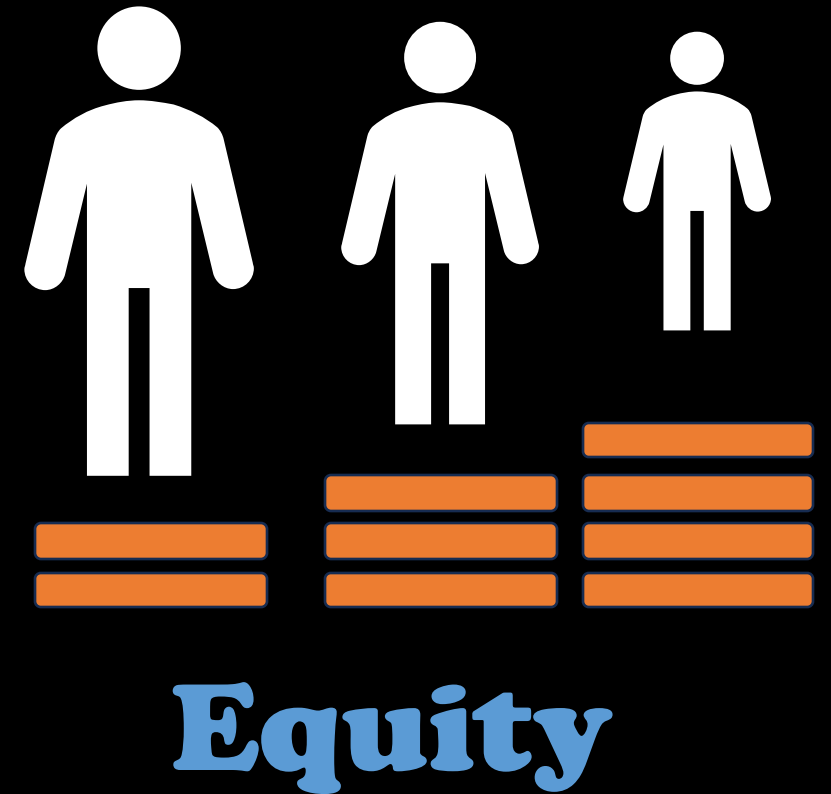
Equ(al)ity
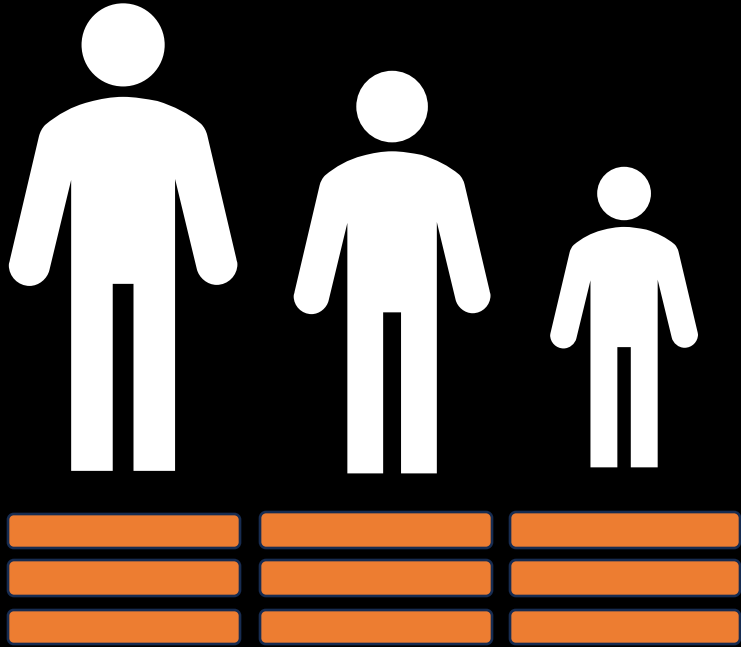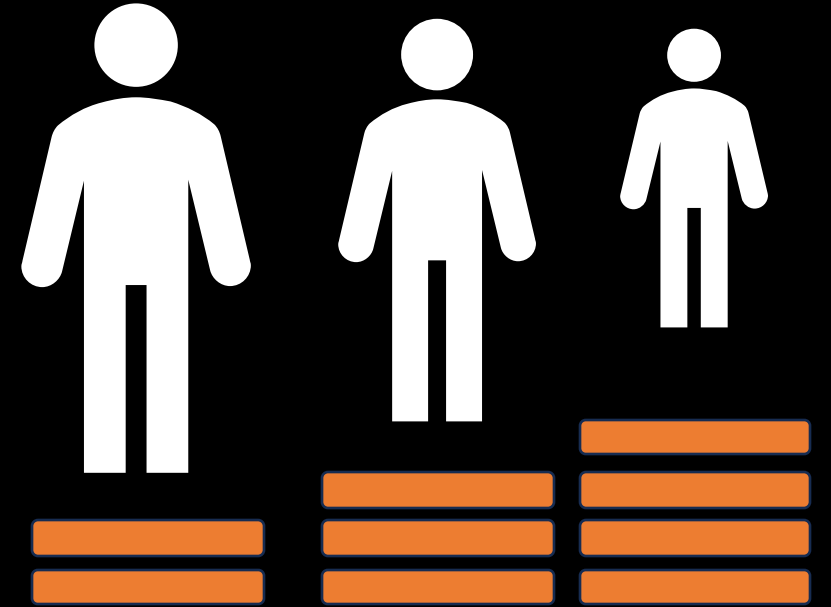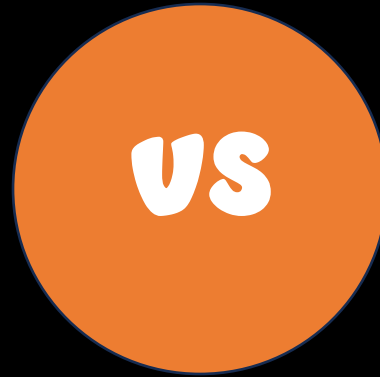
Equality **vs** Equity

Equality

- All people have the same rights, opportunities, and access to resources
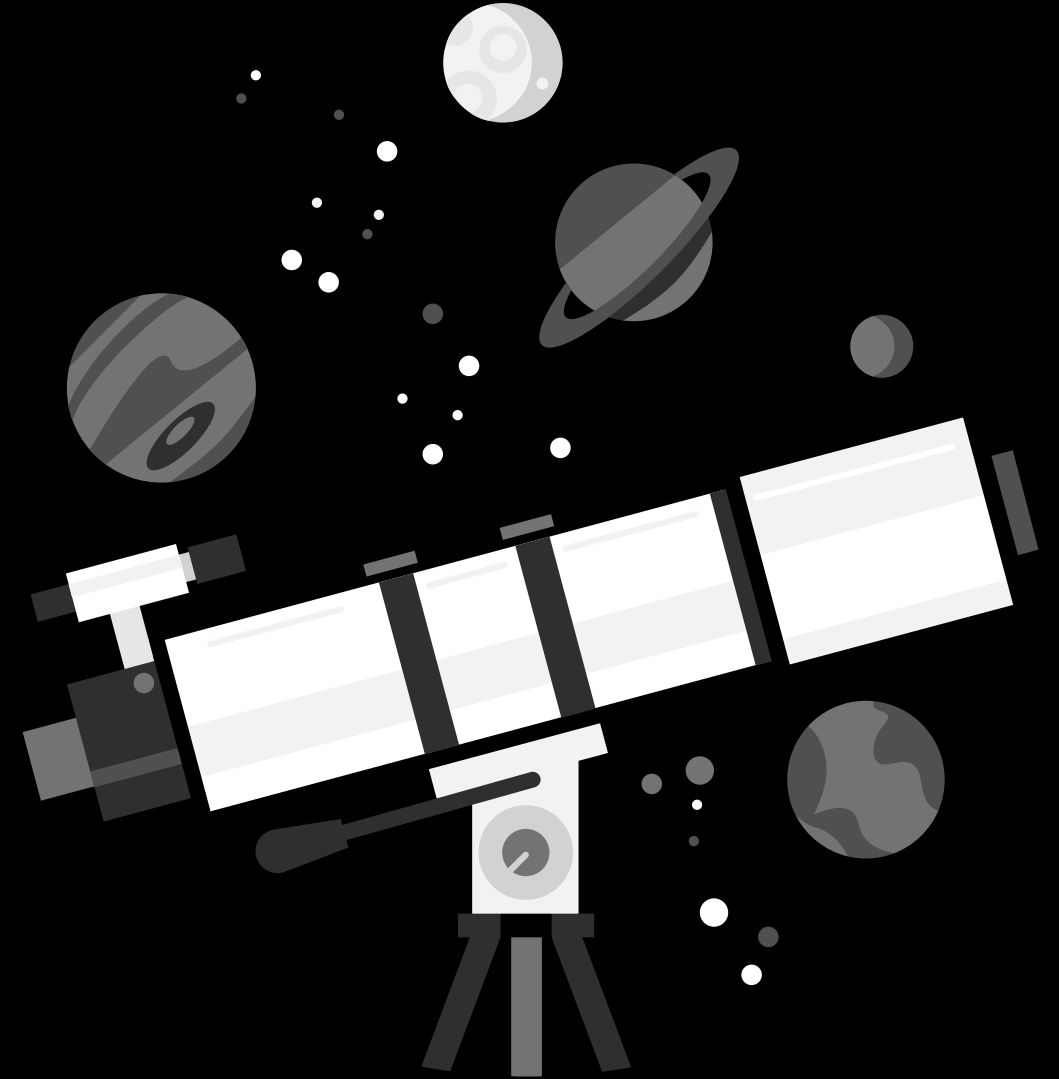
- Goal: absence of discrimination

- Recognizes that people may start from different positions, and may require different levels of support to achieve the same outcomes

- Goal: Create a just and inclusive society

Equity

Equity vs Equality

General examples:

- Equal healthcare
- Equal access to education
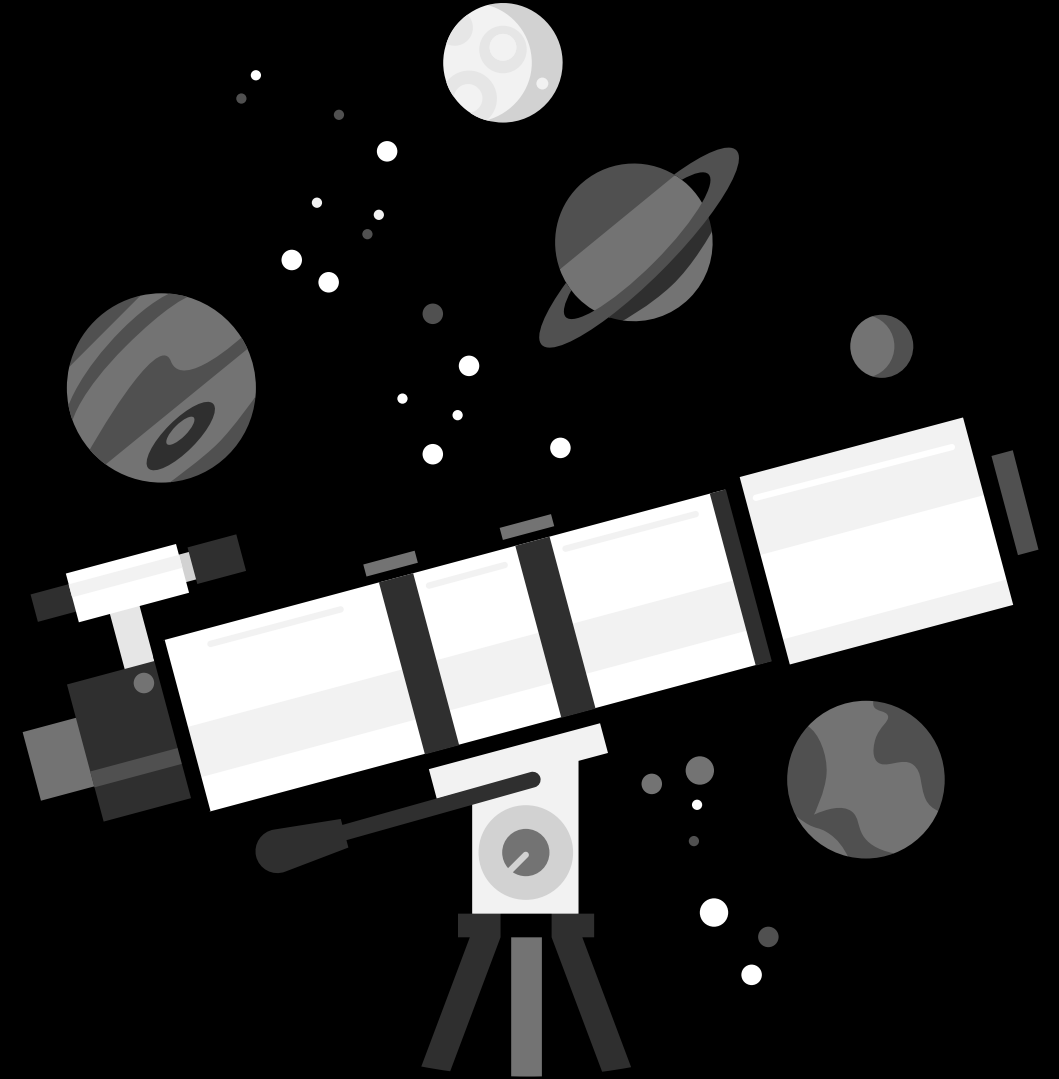- Equal pay for equal work

Equity vs Equality

General examples:

- Equal healthcare
- Equal access to education
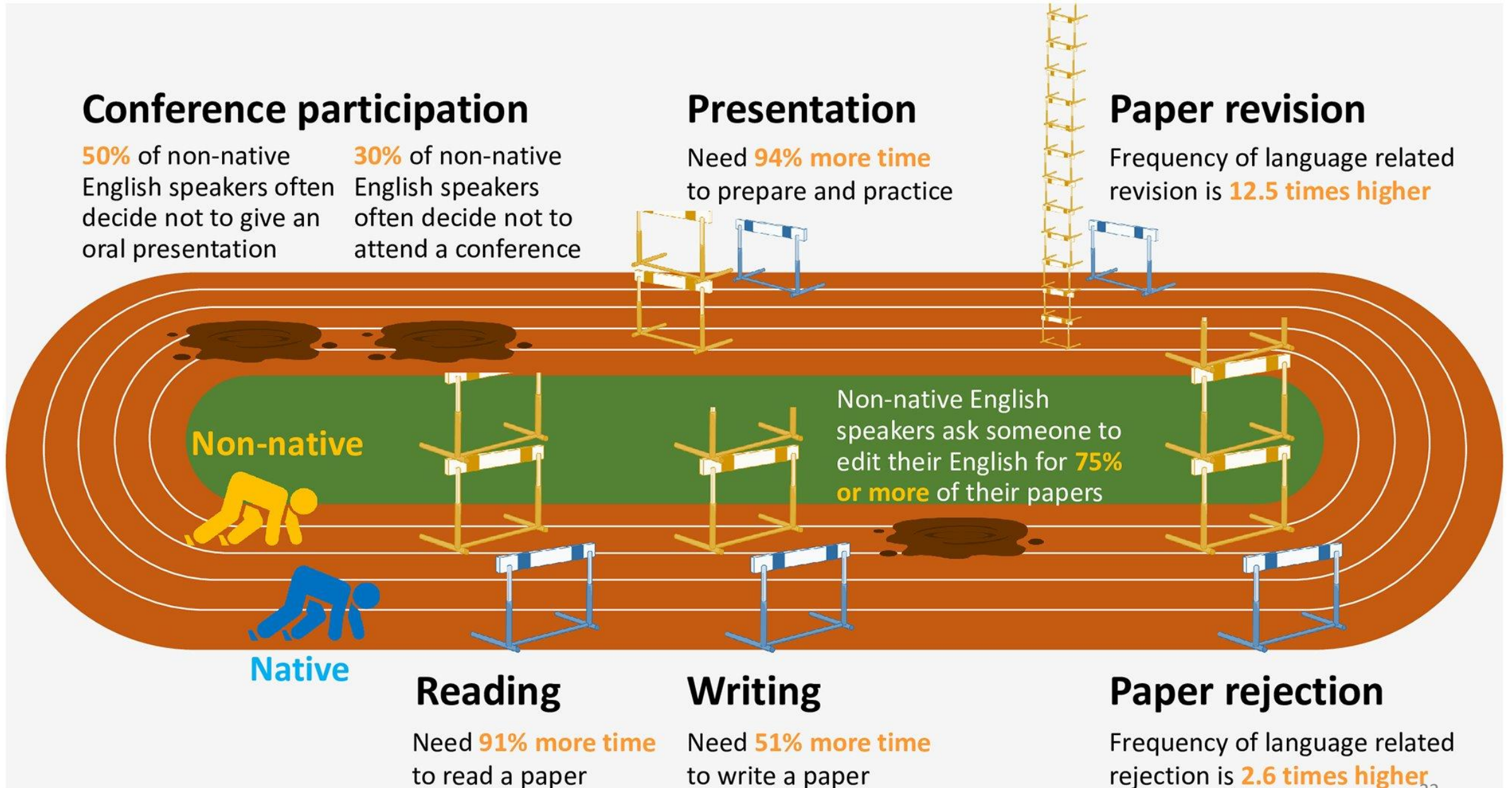- Equal pay for equal work

Equity examples in Astronomy:

- Equal access to telescopes and observing time
- Representation in leadership roles
- Culturally relevant outreach programs

Equity vs Equality: Example language barrier

Conference participation

50% of non-native English speakers often decide not to give an oral presentation

30% of non-native English speakers often decide not to attend a conference

Presentation

Need **94% more time** to prepare and practice

Paper revision

Frequency of language related revision is **12.5 times higher**

Non-native

Non-native English speakers ask someone to edit their English for **75% or more** of their papers

Native

Reading

Need **91% more time** to read a paper

Writing

Need **51% more time** to write a paper

Paper rejection

Frequency of language related rejection is **2.6 times higher**

INCLUSION

- Inclusion refers to the intentional effort to value people's differences and enable everyone to perform to their full potential no matter their background, identity, or circumstances

- Aim at creating an inclusive working environment, that is, one in which everyone feels that they belong, and that their contribution matters.

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Discrimination in Astronomy:

Have you perceived that someone from your work environment has been discriminated for any of following reasons?
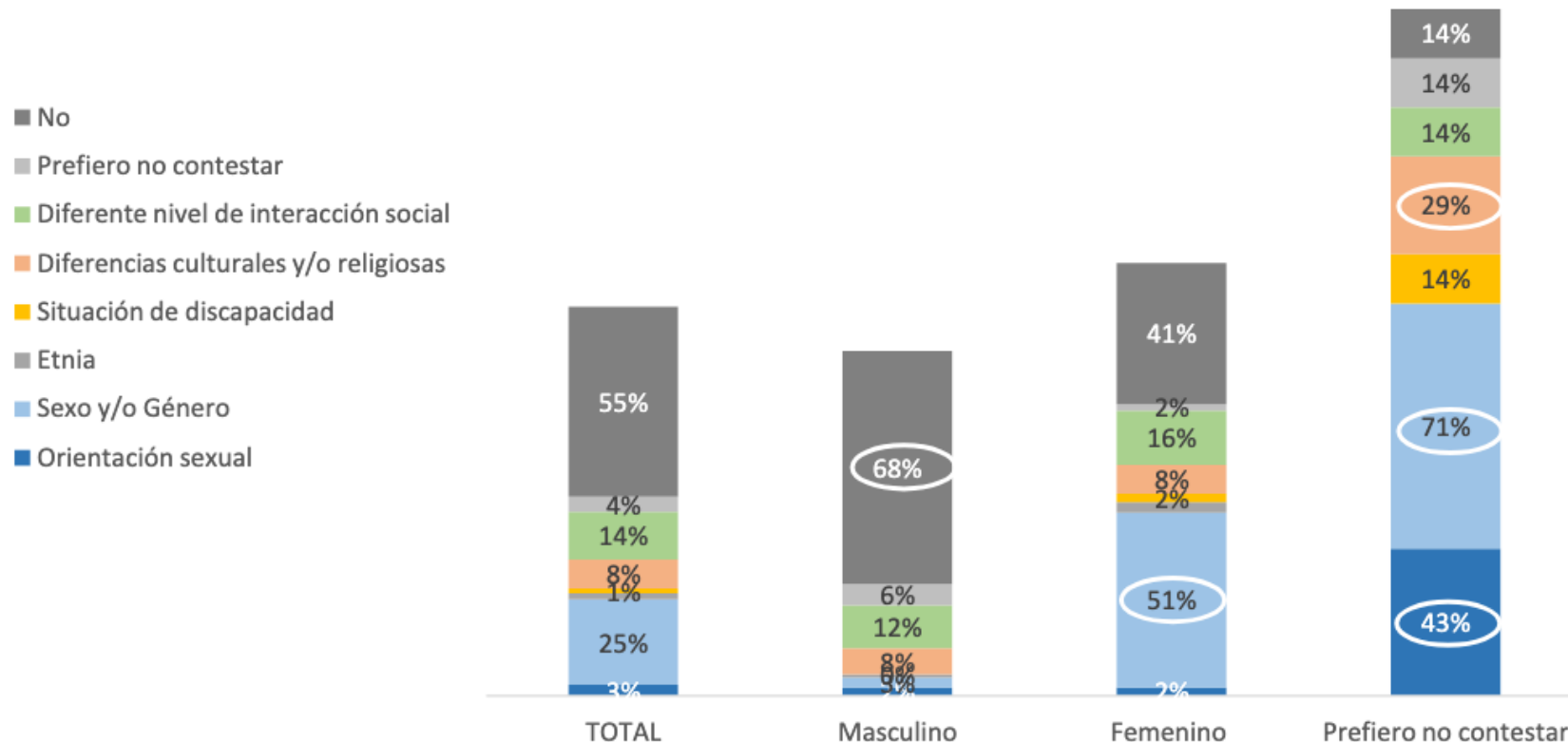

Man have reported feeling less discrimination.
In general, the main reason of discrimination is related to Sex/Gender which affects women and those who do not want to answer because of their sex.
In the same way, for those who do not disclose their sex, they experience other types of discrimination, such as that based on sexual orientation or cultural differences.

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Discrimination in Astronomy:

Have you also felt attacked?

- Unsure 11.4%
- N/A 3.1%
- No 64.9%
- Yes 20.5%

Yes (N=79)

- Women 67.1%
- Men 25.3%
- Non-binary / N/A 7.6%
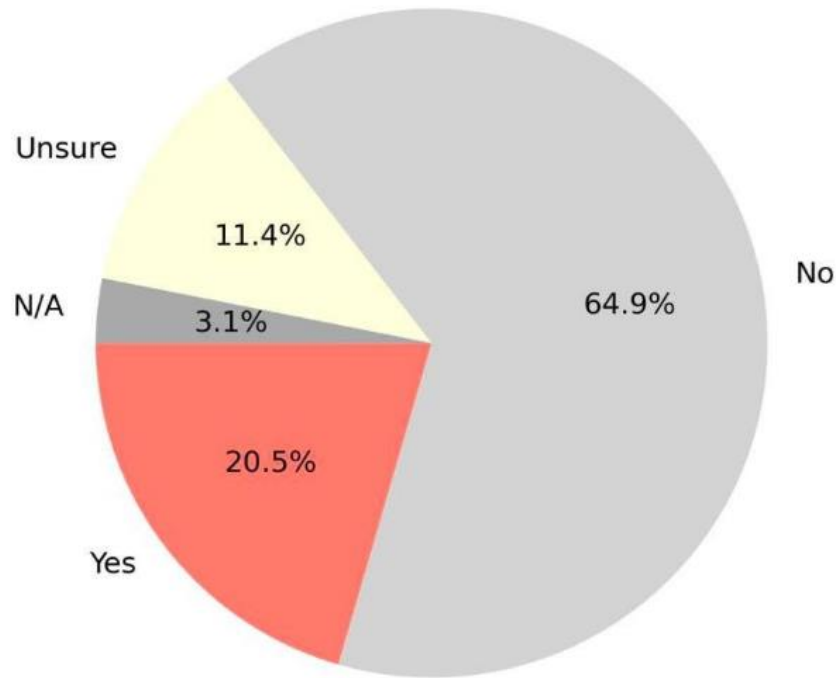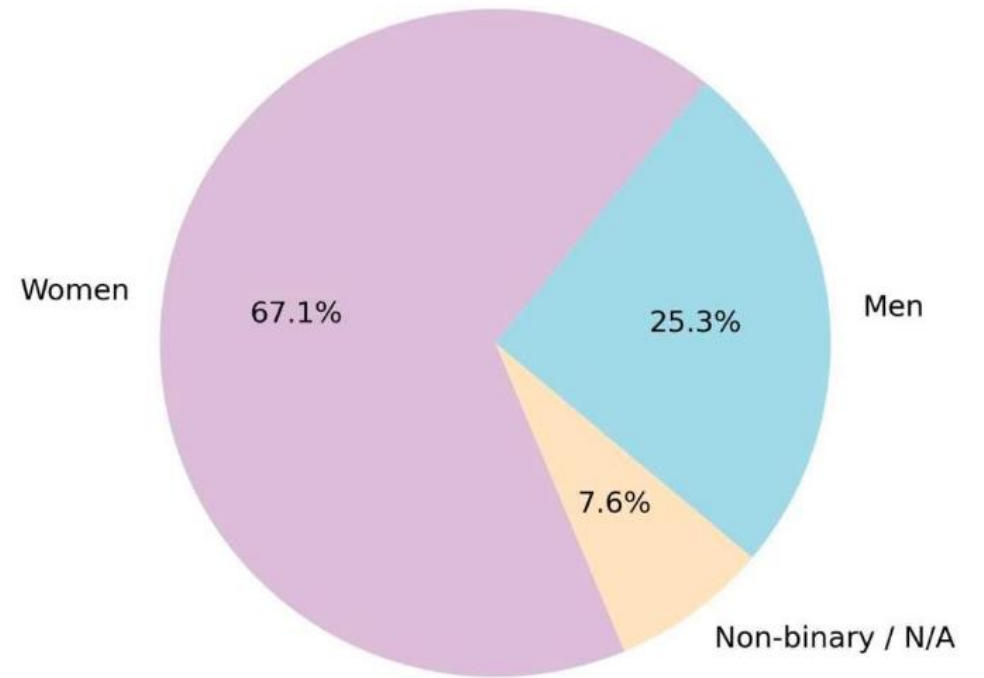
Harvard law school of 1953

Diversity is being invited to the party; inclusion is being asked to dance.

VERNA MYERS

La Silla School 2025 - MJ Rain - Santiago, Chile

So, what EDI stands for?

EQUITY

- Fair treatment, access, opportunity and advancements for all people. One's identity cannot predict the outcome

DIVERSITY

- All the ways in which people differ

INCLUSION

- All variety of people have power, a voice, and a decision-making authority

Definitions sources from cities from Portland office of equity and human rights, The independent Sector, and UC berkeley

Why EDI matter in Astronomy?

Creativity & innovation

Team work & Loyalty

Enhance productivity

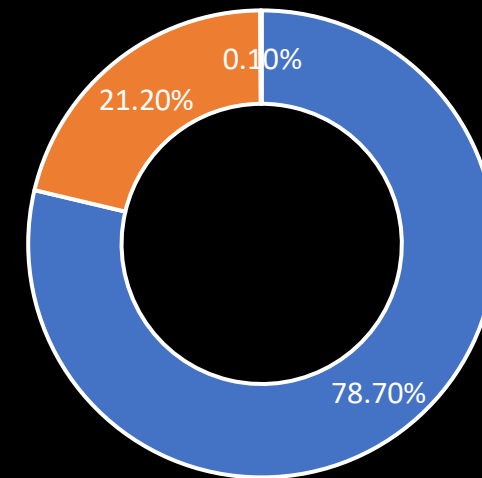**Stronger publications**

Why do they matter in Astronomy?

Creativity & innovation: Equitable access prevents talent loss (Pommier et el. 2018)

IAU counts with nearly 12,000 members (professional astronomers and outreach members)

< 2800 female members (21.2%)

IAU Total members

0.10%
21.20%
78.70%

◻ Male ◻ Female ◻ Gender Unknown

Gender Disparity in Astronomy
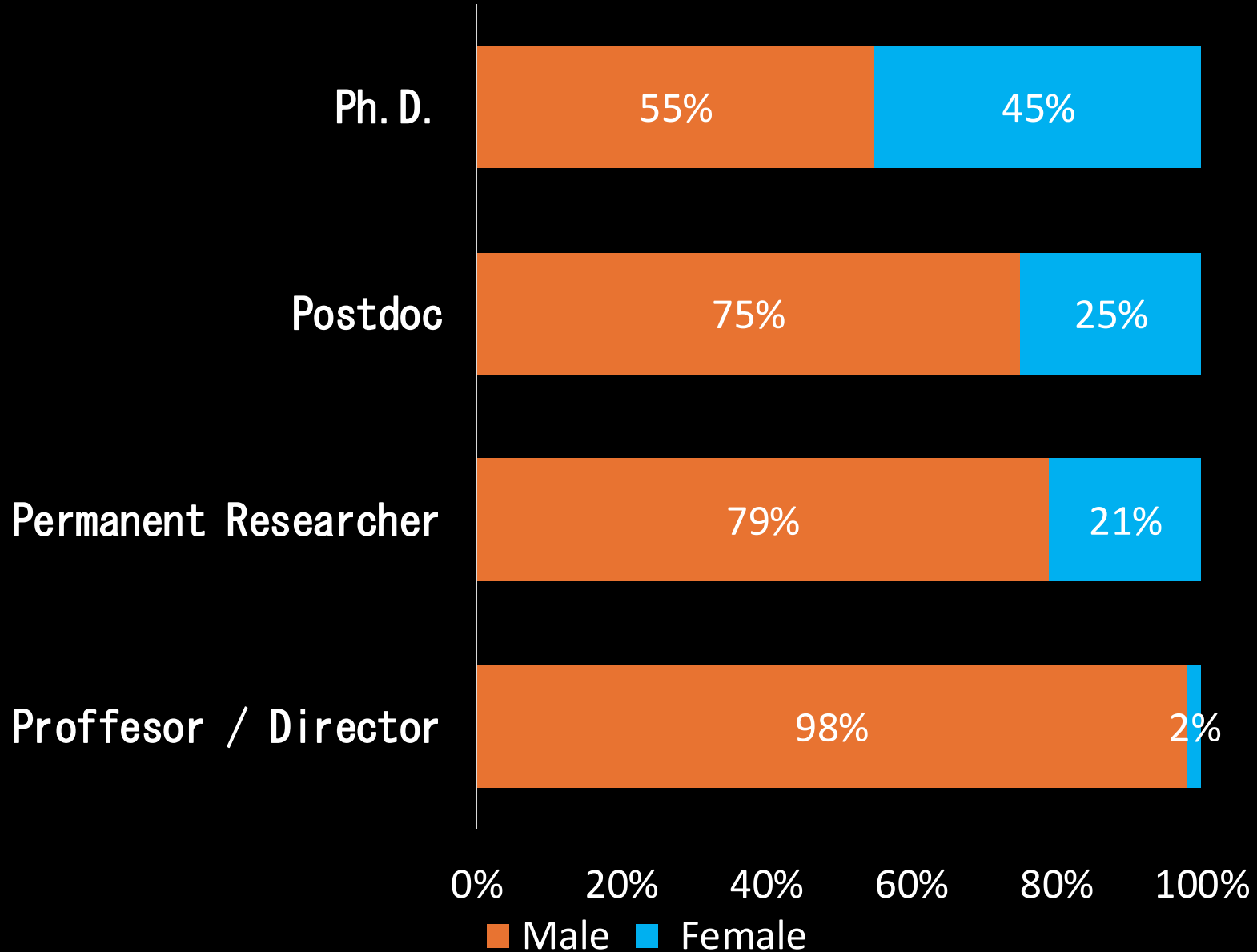
Leaky pipeline effect

Postdoc 6-17yrs or more
75% M - 25% F
(90% are not supported – mostly mothers)

Permanent position
Jr. Researcher
8-10yrs
80% M - 20% F

Sr. Researcher
98% M - 2% F

PhD 5 yrs
55% M - 45% F
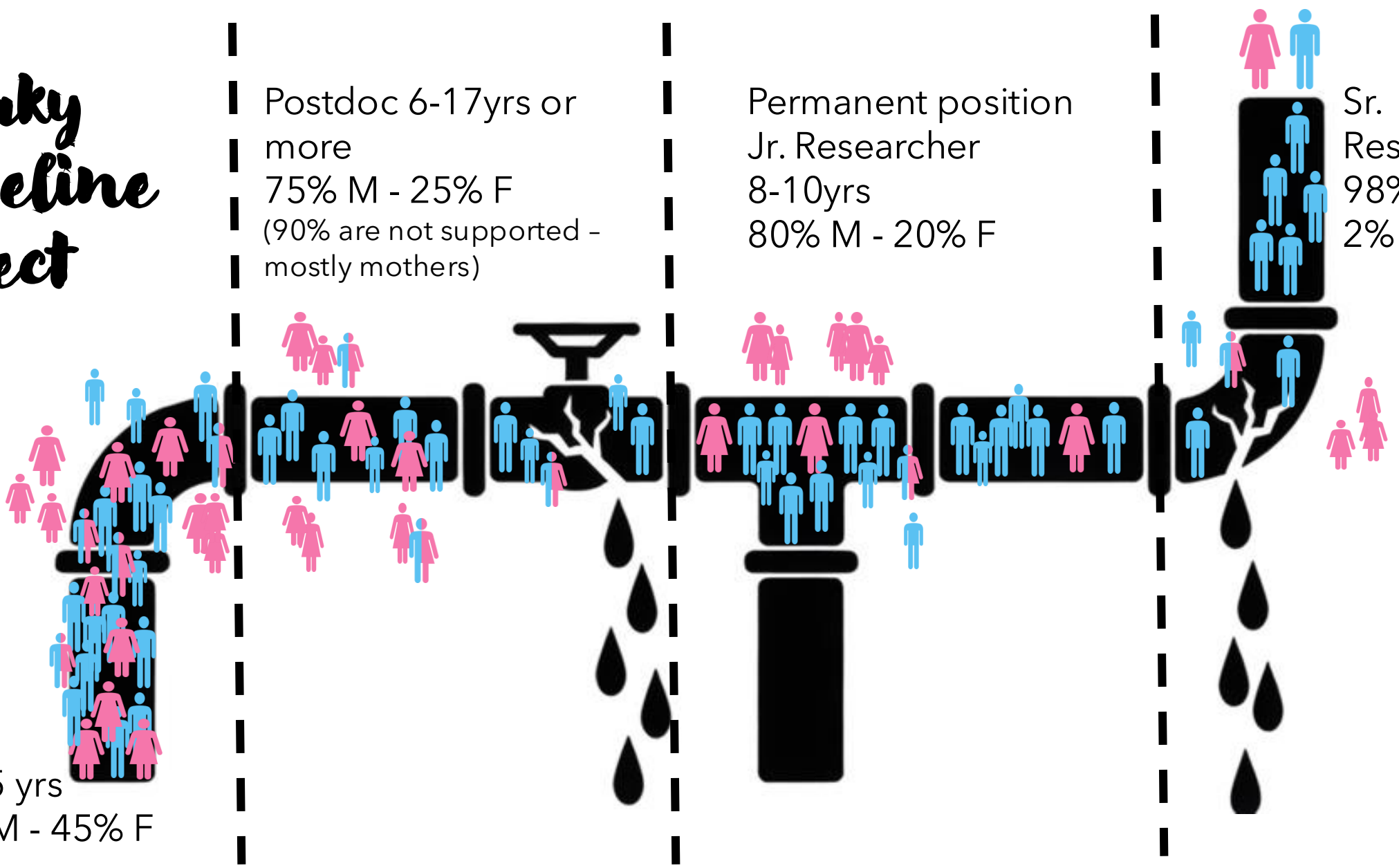
Why do they matter in Astronomy?

- **Team Work and Loyalty**: Global collaborations require diverse voices (Richard Freeman & Wei Huang 2014) [*]

International astronomical union (IAU) strategic plan 2020-2023. *"Global nature of astronomy and the need to include diverse backgrounds to maximize scientific and societal benefits"**

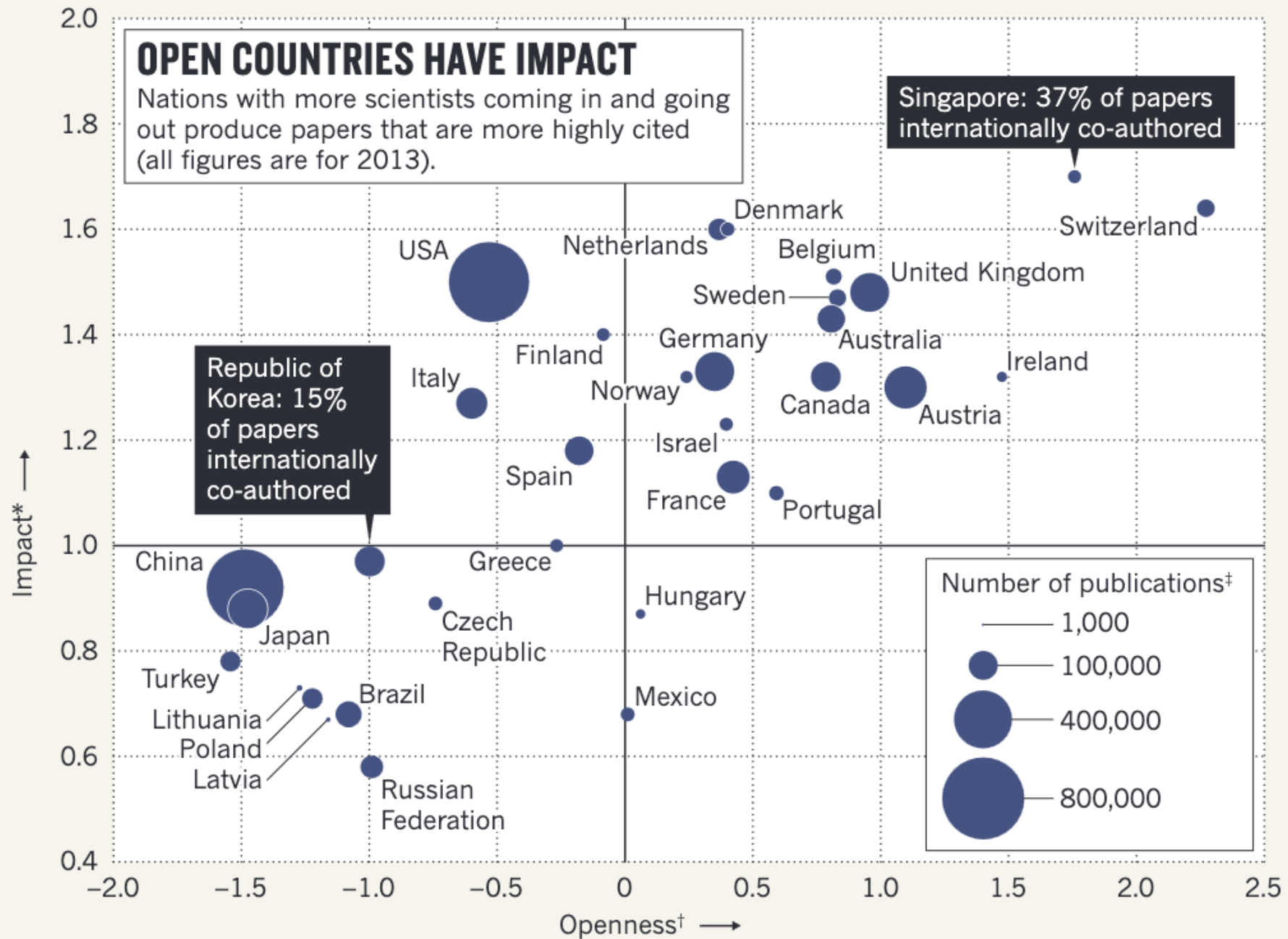Carolina Wagner and Koen Jonkers
Nature 550 (7674), 32-33, 2017

The more money spent, the more the articles produced.

More government funds spent does not necessarily result in more citations

OPEN COUNTRIES HAVE IMPACT
Nations with more scientists coming in and going out produce papers that are more highly cited (all figures are for 2013).

Singapore: 37% of papers internationally co-authored

Republic of Korea: 15% of papers internationally co-authored

Number of publications‡
— 1,000
— 100,000
— 400,000
— 800,000

Impact* →
Openness† →

Countries shown: Denmark, Switzerland, Netherlands, Belgium, USA, United Kingdom, Sweden, Germany, Australia, Ireland, Finland, Italy, Norway, Canada, Austria, Israel, Spain, France, Portugal, China, Greece, Hungary, Japan, Czech Republic, Turkey, Brazil, Mexico, Lithuania, Poland, Latvia, Russian Federation

*Based on field-weighted citations; †Determined by numbers of scientists emigrating from, immigrating to and returning to a country, plus international co-authorships; ‡Publications are assigned to a country according to the proportion of co-authors based there.

Why do they matter in Astronomy?

- **Stronger publications:** Broad perspectives lead to Better science

Freeman, R. B., & Huang, W. (2014). Collaborations: Strength in diversity. *Nature*, 513(7518), 305.
Page, S. E. (2007). *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools, and Societies*.

Why do they matter in Astronomy?

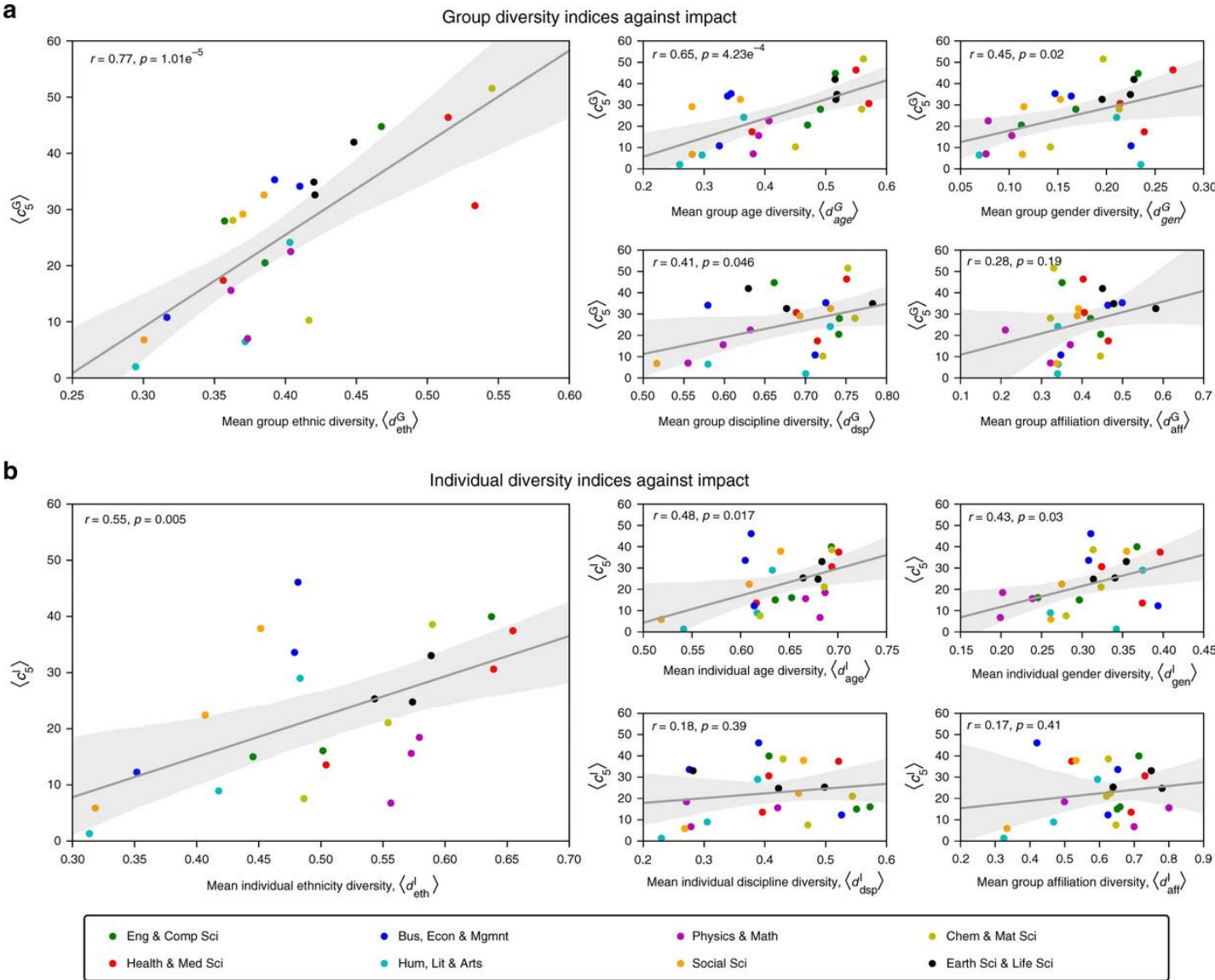**Enhance productivity:** Inclusive Environments boost participation

The preeminence of ethnic diversity in Scientific collaboration

- 9 millions of papers, 6 millions of scientist

$<C_5^G>$ mean 5-year citation count

diversity index $<d_x^G>$ where x E {ethnicity, academic age (experience), gender, discipline, affiliation}

Simple exercise: Say the color of the word **(Do not read the word)**

QWERTY UIOP ASDF JKL ZXCV

BNM< 1234 5678 2+2 ^&*(

1a) Say the color of the word
(Do not read the word)

Pink   Green   Cyan   Yellow   Purple

DarkGreen   Orange   Gray   Red   Lila

Pink   Cyan   Red   Green   Orange

1b) Say the color of the word
(Do not read the word)

Pumpkin Grass Sky Sunshine
Flamingo Paranal Night
Comet Pumpkin Grass Sunshine
Sky Paranal Flamingo Night Comet

1c) Say the color of the word
(Do not read the word)

Green Lila Purple Sunshine Flamingo Paranal Night Comet Pumpkin Grass Sunshine Sky Paranal Flamingo Night Comet

Calculate # of correct responses per slide

1) Which slide had the most correct responses? Which slide had the fewest?

2) For the slide with the most errors, why do you think you made these errors?
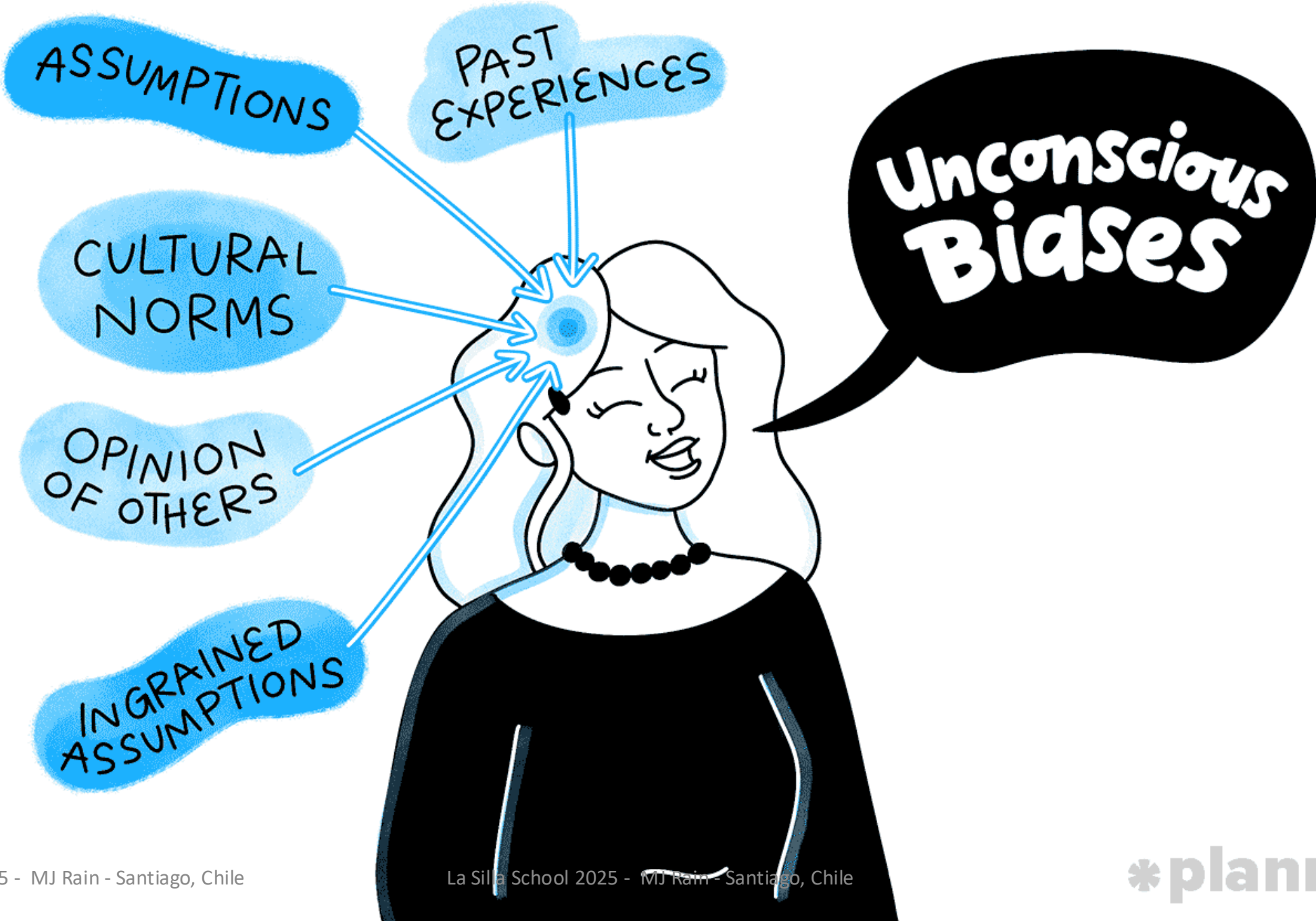
Unconscious BIAS

WHAT IS IT?

Instinctively
Categorizing
People and things
Without being aware of it

FLAW
In thinking guided by past experiences and mental preconditioning

There are more than 150 Types of bias

!

And they **IMPACT** us, our work and our relationships
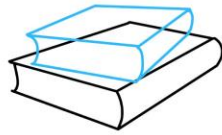
Stay on Top of Your Biases: Any patterns?

HOW TO OVERCOME your Unconscious Biases

*plani

1. KNOW THEM WELL

READ ABOUT THEM

RECOGNIZE THAT THEY EXIST
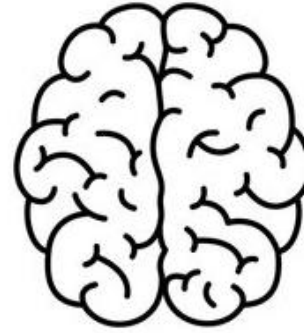
Be mindful

IN YOUR WORDS and ACTIONS

2. THINK CRITICALLY

Attend to data and evidence

LOOK AT PROBLEMS AS A DIAMOND

WITH MULTIPLE FACETS
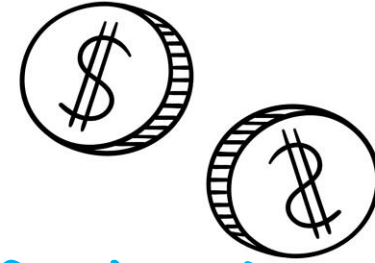
And not as a coin

WITH ONLY TWO SIDES

3. CHALLENGE ASSUMPTIONS AND TRADITIONS

TAKE A CONTRARY VIEW

Ask WHY And Why not?

often

Embrace diversity

PRACTICE EMPHATY

What can we do?

- Fair distribution of resources
  (https://journals.aas.org/psj-policies/)

PUBLISH

PUBLISH
or
PERISH

PUBLISH
IN HIGH IMPACT
JOURNALS
or
PERISH

PUBLISH
FREQUENTLY IN HIGH
IMPACT JOURNALS
And maybe you wont
PERISH
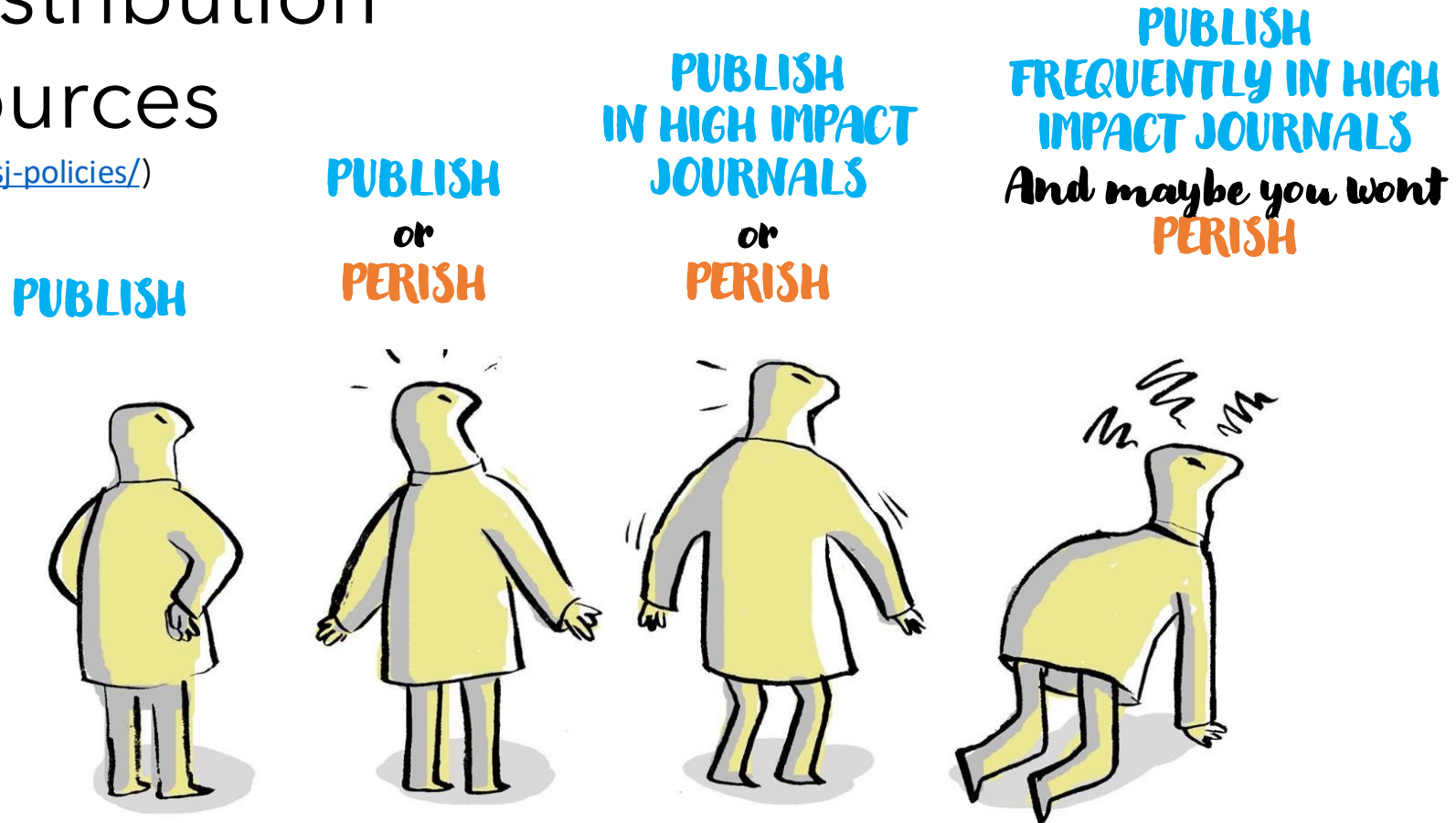
facebook.com/pedromics

# Peer review at @STScI and @ESO

HST cycles 11-21
(2001-2011)

ESO P82-96
(2008-2015)

Proposal success rates are calculated for HST Cycles 11 through 21 as a function of the gender of the Principal Investigator (PI). In each cycle, proposals with male PIs have a higher success rate, with the disparity greatest for Cycles 12 and 18. Similar results found in ALMA, NRAO

Patat et al. 2016

Reid et al. 2014
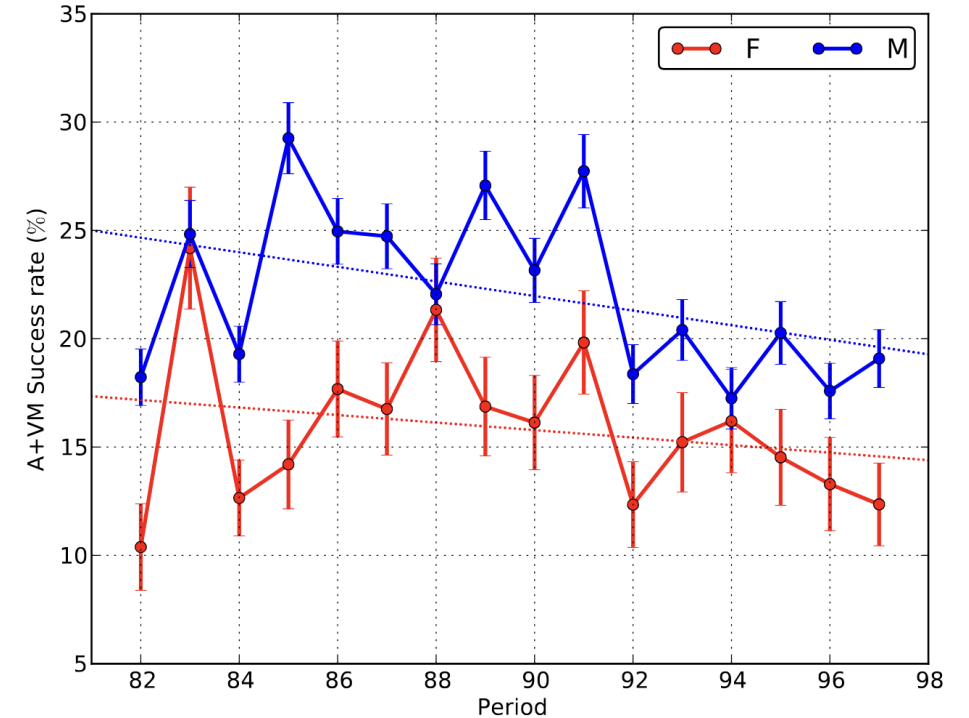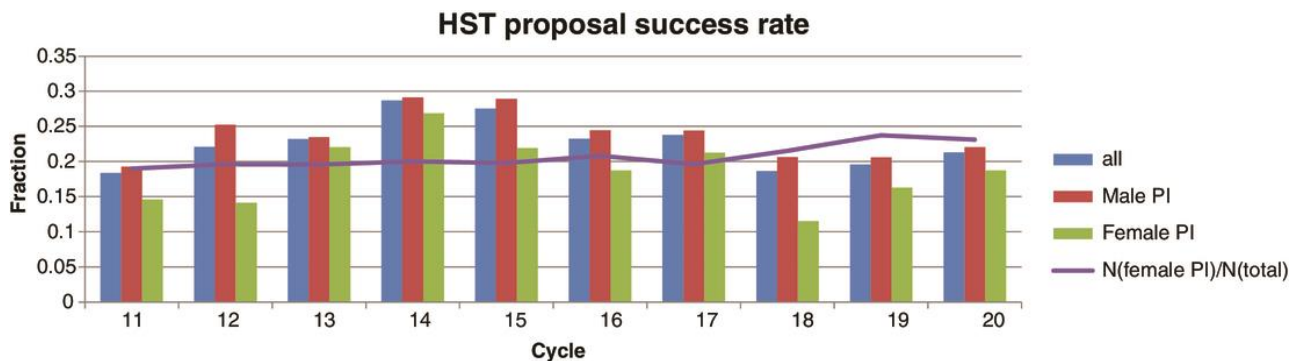
Why do they matter in Astronomy?
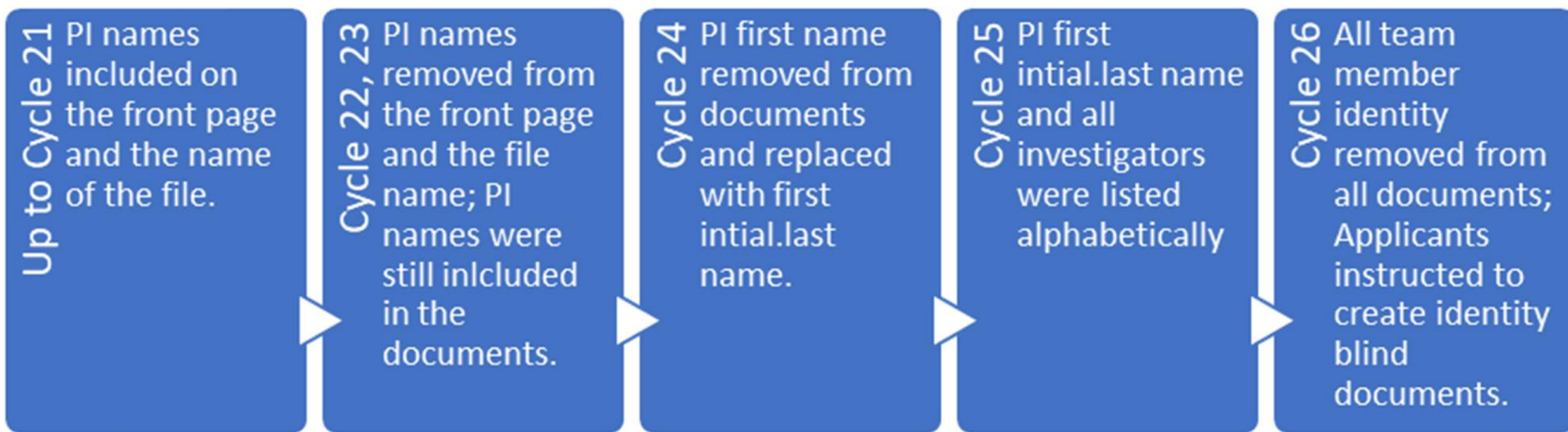
- **Double-blind selection processes**

    o Reduces Subjectivity and Bias
    o Promotes Objectivity and Fairness
    o Encourages Openness and Transparency
    o Improves efficiency

https://www.eso.org/sci/observing/phase1/dual-anonymous-guidelines.html

HST after cycle 21

Reid et al. 2020

Up to Cycle 21	Cycle 22, 23	Cycle 24	Cycle 25	Cycle 26
PI names included on the front page and the name of the file.	PI names removed from the front page and the file name; PI names were still inlcuded in the documents.	PI first name removed from documents and replaced with first intial.last name.	PI first intial.last name and all investigators were listed alphabetically	All team member identity removed from all documents; Applicants instructed to create identity blind documents.

HST after cycle 21

Reid et al. 2020

Why do they matter in Astronomy?

Selection processes:
Challenges vs CV screening

- 60% more minorities selected for interview

- 125% more women selected for interview

Why do they matter in Astronomy?

Open access to resources

nature > nature human behaviour > editorials > article

Editorial | Published: 19 December 2023

Post a preprint of your next research paper

Nature Human Behaviour **7**, 2039 (2023) | Cite this article

9074 Accesses | **19** Altmetric | Metrics

Fewer than one in ten research articles are posted as preprints. Yet sharing research on public repositories comes with many advantages and few caveats. At *Nature Human Behaviour*, we encourage researchers to embrace preprints to jumpstart the communication of research findings.

We − along with all other Nature Portfolio journals − encourage the posting of preprints for research articles, as we believe that they have a functional role in the science ecosystem and can benefit both researchers and the public. Yet, fewer than 10% of the research articles published in *Nature Human Behaviour* in 2022 had a preprint associated with them.

Individual best practices and how to be a good ally

What can we do?

1) Do not need to be an expert to deal with EDI in Astronomy

Quick Win
As an individual no one is perfect, and learning how to be an ally is a journey. A simple and easy way to make sure you're on the right track is to always listen, acknowledging your mistakes, apologize, and learn from them.
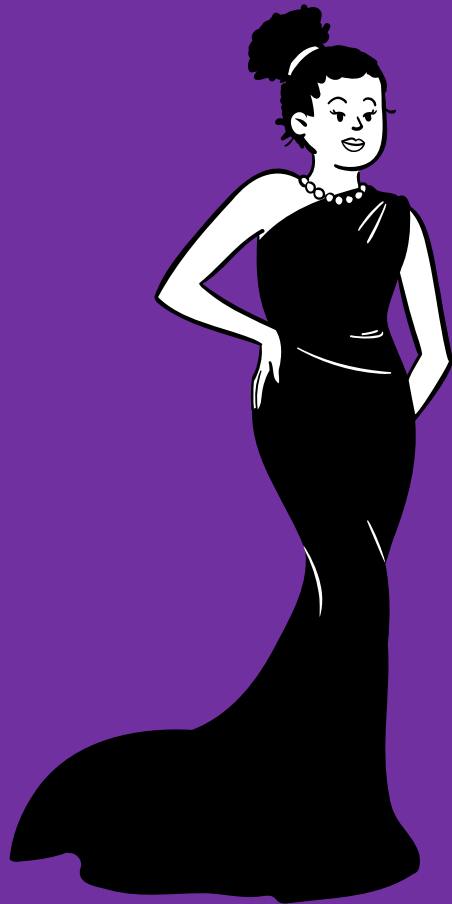
Individual best practices and how to be a good ally: What can we do?

2) Visible identities:
Pay attention to whom you work with. Who is missing from your collaborations? What can you do to fill those gaps and engage with different people?

Individual best practices and how to be a good ally: What can we do?

3) Encouraging success in others
Nominating individuals that you know deserve recognition is a great practice to make people feel like their work is making a difference and being acknowledged

Amplify voices of scientists who are least likely to be heard

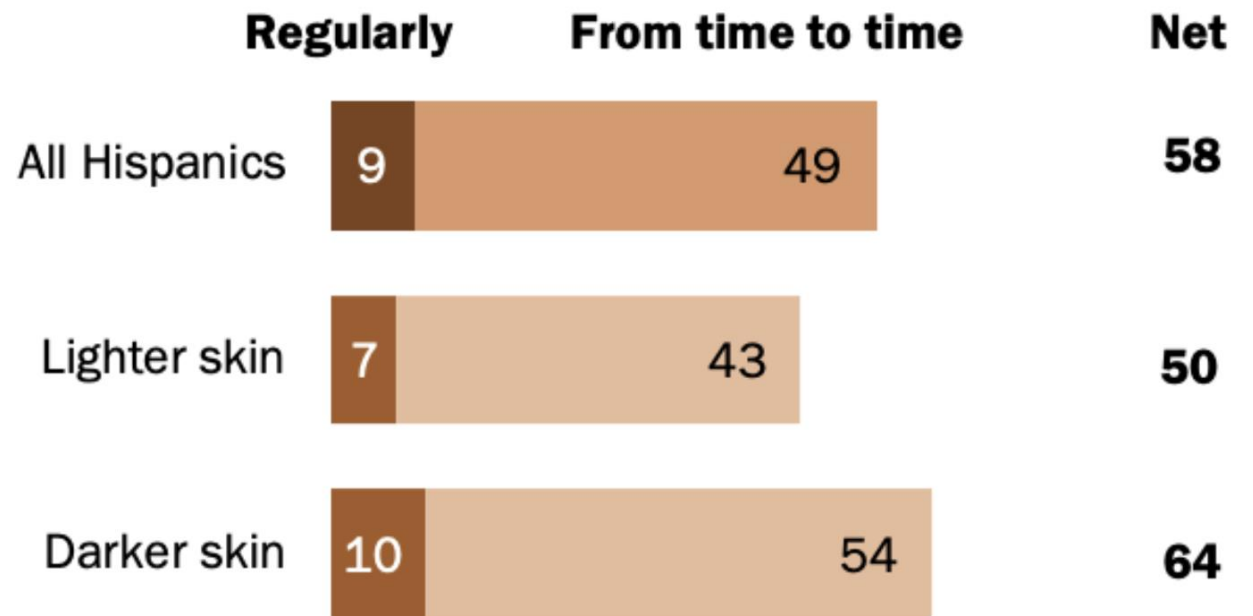# Individual best practices and how to be a good ally: What can we do?

4) Be careful with color

Ana Gonzalez-Barrera, 2019

About two-thirds of Hispanics with darker skin colors (64%) report they have experienced discrimination or been treated unfairly regularly or from time to time, compared with half of those with a lighter skin tone. These differences in experiences with discrimination hold even after controlling for characteristics such as gender, age, education and whether they were born in the U.S. or abroad.

Experiences with discrimination more common for Hispanics with darker skin

% of Hispanics who say they have personally experienced discrimination or been treated unfairly because of their race or ethnicity

	Regularly	From time to time	Net
All Hispanics	9	49	58
Lighter skin	7	43	50
Darker skin	10	54	64

Note: Hispanics are of any race. For more on methodology, see text box, "How we asked about skin color in the survey."
Source: Survey of U.S. adults conducted Jan. 22-Feb. 5, 2019.

PEW RESEARCH CENTER

Individual best practices and how to be a good ally: What can we do?

5) Pay attention to hierarchy Mentoring other who are earlier in their career, either formally or informally.

"Mentorship is not always an equitable mechanism for knowledge transfer and partnership due to mentors historically choosing people "like themselves" to mentor "
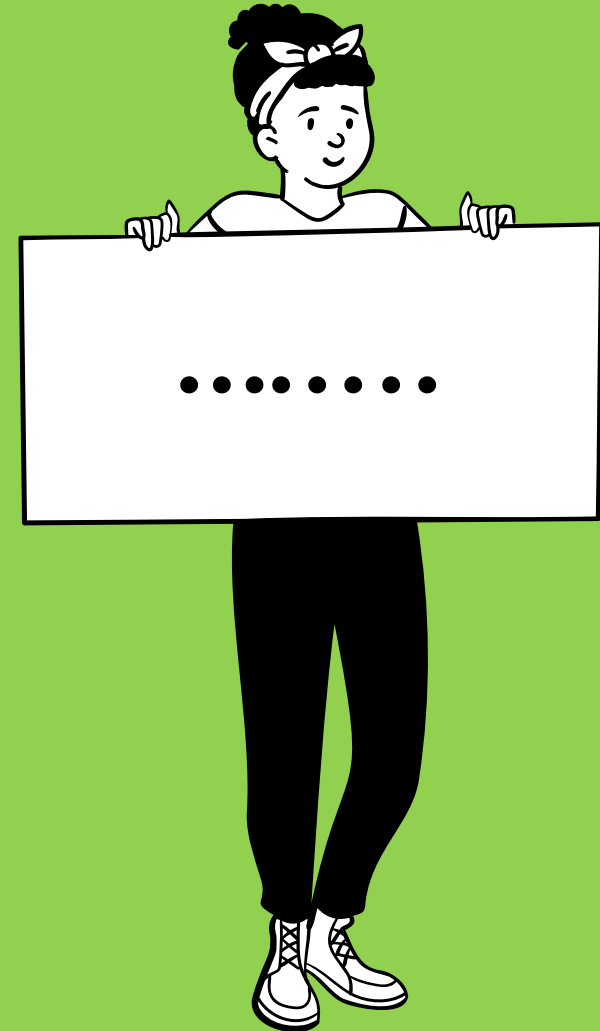
MENTORING

Individual best practices and how to be a good ally

6) Practice Self awareness consistently, Engagement with EDI initiatives
The "burden" of EDI often falls to those with a perceived greater interest, i.e. minority groups

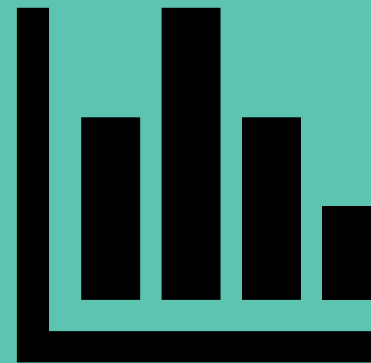# Individual best practices and how to be a good ally

6) Watch your language

नमस्ते

Hej!

こんにちは

Hallo

ciao

Bonjour

Ola!

Hola

Merhaba

你好

Individual best practices and how to be a good ally

7) Fill out demographic information, surveys, etc, when requested

Double check your data!

# Best practices in leadership, supervision and management

Supporting the individual
Supporting people means trusting people to do their job no matter their circumstances.

- Family-friendly and flexible work policies (e.g., parental leave, remote work options, child-care support)

Be an empathetic leader:
Organization leaders must feel emotionally and intellectually connected to the need and importance of belonging, it's almost impossible for real change to happen.
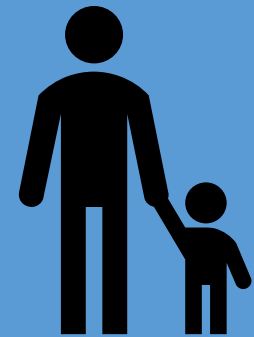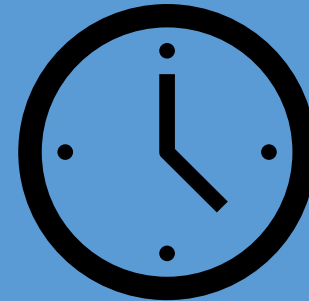
Guidance for organizations and academic departments

EDI awareness to get a foundation of knowledge.

Unconscious bias training to make us aware

Mental Health first aid training to be there for (you) others when needed

Training

EDI Sessions

Unconscious bias

Mental Health

Guidance for organizations and academic departments

2) Policy
Make sure your organization has robust and clearly worded policy around: Diversity, Bullying and Harassment, Parental leave, Flexible working, Mental Health and wellbeing, menopause (for example)

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3) Hiring, promotion and progression

Blind/anonymous applications where possible, and clearly defined criteria for both the applicant and the panel.

Can someone from the EDI committee sit on the panel? Are your panel a mix of different types of people who will bring differing outlooks and opinions?

In general any practice that reduces the overall stress during an interview situation is best practice for inclusion

Get everyone involve! Who should carry this responsibility?

- Reconsider candidates 'requirements'
- Identify who else could represent minority perspectives.
- Filling the positions through open calls.
- We should educate ourselves, be aware of our own biases, and include everyone in the process, training, and discussions.

GRACIAS