

DIVERSITY, EQUITY, AND INCLUSION AS FOUNDATIONS FOR SCIENTIFIC RIGOR



Scientific Rigor



aleitgravimeter, Zugspitze (Christian Voigt, GFZ)



Das Bild zeigt den Campus des South African Astronomical Observatory circa 350 km nordöstlich von Kapstadt, wo seit 1998 das Geodynamische Observatorium SAGOS betrieben wird. (CC-BY-SA, Stolarczuk, GFZ)



richter über Süddeutschland aufgrund erhöhter Sonnenaktivität. (CC BY: Dr. Monika Korte (Sektion 2.3), GFZ)



Wartung zweier Antennen der Satelliten-Empfangsstation in Ny-Ålesund (Spitzbergen, Norwegen). (CC-BY: Carsten Falck, Sektion 1.2, GFZ)



(Carsten Falck, GFZ)



Mikroatolle in Singapur (Meike Bagge, GFZ)

DEI in Science

Diversity: **who's in the work.**

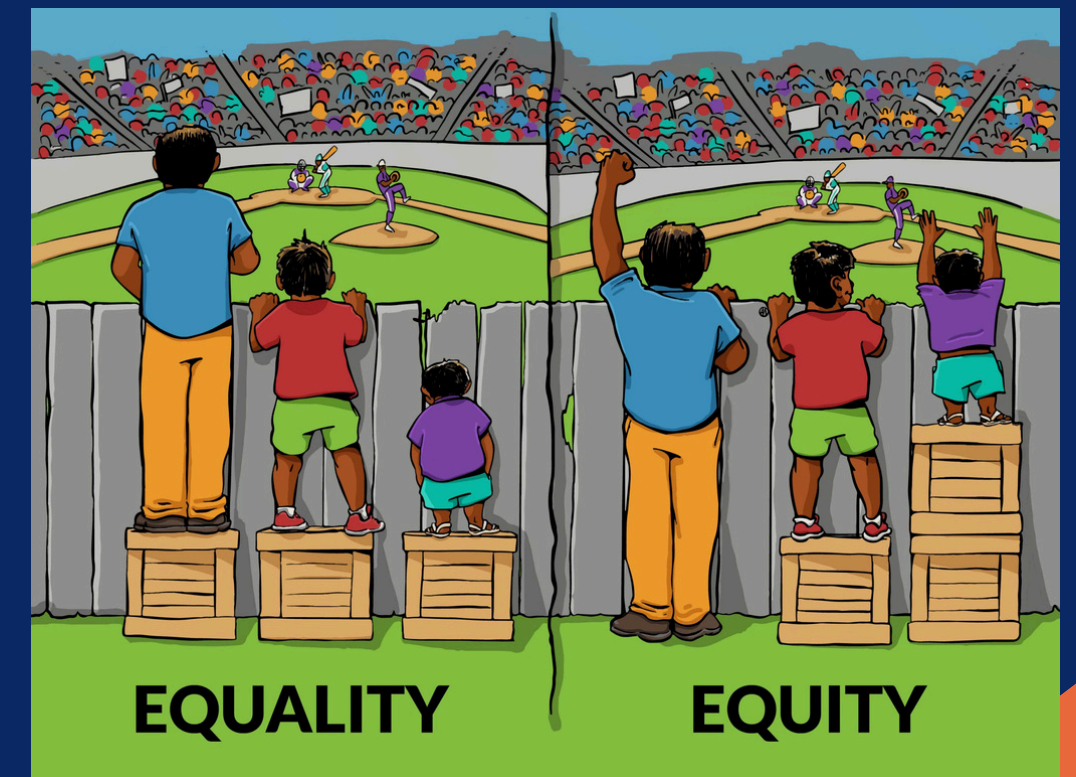
Range of disciplines, methods, languages, cultures, lived experience + data.

Equity: **How to access resources.**

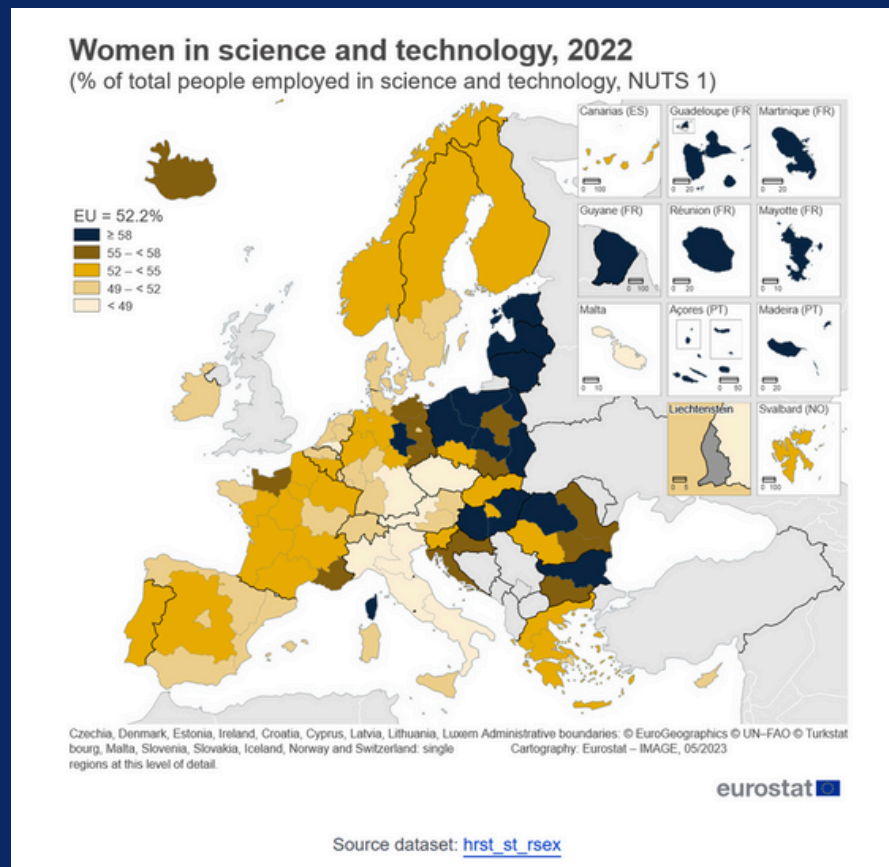
Fair routes to instruments, field slots, authorship, budgets + data.

Inclusion: **How decisions get made.**

genuine voice, dissent without penalty, transparent criteria + data.



Gender inequalities in Germany

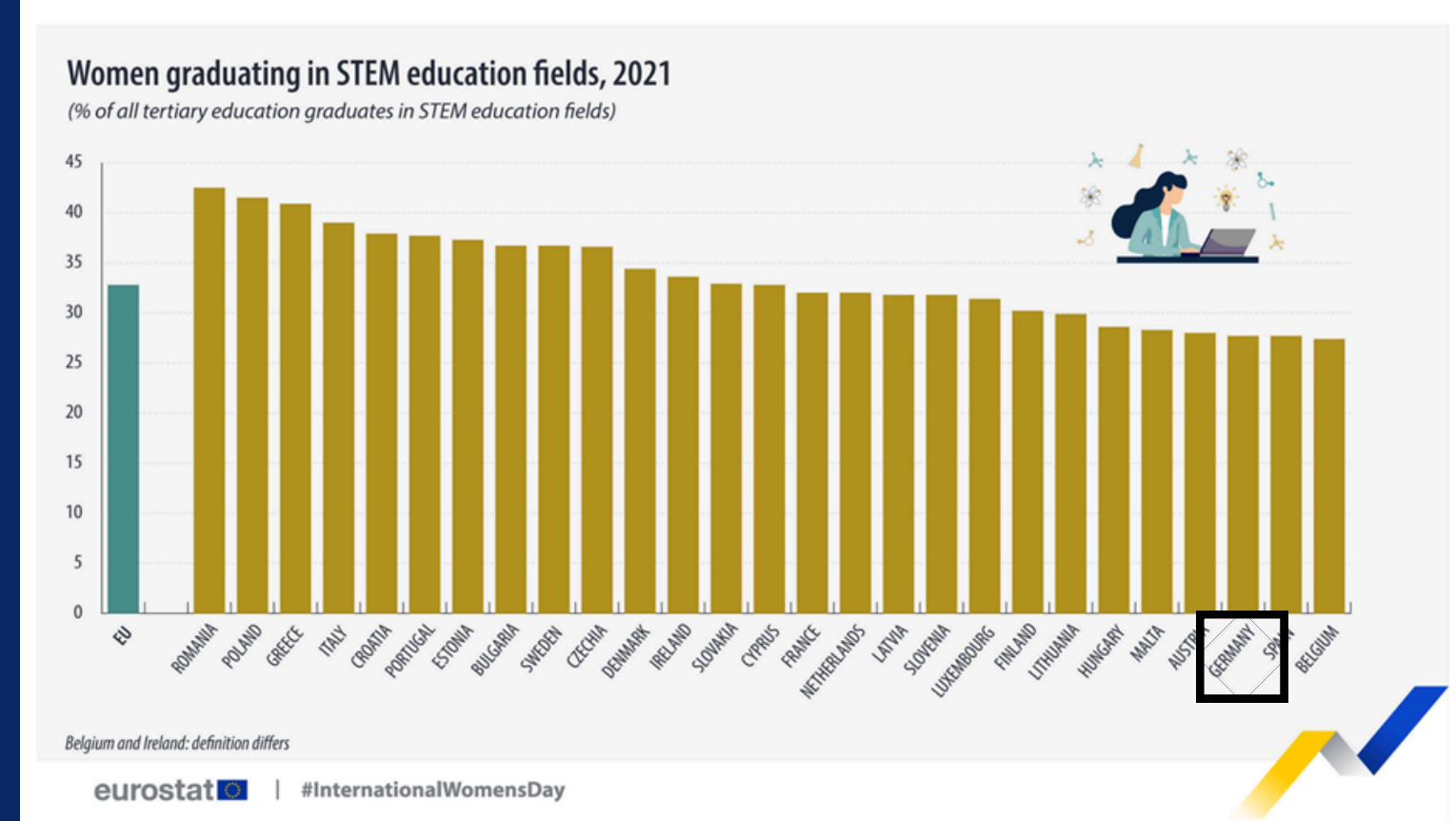


Women in Science & Technology Employment (2022)

- EU average: 52.2% women in science & tech roles (broadly defined).
- Many German regions fall below 49%, especially in southern and central regions.
- Stronger representation in Baltic states, parts of Scandinavia, and eastern EU.

Women Graduating in STEM (2021)

- The proportion of women graduating in STEM in Germany is significantly below EU average (~25%).
- Romania, Poland, and Greece show notably higher female STEM graduation rates.



What about the other dimensions of Diversity?

Such as race, ethnicity, gender, sexual orientation, socioeconomic status, etc

Why do we need a DEI approach in science?

Systemic Racism & Discrimination

- Lack of Representation in Leadership & Decision-Making

Unequal Access to Quality STEM Education

- Unequal Access to Quality STEM Education (Funding, teacher quality, and curriculum access create a pipeline problem).



Financial Barriers & Student Debts

- Financial Barriers & Student Debt

Lack of Inclusive Policies & Practices

- Hostile Work Environments & Microaggressions
- Lack of Inclusive Policies & Practices

Unconscious Bias

How?

Our brain makes quick judgments based on habit and experience without us even noticing.



This can lead to some people being overlooked or treated unfairly.



Why?

Because they are the way they are.



Affinity/Similarity Bias

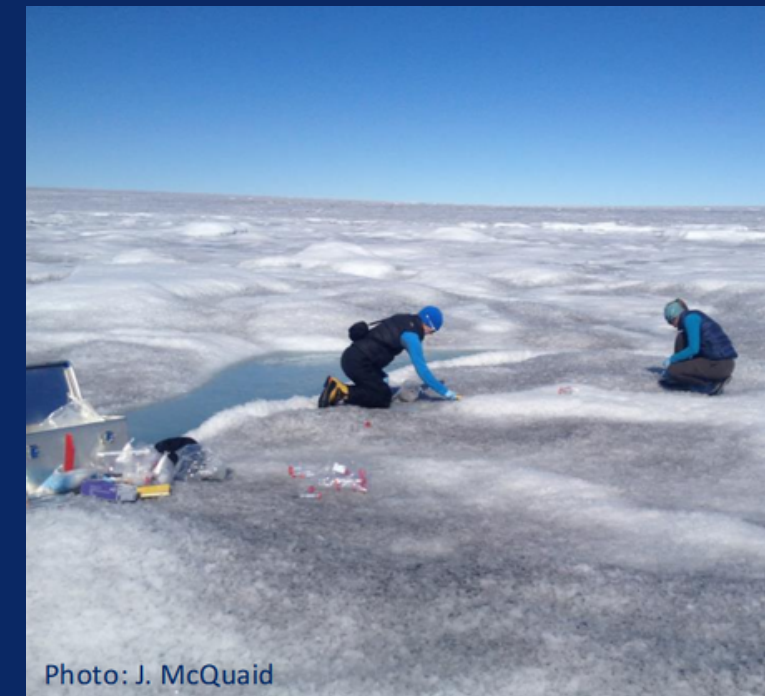
- Citing the same “in-group” authors
- Collaborating with colleagues from similar backgrounds
- Mentoring students who remind us of ourselves,
- Forming panels with people from the same networks



- NASA publicity
- Prestigious labs' findings are cited uncritically
- Early or charismatic results dominate the field
- Methodological myths become “truths”
- Networks reinforce each other's work

Convenience Bias

- “Typical” or easy-to-access field sites (Status Quo Bias)
- Data collected only in seasons with comfortable weather
- Avoidance of hard-to-reach communities or environments (Safety-Comfort Bias)
- Overgeneralizing from a narrow sample (Availability Bias)



Body-Norm Bias

Equipment and tools are designed around a single “default” body type (often average-sized, male, non-disabled).

Gatekeeping Bias (Information Access Bias)

- Often by a senior person
- A particular gender
- Someone from the dominant cultural/national group

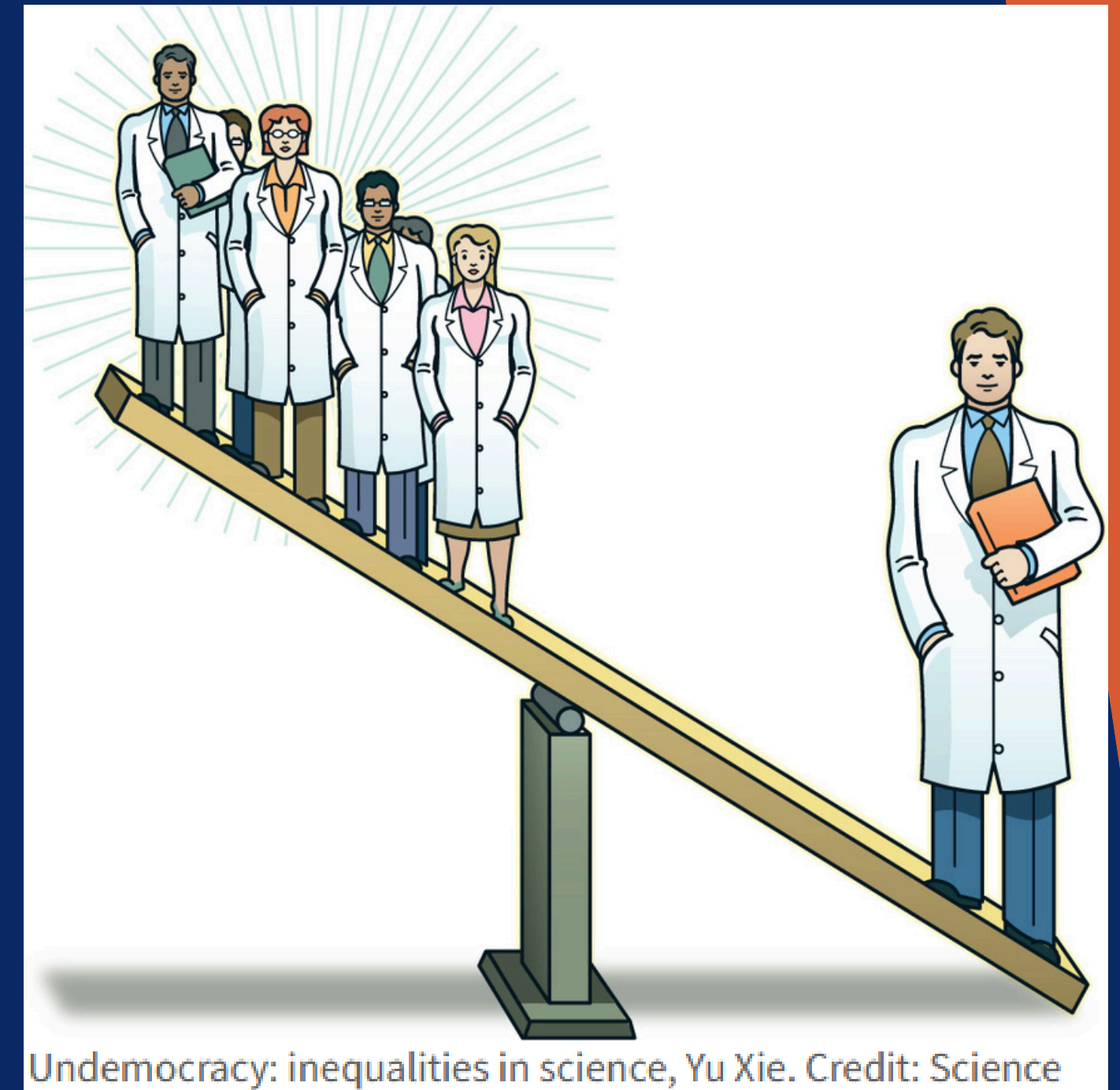


Recency Bias

High-status tasks (writing, theory, PI-level framing) can be more valued than so-called “low-status” tasks such as:

- logistics,
- community engagement,
- data cleaning,
- field coordination,
- code and pipeline building.

This systematically undervalues roles often performed by women, international scholars, technicians, and early-career or marginalized researchers.



Undemocracy: inequalities in science, Yu Xie. Credit: Science

Prestige Bias / Affiliation Bias

Judgement of manuscripts, proposals, or dataset more positively when it comes from a “prestigious” institution or well-known researcher.

Reviewers focus on the tone rather than the scientific content, especially when authors:

- write in non-native English,
- communicate more directly or indirectly than expected,
- use culturally different academic styles,
- express strong claims or activist scholarship.

Tone policing disproportionately affects women, international scholars, early-career researchers, and scholars from marginalized groups.

Prestige bias. As Merton observed, prestige-based bias calls attention to a “class structure” in science, where those rich in prestige disproportionately accumulate limited resources (e.g., grant monies, publication space, awards), which allows them to garner yet more prestige in a process of cumulative advantage (Merton, 1973, p. 443; Price, 1976). The preferential evaluation of contributions by the prestigious versus the nonprestigious has been dubbed “the Matthew effect” (Merton, 1968). Some researchers perceive that prestige-bias affects peer review: surveys report that applicants to the NSF and NIH are concerned about “old boy” networks (McCullough, 1989, p. 82; Gillespie et al., 1985, p. 49) and bias against researchers in nonmajor universities (Gillespie et al., 1985, p. 49).

JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE AND TECHNOLOGY—January 2013
DOI: 10.1002/asi

Visa Bias / Mobility Bias

Researchers from certain regions face stricter or slower visa processes, which leads teams, often unconsciously, to exclude them from fieldwork, conferences, or collaborations.

Assuming that collaborators with limited English proficiency cannot contribute fully

Country-Specific Approval Rates in 2025

Visa acceptance rates often depend on the country of origin.

For example:

- **High approval rates:** Japan, South Korea, Canada, USA, Australia (mostly for long-term visa applications)
- **Moderate:** India, Brazil, South Africa, Argentina, Vietnam
- **Lower:** Pakistan, Nigeria, Afghanistan, Iran



Removing barriers

**Budgeting for
accessibility and
international
participation**

**Questioning who
gets the position**

**Diversifying
citation and
collaboration
practices**

Call for Action

**Questioning our daily
decisions**

**Creating equitable
authorship models**

**Expanding
mentorship networks**

**Developing inclusive field
protocols**

Thank you very much

