

How Can We Diversify our Physics Intake?

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How Can We Diversify our Physics Intake?

- Tackling the gender and attainment gap.
- Can data become a barrier to progress?

Tackling the Attainment Gap

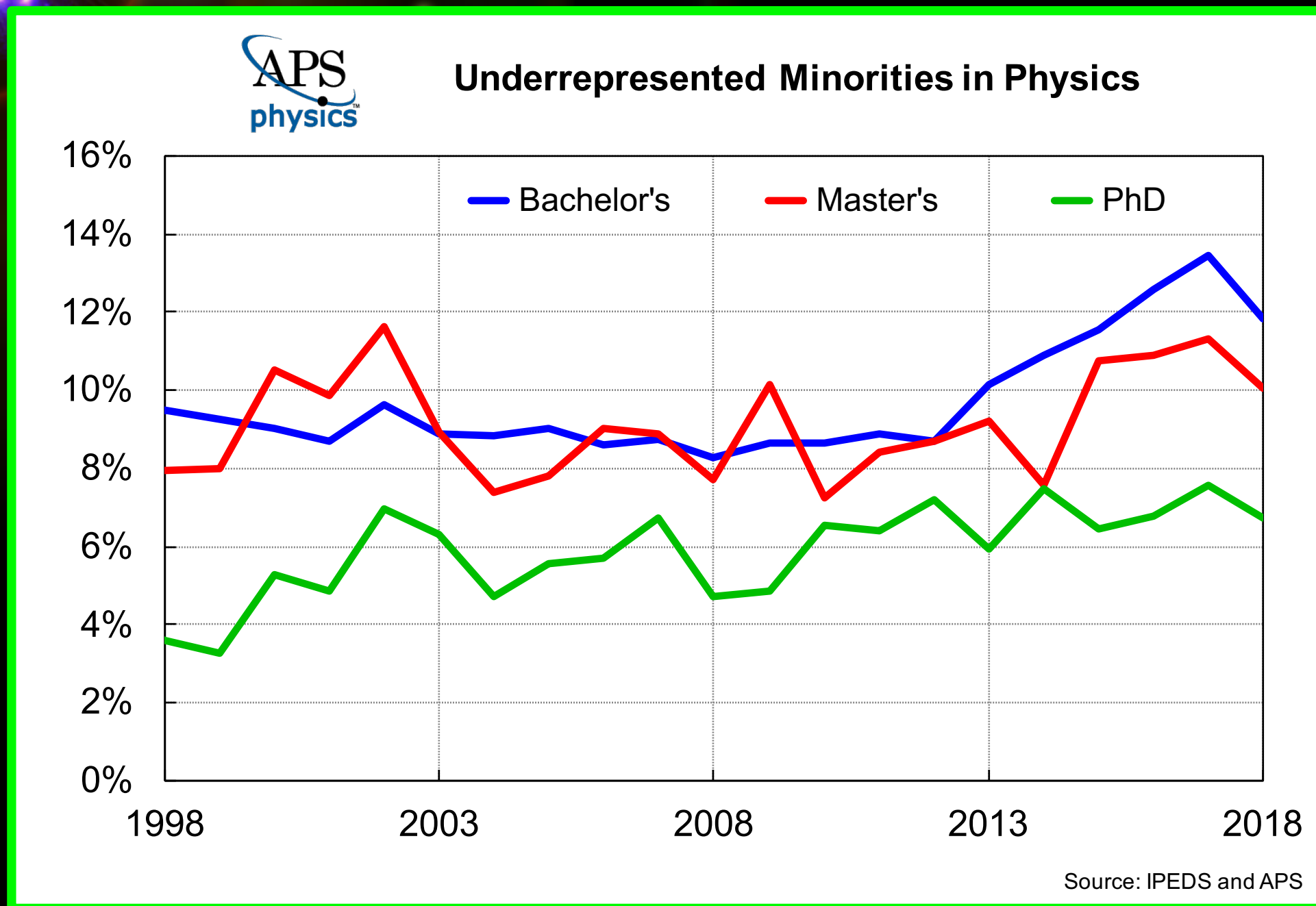
- disadvantaged pupils are 18 months behind their peers post-GCSE
- no change in 5+ yrs (i.e., attainment gap has stopped closing)
- gap at Primary is growing ... implications for future problems
- gap between Black Caribbean and White British students at GCSE level has doubled to 12 months in the past decade
- Chinese pupils are 24 months ahead of White British pupils at GCSE
- increasing proportion of disadvantaged children in high-persistence of poverty (37%) is the primary cause of stalled/growing gap

Gap in months relative to non-disadvantaged pupils nationally

	Early years	Primary school	Secondary school
Kensington and Chelsea	3.5	0.8	7.5
Kent	4.5	9.8	22.4
Kingston upon Hull City of	4.8	6.0	19.5
Kingston upon Thames	2.9	9.0	12.6
Kirklees	4.9	11.7	20.1
Knowsley	4.4	8.4	24.7
Lambeth	3.9	5.5	13.8

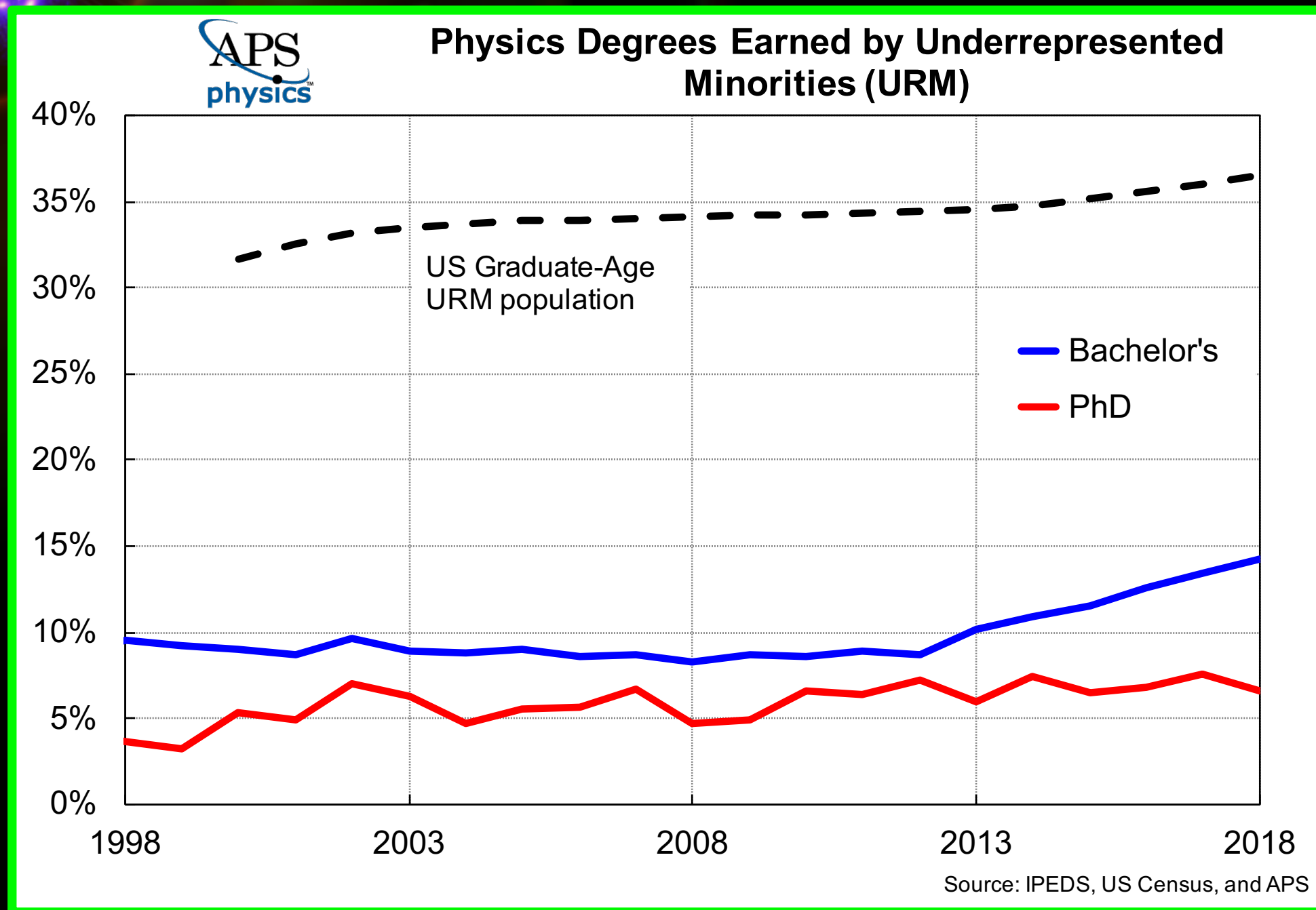
Underrepresented Minorities in Physics

- state of play in the US... more or less reflects the UK



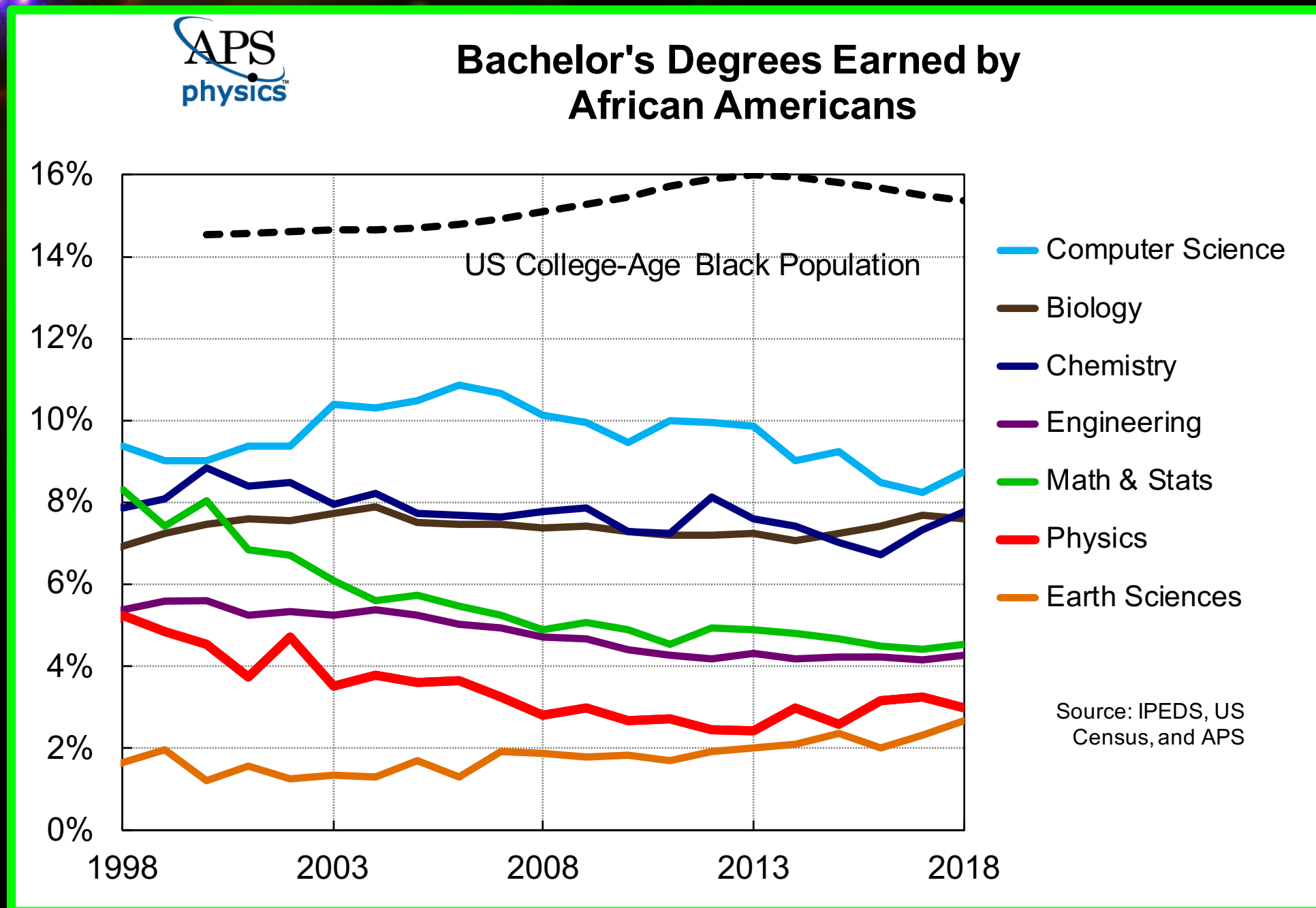
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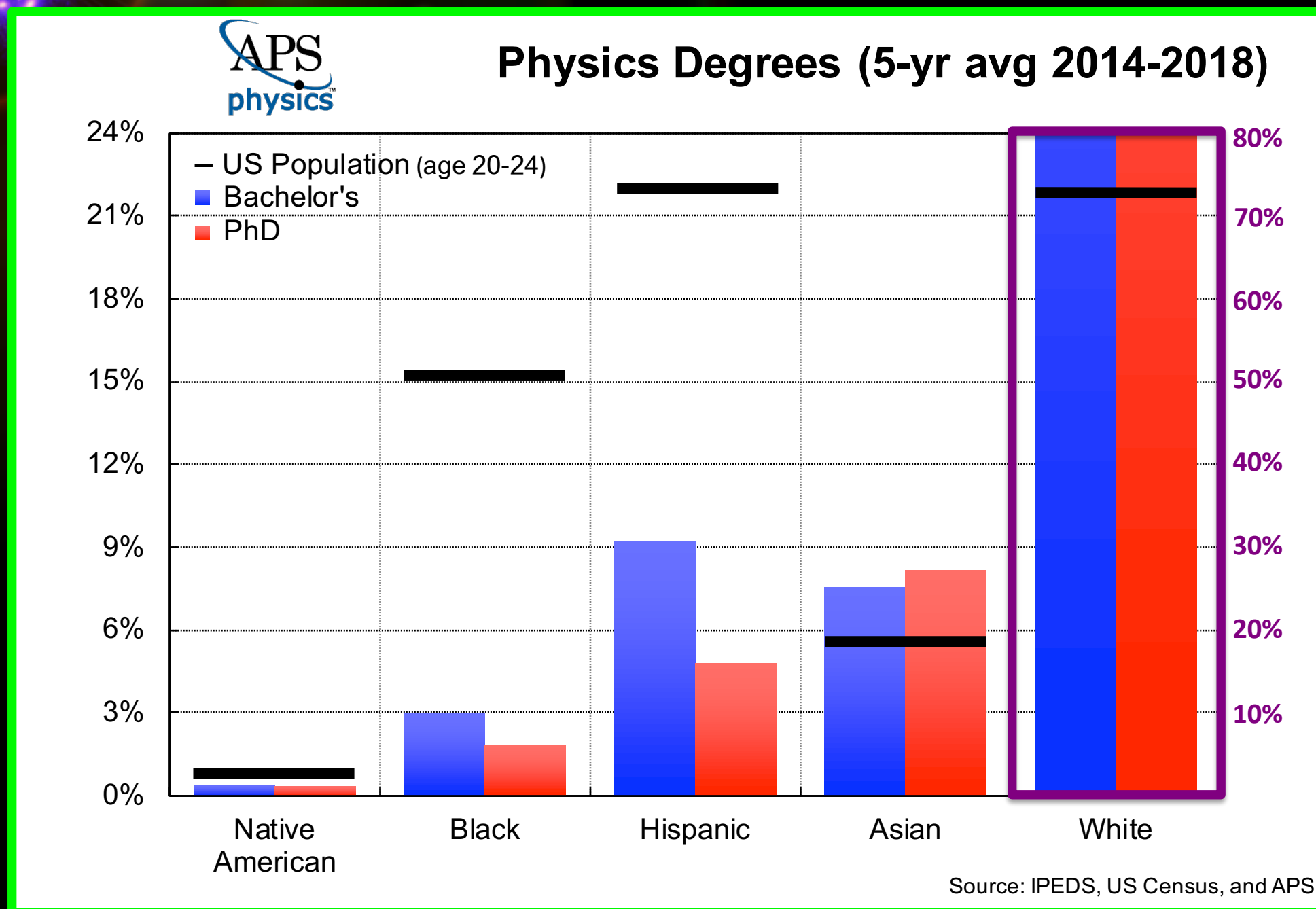
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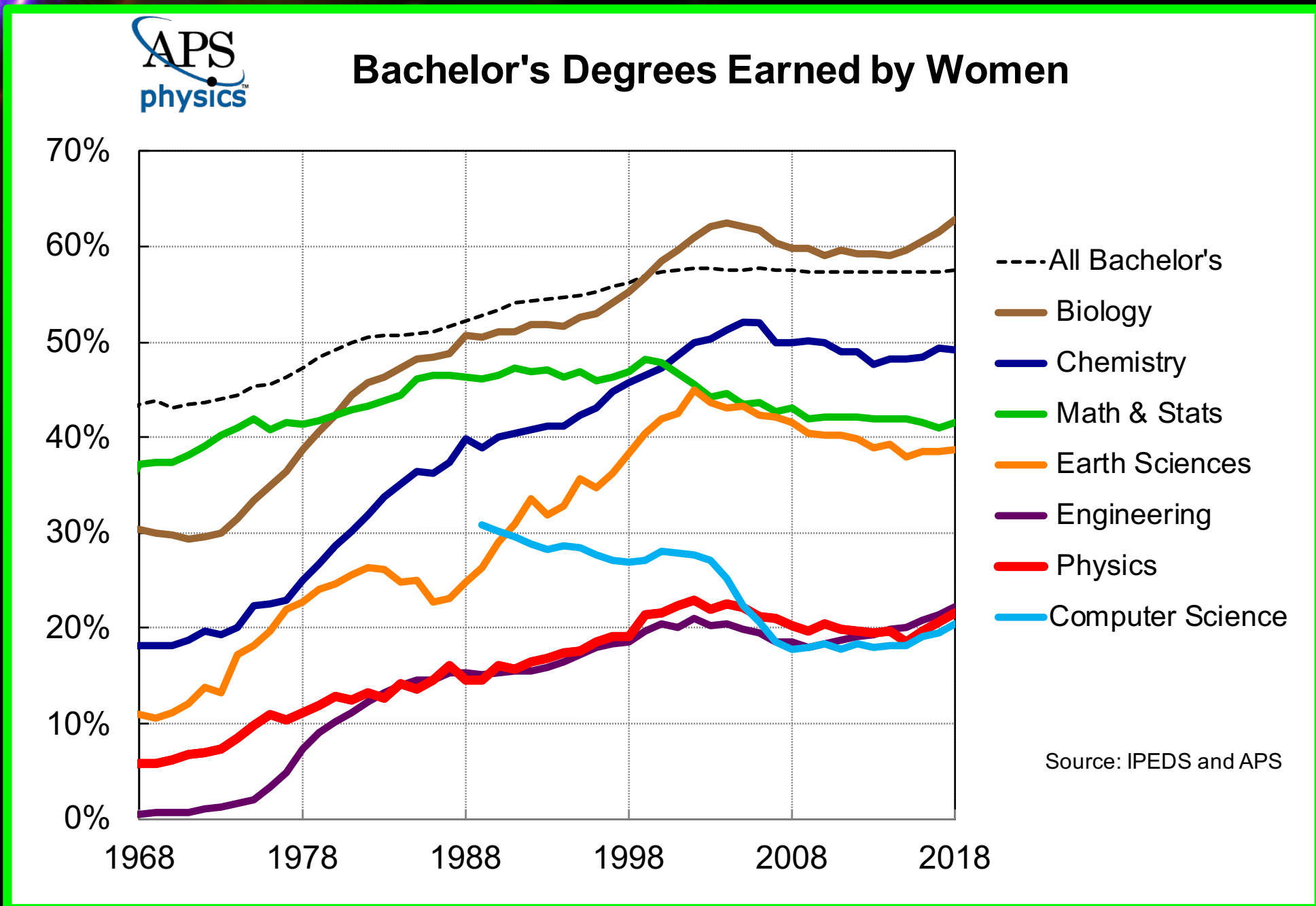
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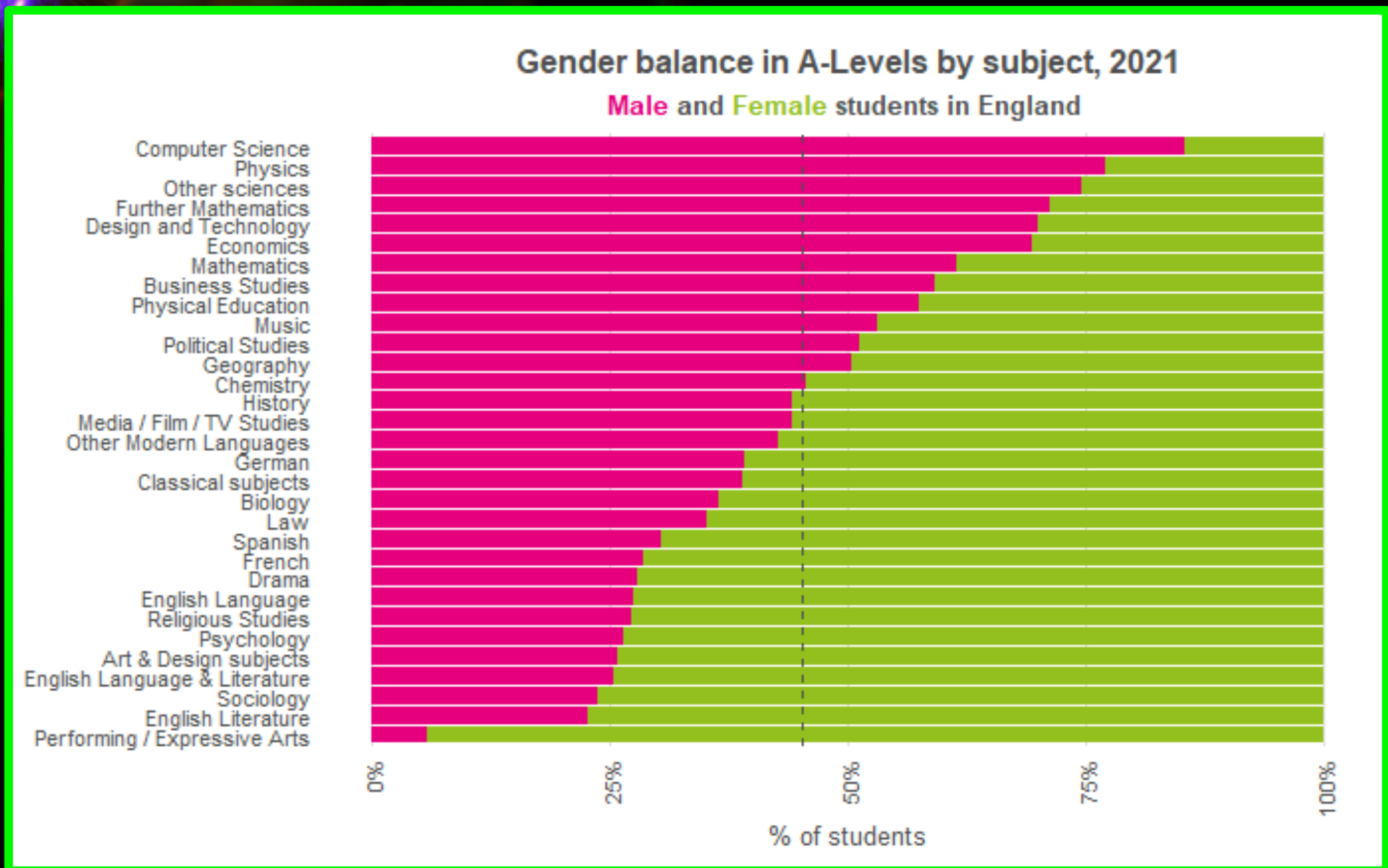
Tackling the Gender Gap

- state of play in the US... more or less reflects the UK



Tackling the Gender Gap

- state of play in the UK...





How Can We Diversify our Physics Intake?

- **What doesn't work?**
 - **More or less everything done over the past 20 years (APS Bridge Programmes, Mentoring Community, Site Visits, Scholarships & Awards, URM Profiles, Brochures, Web Pages, YouTube Channels, etc.)**
 - **One-off visits**
 - **Celebrities**
 - **Outreach which targets science-literate communities (Science Festivals, Museum partnerships, Rigb, TED, etc)**
- **Establishing a genuine community takes a long time & a significant commitment of resources... buy-in from HEI academics is rare to non-existent**



How Can We Diversify our Physics Intake?

- **What might work?**
 - **Sustained year-in/year-out partnerships with bottom quintile POLAR4 primaries and secondaries**

What Works?... Sustained and substantive commitment to bottom quintile POLAR4 pupils

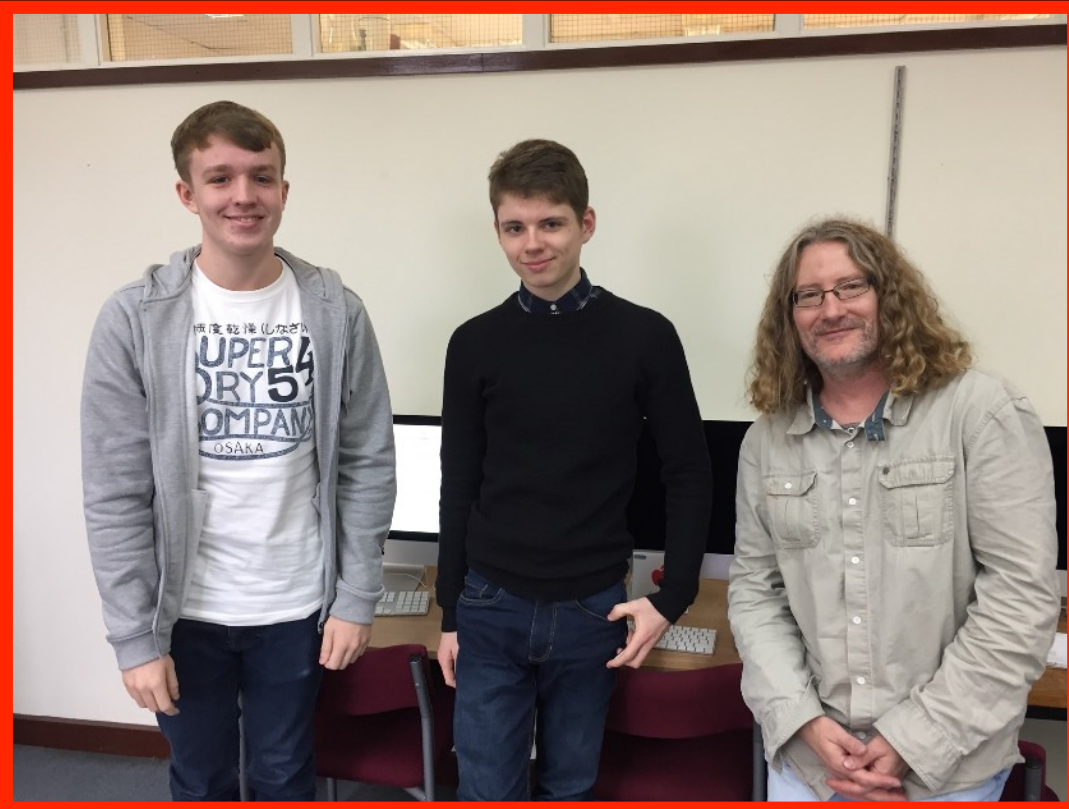




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What Works?... Research Internships for B,C,D,E Pupils from Bottom POLAR4 Quintiles





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 - **Careers Education (Teachers, but especially, Parents!)**

What Might Work?...

Education (Teachers, but especially, Parents)

Wakeham Review of STEM Degree Provision and Graduate Employability



- Up to the minute employment statistics (2022 Guardian Tables):
 1. Physics (90%)
 2. Chemistry (82%)
 3. Maths (81%)
 4. Engineering (80%)
 5. Biosciences (79%)
 6. Environ/Marine (70%)
 7. Computer Science (65%)

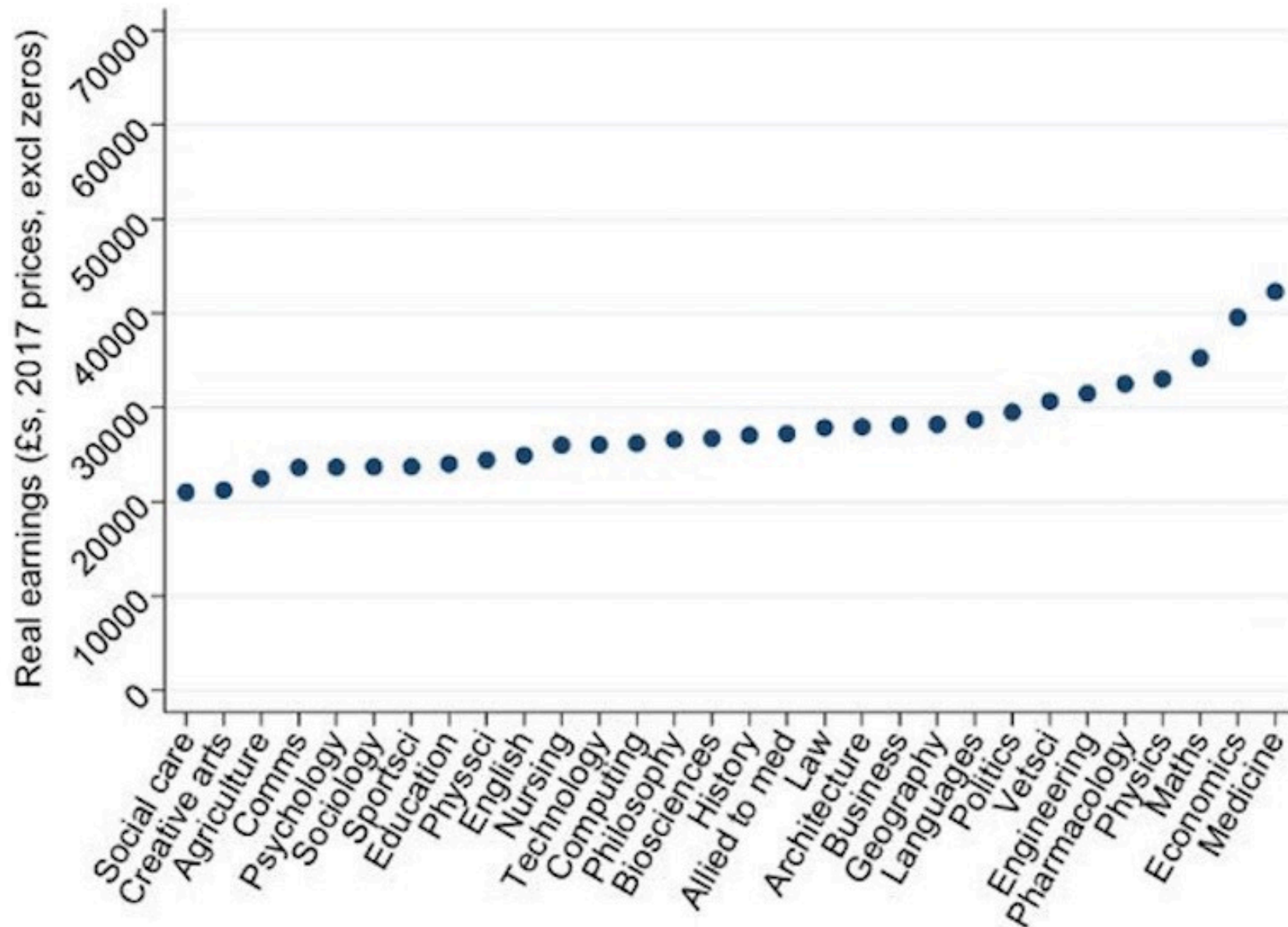


**Building our
Industrial Strategy**

What Might Work?...

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 - **Careers Education (Teachers, but especially, Parents!)**
 - **Peer role models**

What Works?...

Inspirational Peer Role Models



UNIVERSITY
OF HULL



THE CHANGING

FACE OF PHYSICS

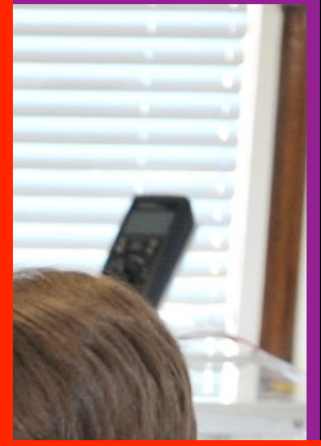
Think it's a man's world? Think again
#WomenInScience



**Athena
SWAN**
Bronze Award

What Works?...

Inspirational Peer Role Models



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What Works?...

Inspirational Peer Role Models

- advanced radiography and machine learning

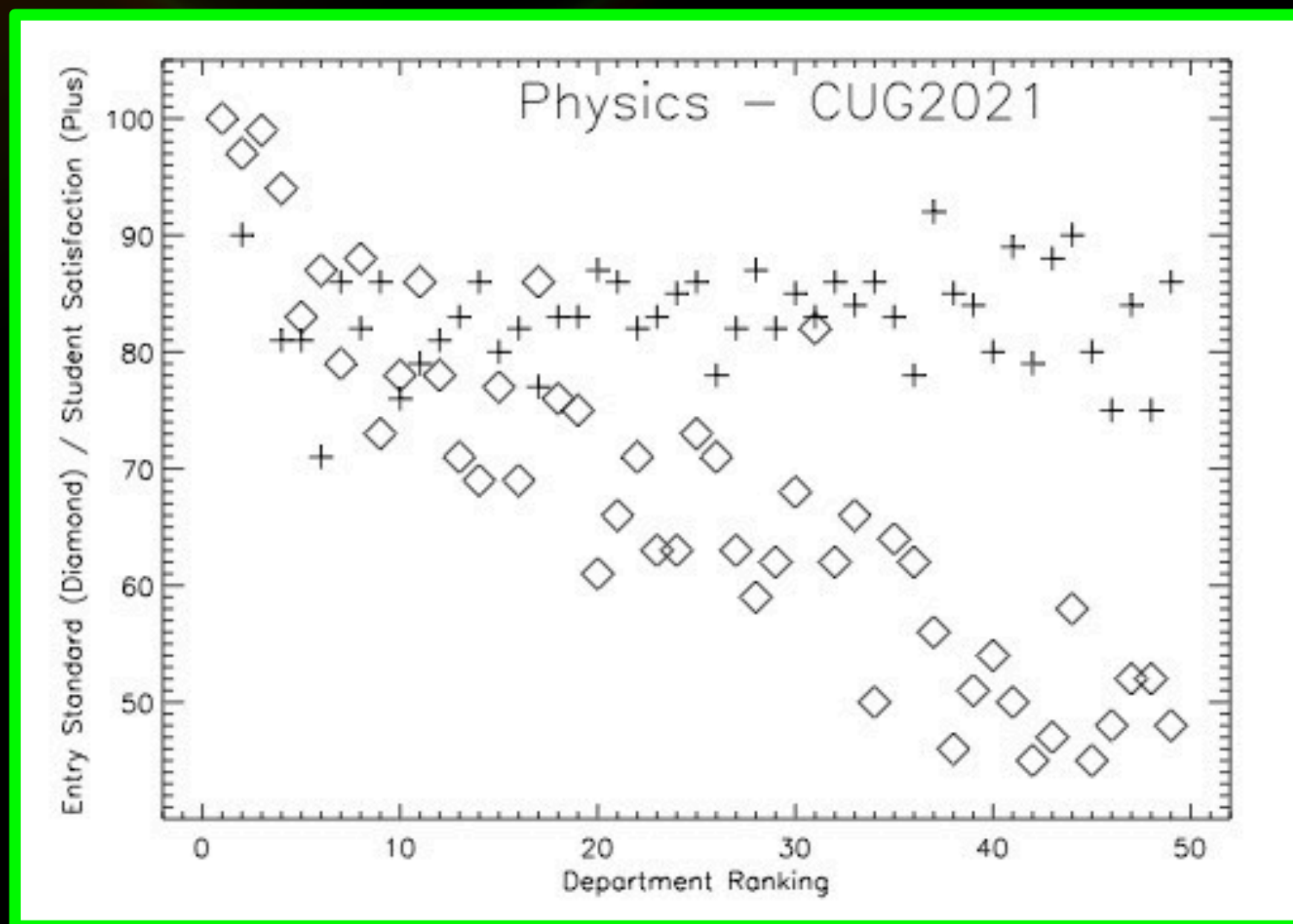


**Kiri Newson: Bell
Burnell Graduate
Scholarship Fund
awardee 2020**

Working with her Medical Physics colleagues at the University of Hull and the NHS Trust, Kiri will be using artificial intelligence and machine learning algorithms to develop safe and efficient radiographic analyses tools to help in the fight against cancer. She explains how despite struggling at school, feeling written off by her teachers and having a learning difficulty go undiagnosed for many years, she always knew physics was the path for her.

Two More Things We Could Do...

- minimise the role of A-level results in recruitment, which, like SATs and GREs in the US are both culturally and socio-economically biased
- as a community, make strong and openly supportive statements for League Tables which celebrate & codify 'Value Added' (and equally, condemn those which employ Entry Tariff as a key metric)

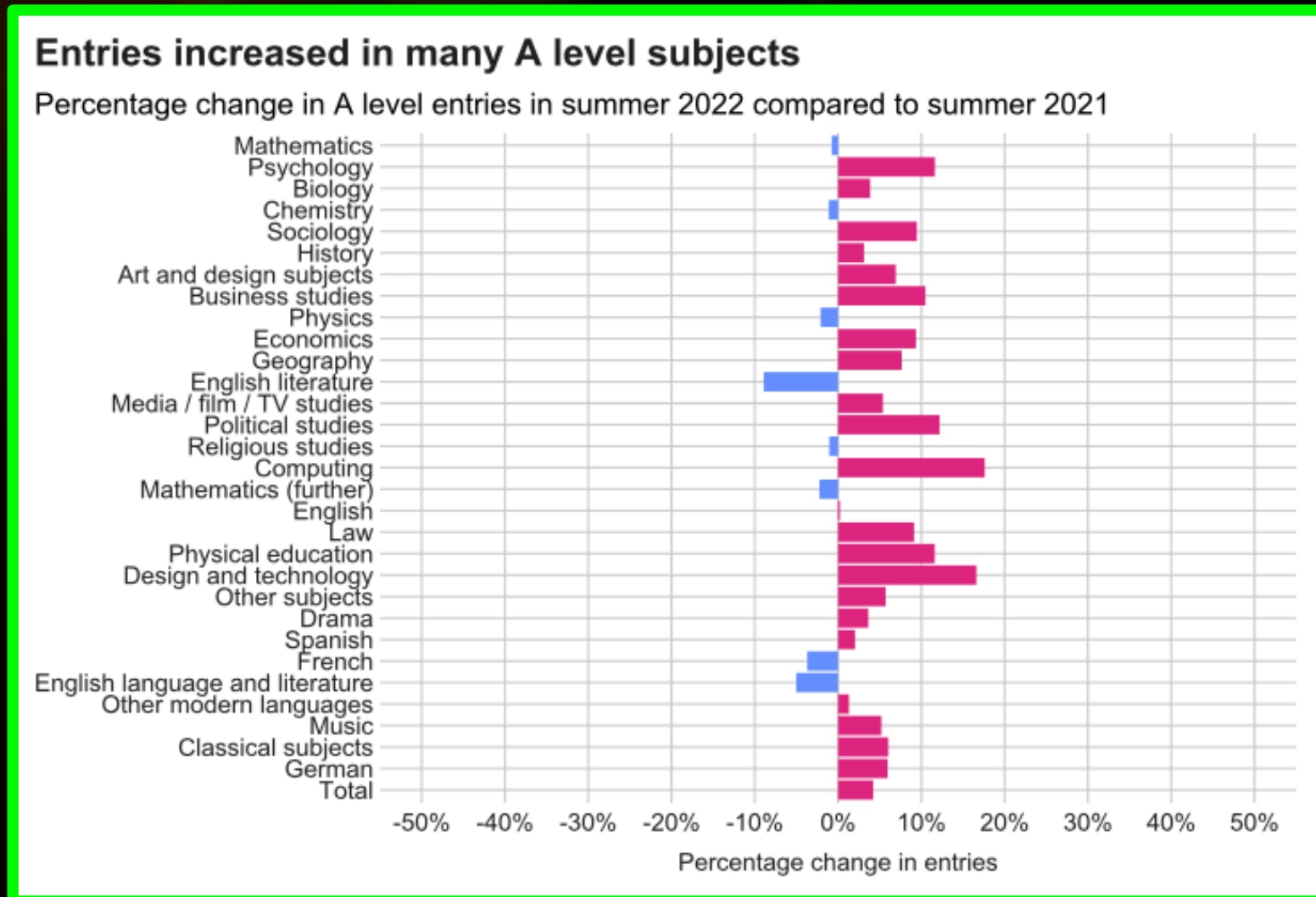


One Small Plea to Facilitate Data Access

- **implement an easy-to-use front-end to the 2011 Census Data**
 - **20,000 line .csv file which includes detailed ethnicity breakdown by Local Authority**
- **generate post codes for the complete list of Nurseries, Primaries, Secondaries, and Colleges within any given Local Authority**
- **extract POLAR4 quintile data for each post code from OfS**

Keeping an Eye on the Future

- amongst STEM, Physics had the largest decrease in A-level entries this year (down 2.1%)
- AS-level is up 14.5% on 2021, but that is half the growth seen by Maths, Chemistry, and Biology



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- AS-level is up 14.5% on 2021, but that is half the growth seen by Maths, Chemistry, and Biology
- and, finally, no sign of any recent impact on gender at A-level

Ten most popular A-Level subjects in 2021, by gender
(Change from 2017 shown in brackets)

Female students		Male students	
Subject	Rank	Subject	Rank
Psychology	1 (=)	Mathematics	1 (=)
Biology	2 (=)	Physics	2 (=)
Mathematics	3 (=)	Chemistry	3 (=)
Sociology	4 (+2)	Biology	4 (=)
Chemistry	5 (+3)	Economics	5 (+1)
Art & Design subjects	6 (-1)	Business Studies	6 (+2)
English Literature	7 (-3)	History	7 (-2)
History	8 (-1)	Psychology	8 (+1)
Geography	9 (=)	Geography	9 (-2)
Business Studies	10 (+3)	Computer Science	10 (+6)

Thank You

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