Lecture 5 Notes

Jess Wade – Women in Science

Background in physics, but also chemistry and materials where she is now a lecturer. Her research focus is on chiral molecules.

From her time in physics she became interested in equality and representation. Physics is 80% male. Predominantly white and Chinese, poor representation of other demographics

Diversity isn’t just about altruism but also you need diverse thinking in order to innovate and to have research breakthroughs and successful teams.

Engineers from Imperial:

* Roma Agrawal; masters in structural engineering and designed the Shard, author and broadcaster
* Richard Parasram; head of delivery of quantum technologies for department of science
* Chi Onwurah; EEE at Imperial, set up the telecoms network in Nigeria, now Shadow Minister for science, research and innovation and Labour MP for Newcastle. She gave a talk at Imperial.

The Problem:

* This is context of the problem in UK high schools.
* 20% of A-Level physics students are female.
* 0.5% of A-Level physics students are Black Caribbean.
* Girls are 2.5x more likely to study physics at an all-girls private school.
* 70% of physics students come from 30% of schools; less affluent = less likely.

Notably, none of these statistics have changed significantly for many years. In fact, A-Level physics had 2.6% less people studying it last year than the year before.

Why Should You Care?:

* Everyone should have the opportunity to study what they want
* Competition for talent (i.e. staff recruitment) is very high, and the current generation care about equity therefore companies HAVE to care about it in order to attract the best talent
* There is lots of evidence that more diverse teams are more successful
* There is a talent shortage so we need to recruit from a broader demographic
* There is a moral duty to treat everyone equally
* There is a legal duty to treat everyone equally
* Retention of current engineers so they stop going into management consulting

EDI has a focus on inspiring people (to enter science), on celebrating people, but little on persuading people to stay

What can we do?:

* Empower others
* Examples are
	+ Toni Morrison (Nobel Prize for Literature 1993) “When you get these jobs that you have been so brilliantly trained for, just remember that your real job is that if you are free, you need to free somebody else.
	+ Carl Wieman (Nobel Prize for Physics 2001) “success in physics has little to do with talent and a great deal to do with educational privilege”
* Most A-Level physics teachers in the UK don’t have a background in physics which means getting good education in physics is a privilege. If you have that privilege then you need to empower somebody else.
* Outreach can be done in many ways, e.g.;
	+ Talks in schools – good for reaffirming those who were already interested, but one off interventions are not good at changing the minds of those who have already decided against STEM
	+ Workshops – e.g. 2 day workshop for all girls in physics, at end of workshop the girls presented to their parents who were also invited in.
	+ Newspapers, TV, Radio
	+ Books
	+ Social Media
	+ Science Festivals
* Outreach needs to equip students with the skills, networks and opportunities they need in order to study STEM. It’s important to include parents and teachers as they are influencers in the young people’s lives.
* Outreach needs to be evidence based (see slides for various reports, many of which are by Institute of Physics though they are more broadly applicable than just Physics)
* Social capital (who you know and how you interact with the world around you) impacts your likelihood of choosing science. E.g. do you know engineers/scientists? Do you watch documentaries/science shows? Do you visit science museums etc.
* Slides give more examples of good practice such as “I’m an Engineer, Get me out of here”
* Book recommendation; Inferior by Angela Saini [Also her other books, Geek Nation, Superior, etc.] – Charles Darwin called women intellectually inferior and it has been a long standing viewpoint which this book disproves. Jess ran a funding campaign and got a copy of the book into every state school in the UK. This is empowering the students in those schools so they can drive change
* Undergraduates – degrees are signed off by the accrediting bodies (e.g. engineering council) but to work out HOW to embed EDI as part of the curriculum Jess ran student projects nation wide to get student voice and used these to influence the accrediting bodies. Additional details on the project are visible in the slides and also on the website Inclusive Physics Curriculum Project.
* Early Career Researchers + Hidden Curriculum; you are taught the technical part of your degree which you need to pass your exams. But then there are other things (how to network, how to write a good report, how to interview well, how to present well) which you are not necessarily actively taught, but it is assumed you know. These are referred to as the hidden curriculum. People from some backgrounds will know less of these than those who are more privileged.
* Example of addressing the hidden curriculum; funded summer school for BAME students to learn skills needed for engineering and physics careers (e.g. interviews etc.). This was part of the Blackett Lab Family which is a network of Black physicists. similar for Women in science
* Recognition and Esteem – how do we better acknowledge and recognise engineers from marginalised backgrounds? Jess has run a project on Wikipedia (unfiltered free access to knowledge which is non-partisan, democratised and accessible) to add women since 2018 and has written a new biography virtually every day since (over 2000 new entries!)
	+ Only 19.65% of biographies on the site were about women
	+ Poor representation of different races and the global south
* Slides include examples of [Sarah Gilbert](https://en.wikipedia.org/wiki/Sarah_Gilbert) and [Kizzmekia Corbett](https://en.wikipedia.org/wiki/Kizzmekia_Corbett), [Sumitra Mitra](https://en.wikipedia.org/wiki/Sumita_Mitra), [Gladys West](https://en.wikipedia.org/wiki/Gladys_West)
	+ Many of the wiki pages Jess has written have then been followed by these women being celebrated by having a Barbie made, by being named Time person of the year, by inducting people into various Halls of Fame, medals, etc. This is because these stories had become accessible, and could be found by people in power.
* UK physics medals and prizes; 92% to men, 98% to white people
	+ Jess now writes prize nominations for people to win awards, e.g. for the Royal Academy of Engineering and encourages our students to do the same as it’s only a paragraph
* Royal Academy of Engineering
	+ Made Lewis Hamilton a Fellow and they then created the Hamilton Commission which supports engineers from minority ethnic engineers (especially in motorsport)
	+ LH has paid for the training of black teachers in STEM subjects
	+ LH has funded MScs in motorsport for BME students
	+ They have research fellowships and offer mentoring for marginalised groups to increase likelihood of funding for these applicants
* Summary of what we can do:
	+ Improve awareness
	+ Pro-actively challenging stereotypes
	+ Level up: share your privilege and opportunity
	+ Build networks and communities
	+ Evidence based outreach
	+ Nominate people for prizes and awards

