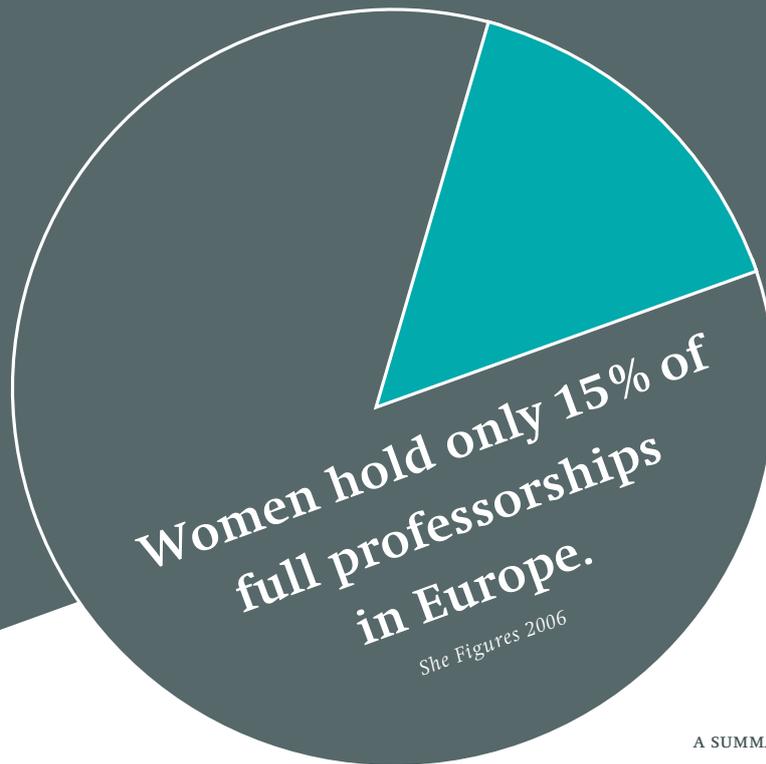


THE WAY FORWARD

Women in Science



A SUMMARY OF IDEAS EXPRESSED AT
THE SET-ROUTES INTERNATIONAL CONFERENCE
»WOMEN IN SCIENCE: THE WAY FORWARD«*

Off balance!

Women are underrepresented

More than half of the European student population is female, but women hold only 15% of full professorships, ranging from 9% in Belgium to 21% in Finland. Representation of women at the top levels of industry is similarly low. Clearly the gender gap is not closing at the rate one would expect given the increase in the percentage of female university graduates and PhD holders.

In other words, a large percentage of our higher education graduates are not reinvesting their skills in the economy. Can we afford this waste of talent?

The optimistic view is that, over time, the numbers of men and women in higher positions will equalize as modern practices increase fairness, and more women who enter the bottom of the career chain move upwards. But at the current rate this may take decades.

The pessimistic view is that the gender gap in higher ranks will not decrease because the success rate of women is lower than that of men at every step on the career ladder.

Patience is fine, but we have to set some limitations.

LESLEY YELLOWLEES
UNIVERSITY OF EDINBURGH, UK

There is not one clear single cause for the underrepresentation of women, there are many different causes tied to one another.

ISABEL BEUTER
CEWS, GERMANY



Women lack the social and professional support that men receive throughout their careers

After having done a lot of meta analyses on gender differences in psychological variables, it was becoming very clear to me that all these stereotypes about enormous gender differences in psychological characteristics and ability are just not well founded in the scientific data.

JANET HYDE
UNIVERSITY OF WISCONSIN-MADISON, USA

¹ Hyde JS (2005)
The Gender Similarities Hypothesis.
American Psychologist **60**: 581–592

I believe that girls' disinterest and lack of confidence in their ability to succeed in math and science has its roots in their very early years. To a huge degree girls' disaffection is related to their own perception of their ability to succeed in math and science, not to their actual ability.

ROSALIND BARNETT
BRANDEIS UNIVERSITY, USA

Are there differences?

Men and women are very similar

Populist books promote a view of insurmountable differences between men and women, apparently explaining why men and women achieve differently – thereby reinforcing traditional stereotypes.

Recent scientific literature however reports that the differences between men and women are very small in 80% of measurable traits (Hyde 2005).¹ There is greater variation within each sex than there is between them.

The differences in traits that can be considered to be of primary importance in intellectual discourse, such as maths or language performance, are very small. And the variation in those traits where a difference is detectable – physical aggression, motor performance, measures of sexuality and spatial rotation abilities – cannot directly explain why there are so few women in higher positions.

Pervasive negative gender stereotypes

The self-fulfilling prophecy

We continue to adhere to gender stereotypes that harm women's self-esteem and self-belief.

Most of us, men and women alike, have unconscious stereotypes that make us associate men with careers and women with families. These stereotypes traditionally evolved in order to help society function. On the other hand, the same stereotypes place men and women in specific roles, thereby blocking societal change.

As a result of stereotyping, girls are not expected to perform well in maths and science in school. Consequently, girls' self-confidence in these subjects is diminished. In the manner of a self-fulfilling prophecy, this leads to fewer women pursuing the study of the "hard" sciences.

Breaking the stereotype barrier

As members of society, we have to become aware of our biases if any real changes are to take place.

Data suggest that our social environment has a large effect on how our unconscious biases and stereotypes are formed and expressed. Role models can influence the expression of these stereotypes.

How do these stereotypes affect women who choose scientific careers?

Very few studies have compared men's and women's career paths in the sciences on a multinational level. Ledin *et al*² reported that women on average are only 80% as successful as their male counterparts when applying to the EMBO Long-Term Fellowship Programme. The study showed that:

- Women tend to allow their partner's career to take precedence – for example, they more frequently follow their partners to a new job.
- Women generally bear the major responsibility for childcare and accumulate 'time out' periods from their careers.
- On average, women work shorter hours than men due to family commitments.

Consequently, women, on average, publish fewer papers during their early careers than their male counterparts.

Simply telling women that a math test favors males will lead to poor performance on their part. This is why I get so concerned about the mass media portrayals of girls as lacking in certain abilities.

JANET HYDE
UNIVERSITY OF WISCONSIN-MADISON, USA

Are men overconfident and women realistic or are men realistic and women underconfident?

BRIAN NOSEK
UNIVERSITY OF VIRGINIA, USA

² Ledin A, Bornmann L, Gannon F, Wallon G (2007) A persistent problem. Traditional gender roles hold back female scientists. *EMBO Rep* **8**: 982–987

The Way Forward

What can be done to improve career prospects of women in the sciences?

Women can help themselves by:

- Placing importance on their careers
- Seeking training and help to plan and succeed in their careers
- Being more self-promoting
- Being more self-confident
- Sharing responsibility for their families with their partners
- Speaking out against discrimination.

Funding agencies and institutions have an important role to play in promoting best practice to address gender bias at the institutional level.

Small programmes that address the specific needs of women can help to bridge the gap but it is institutional culture that has to change. It is within institutions that talent is fostered and young scientists are inspired and encouraged to follow a research career path...or not!

Some of today's best practice examples have been highlighted in the UK by the Athena SWAN Award, in the USA they are supported by the National Science Foundation ADVANCE programme.

These initiatives are highly successful because they improve the working conditions for both men and women. Raising people's awareness of the stereotypes that they hold helps to level the playing field.

The most efficient way that we got the mostly male department chairs to attend our workshop on gender equity was via the funding agencies. The funding agencies twisted their arms and got them to attend.

GERALDINE RICHMOND
UNIVERSITY OF OREGON, USA

The actions that promote change should be gender neutral and create better professional and employment environments for men and women. Both men and women benefit from good practice; however, women in particular are adversely affected by bad practice.

LESLEY YELLOWLEES
UNIVERSITY OF EDINBURGH, UK

We need more research: we need a longitudinal study that allows us to follow males and females along their career paths. This would finally tell us why women and men leave the academic career track. And we need to focus more on disciplinary differences, as the retention rate of women is different for different disciplines.

ISABEL BEUTER
CEWS, GERMANY

Some of our efforts within the ADVANCE program are focused around what in a lot of places seems to be the most opaque of all processes... and that is promotion and tenuring.

HERBERT KILLACKKEY
UNIVERSITY OF CALIFORNIA, IRVINE, USA

Ways that work

Improving working conditions and bringing equality to the workplace should benefit both men and women and allow us to take advantage of the intellectual resources of all of society.

The best initiatives are therefore those that work to expose and combat gender bias both in professional and family environments, and create a fair and supportive environment at home and in the work place.

Effective means to empower men and women:

- Supporting students at all levels and encouraging men and women into maths- and science-related subjects
- Reaching out to students to help them plan careers
- Finding appropriate mentors for young scientists
- Offering flexible working hours to men and women with families
- Improving childcare provision
- Providing career advice and help for people who follow their partners to a new job
- Changing institutional culture – highlighting good practice, improving the working environment and removing unconscious bias
- Working towards transparent selection and advancement processes and educating selection committees about unconscious bias
- Ensuring that women are fairly represented on committees that set policy and control funds
- Supporting studies that bring to light the roots of gender bias in science.

FURTHER READING →

All links can be found at www.embo.org/gender/wayforward

FOR MORE INFORMATION → about *The Way Forward*

- **She Figures 2006**
European Commission
- **Beyond bias and barriers:
Fulfilling the potential of women in
academic science and engineering**
The National Academies
- **The gender similarities hypothesis**
Janet Shibley Hyde (2005)
American Psychologist **60**: 581–592
- **Same difference: Gender myths
are hurting our relationships,
our children and our jobs.**
Rosalind Barnett and Cheryl Rivers
- **Institutional change:
Good Practice in University
Chemistry Departments**
Athena Project and Royal Society
- **NSF ADVANCE**
- www.set-routes.org/conference
- www.embo.org/gender/wayforward



A DVD of the key talks from the SET-Routes international conference *Women in Science: The Way Forward** (held in Heidelberg in May 2007) is available upon request. Please send an email to women@embo.org.