Minorities in STEM: Barriers they face in academia & pathways to allyship

Izzy Jayasinghe (she/her)
UKRI Future Leader Fellow | Senior Lecturer
Dept. of Molecular Biology & Biotechnology | The University of Sheffield

appliedbiophotonics.org | i.jayasinghe@sheffield.ac.uk | @i_jayas
Applied Biophotonics Group

Cell signalling

Molecule counting algorithms

High-end optical microscopes

New molecular probes

Automated chemistry

Miniaturised microscopes
Super resolution microscopy

3 µm
Incremental improvement in resolution – e.g. Ryanodine Receptor

- Pre-2008: Confocal (resolution: 250 nm) - Jayasinghe et al. 2009, *Biophys J.*
- 2018: DNA-PAINT (10 nm) - Jayasinghe & Clowsley 2018, *Cell Reports*
- 2019: ‘EExM’ (15 nm + 3D + phos) - Sheard et al. 2019, *ACS Nano*
Personal journey
Born +
Early education
High school
BSc
PhD
Postdoc - PI
Postdoc
Postdoc
PI
BSc Biomedical Science (1st class honours) 2003-2006

PhD (Physiology & Biophysics) 2007-2011

Asst. Research Fellow 2010-2011

Postdoctoral Research Fellow 2011-2013

Dept of Physiology, School of Biomedical Sciences 2013-2015

Associate Research Fellow 2013-2015

Biomedical Physics 2003-2006

Lecturer 2015-2020

School of Biomedical Sciences

UKRI Future Leader Fellow / Senior Lecturer 2020-*

Dept of Molecular Biology & Biotechnology

The University of Sheffield.

The University of Leeds

University of Exeter

The University of Auckland

The University of Auckland

The University of Auckland
Equality, Equity, Diversity, Inclusion & Accessibility in STEMM

TIGER in STEMM

@tigerinstemm

@LGBTSTEM

Athena SWAN

AdvanceHE

IOP
Axes of marginalisation

Photo credit: Dr Caroline Muellenbroich
Marginalisation
Barriers which stifle marginalised groups

www.tigerinstemm.org/resources/barriers-to-funding
Barriers faced in accessing funding

Women
Racial minorities
LGBTQIA+
Disabled

Mechanism of marginalisation: defining success or excellence too narrowly
"Matthew effect"

Correlation of reading age and development

Credit: Carlos Tovar Samanez
“Matthew effect”: marginalisation of female academics during pandemic
Data
“Matthew effect”: marginalisation of female academics during pandemic

- Marginalised from tenure, promotions or hiring

- Effect on manuscript submission so much worse for Black women than White women (DOI: 10.3389/fpsyg.2021.663252)

- Universities choosing to discontinue staff on fixed-term contracts or depts that are deemed “unviable”

Source: UKRI
Racism is the most pronounced axis of marginalisation in the UK.

Figure 3: Differences in median and mean award values

Average amount awarded by ethnicity and gender for research grants in UKRI (2018–19).

Data: “Diversity results for UKRI funding data” released 24/06/2020
Racism is the most pronounced axis of marginalisation in the UK

Data: “Diversity results for UKRI funding data” released 30/10/2019
“Science is and always has been a meritocracy”

UK science medals and prizes

- White winners: 1%
- Non-Black POC winners: 3%
- Black winners: 99%

Royal Society (major medals and prizes, excl. Rosalind Franklin + Africa prizes)
royalsociety.org/grants-schemes-awards/awards/

Infographic via Dr Jess Wade
Barriers faced by minorities in STEM
Barriers faced by women in accessing funding

- Exclusive criteria of excellence (e.g. years since PhD completion)
- Timing and rigidity of funding deadlines
- Expectations on travelling
- Bullying, exclusion, harassment and stigmatization
- Exclusion of women from invited talks, awards, promotion opportunities (e.g. “you are not ready” or “not noteworthy”
Barriers faced by LGBTQIA+ people in accessing funding

- Social exclusion
- Professional devaluation
- Bullying, harassment & hate speech in work place
- Discouraging from being out
Barriers faced by minoritized races in accessing funding

- Implicit & explicit bias → i.e. racism, including anti-Black sentiments
- Stereotyping and geographical devaluation
- Opaqueness of assessment criteria
- Social exclusion
Solution: J-E-D-I
Justice
Fixing the system to offer equal access to both tools and opportunities

Image credit: Tony Ruth
JEDI(A) the 2020 vision

Positive action

Anti-hate speech measures

Preventing bullying, harassment, intimidation in workplaces

Safety from/during travel

Pay gap + barriers to employment/promotions

Intersectionality

Evidence (data) of fairness in funding
Bolder & effective vision for levelling up

- Equity target in hiring, promotions and leadership (similar to Net-Zero)
- Universal basic research grant
- Revamp of assessment of researcher track record
- Independent monitoring and penalty structure for funders & research institutes that do not practice JEDI(A)
- Enforce public accountability of handling and awarding of publicly-funded research.
How do we get to J-E-D-I-(A)?

- Recognize the urgency
- Discard limiting beliefs
- Confront the myth of meritocracy
- Educate others
- Diversify leadership
- Promote and lift the voices of marginalized colleagues
- Allyship