



The Open University of Israel

***WOMEN in STEM* – WHERE DO WE
STAND and WHERE ARE WE GOING?***

***INCREASING the RETENTION and RECOGNITION of WOMEN
SCIENTISTS and ENGINEERS***

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President, the Open University of Israel

Feb. 23, 2011

**CSW
55**



**Commission on the
Status of Women**

22 February - 4 March 2011

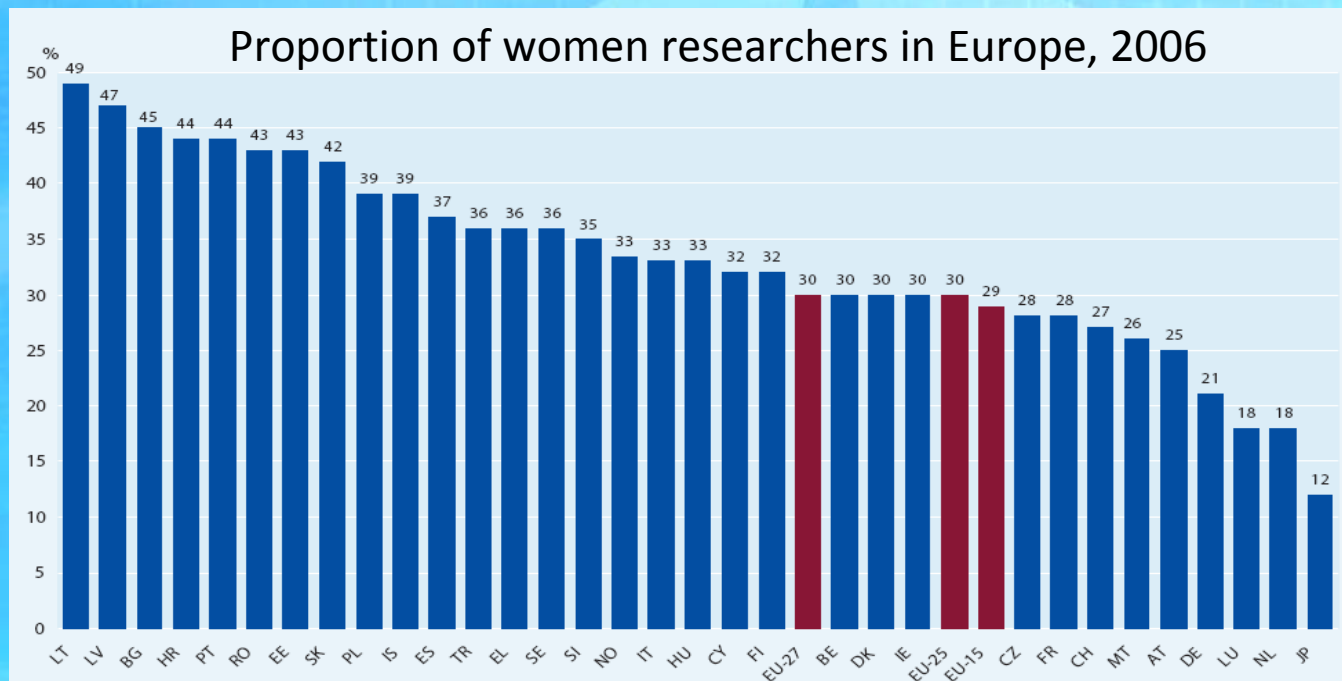
*Gender
Education
Science &
Technology
Employment*

***STEM= science, technology, engineering, and mathematics**

Observation 1:

- Women are under-represented in research, and in particular in science and technology employment:

The share of women researchers in OECD countries in 2008 ranged from 13% (Japan) to 42% (Portugal), with an avarage share of ~ 30%.



Observation 2:

- The share of women in research fields is unequally distributed, with fewer women in Science, Technology, Engineering and Mathematics (STEM)

% of women earning Ph.D.'s in Europe, 2006

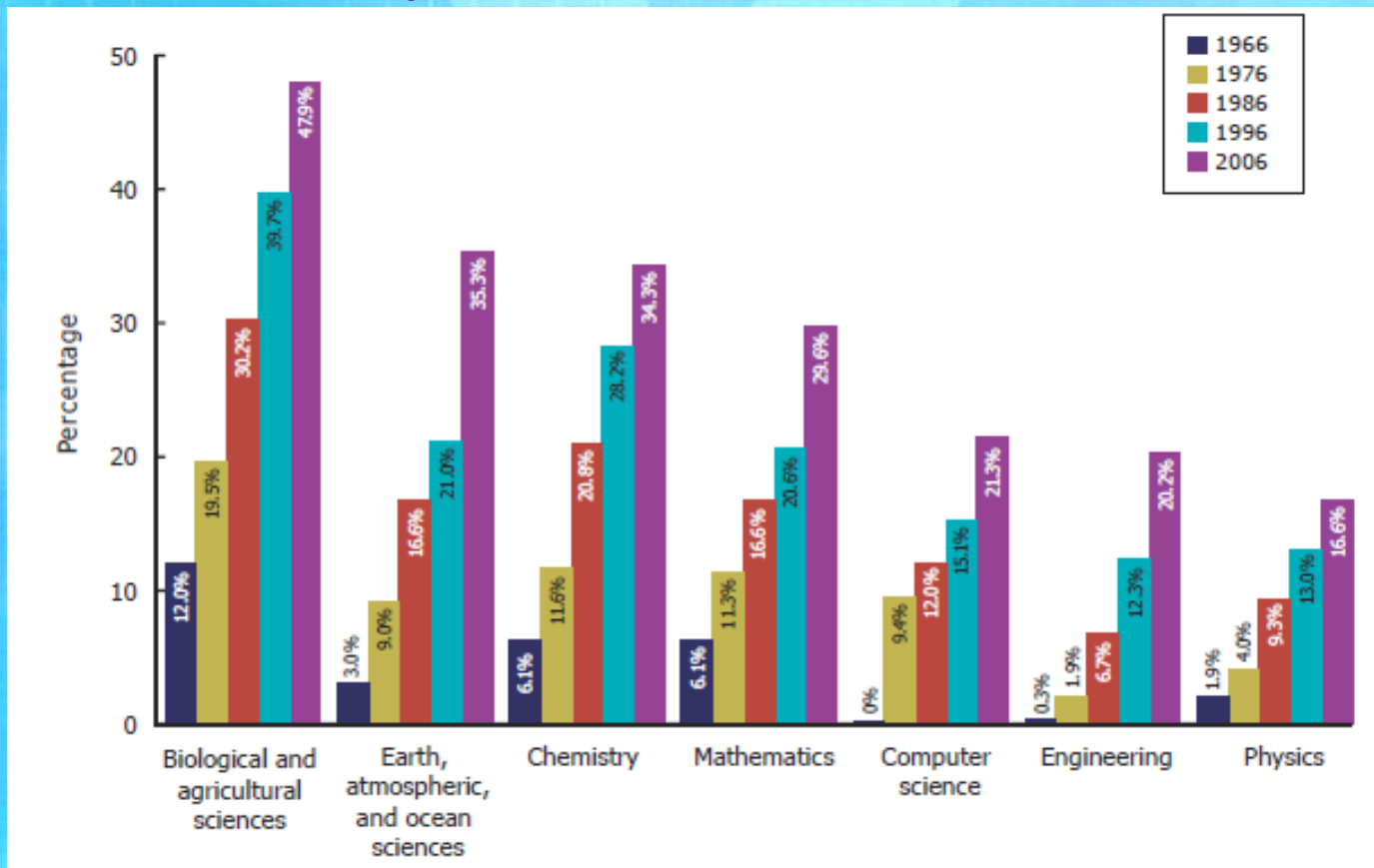
	Education	Humanities & arts	Social sciences, business & law	Science, mathematics & computer science	Engineering	Agriculture & veterinary science	Health & welfare
EU average	64	52	47	40-41	25	51-52	54

STEM

Observation 3:

- The share of women in STEM has increased over time, but converges to a rate smaller than their share in the population

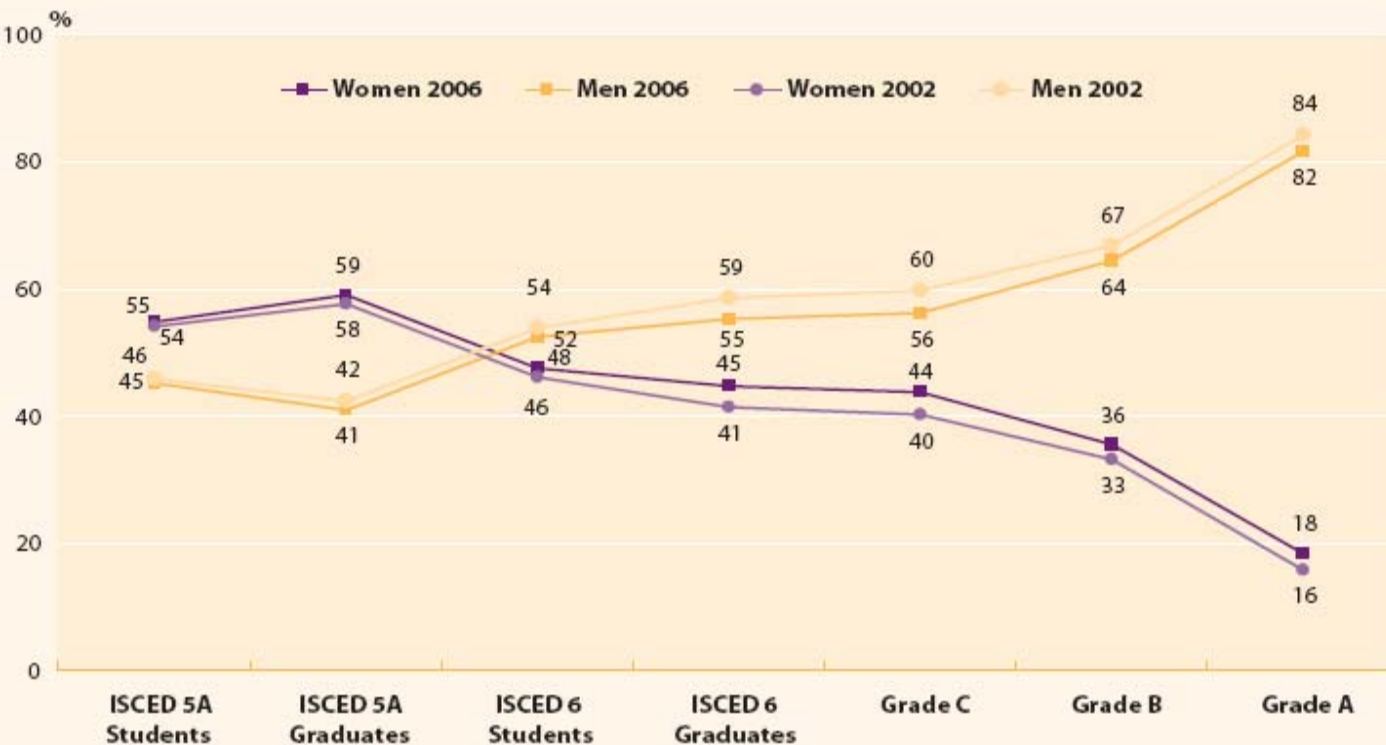
Doctorates earned by women in selected STEM fields, 1966–2006, USA



Observation 4:

- The glass ceiling for women researchers is indicated by the scissors diagram:

Figure 3.1: Proportions of men and women in a typical academic career, students and academic staff, EU-27, 2002/2006



Definition of grades:

A: The single highest grade/post at which research is normally conducted.

B: Researchers working in positions not as senior as top position (A) but more senior than newly qualified PhD holders.

C: The first grade/post into which a newly qualified PhD graduate would normally be recruited.

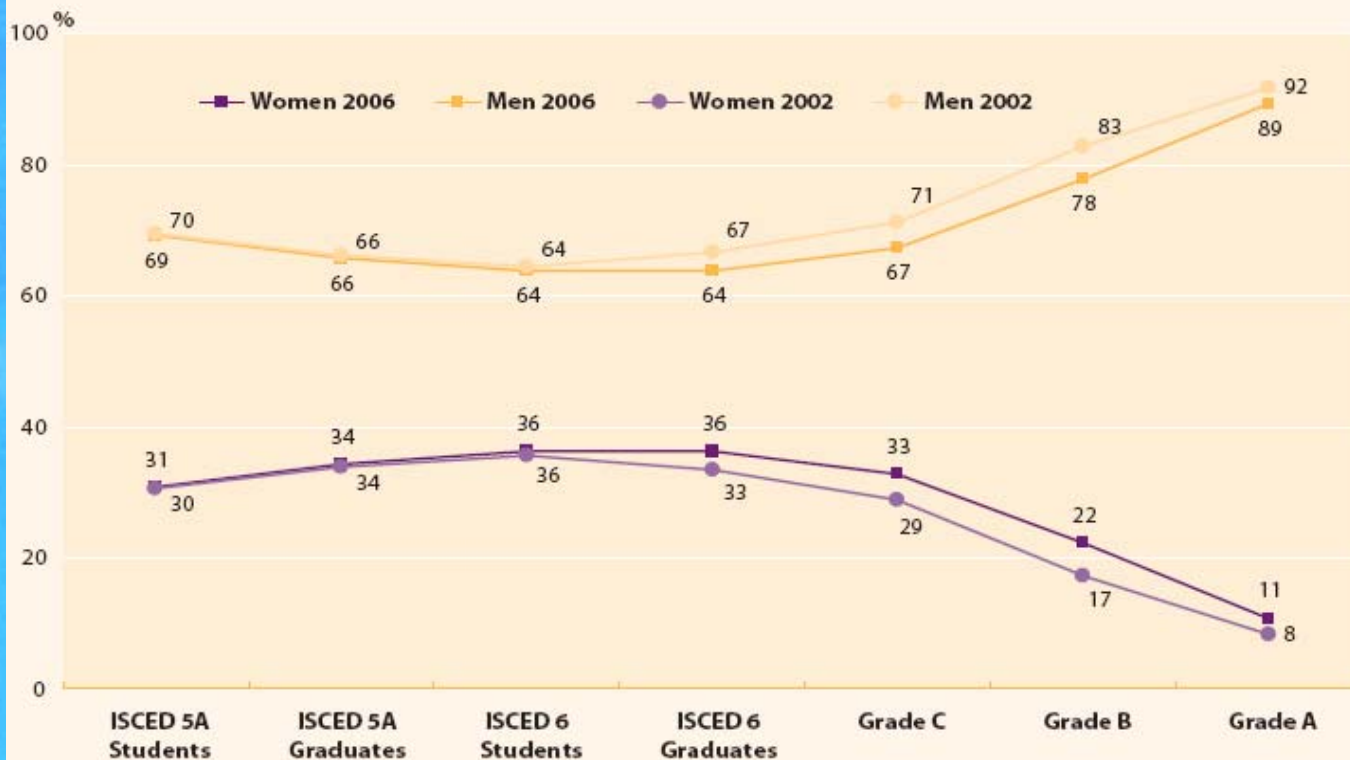
ISCED 5A: Tertiary programmes to provide sufficient qualifications to enter into advanced research programmes & professions with high skills requirements.

ISCED 6: Tertiary programmes which lead to an advanced research qualification (PhD).

Observation 5:

- A scissors diagram exists also in fields where women are under-represented, e.g. in STEM:

Figure 3.2: Proportions of men and women in a typical academic career in science and engineering, students and academic staff, EU-27, 2002/2006



Definition of grades:

A: The single highest grade/post at which research is normally conducted.

B: Researchers working in positions not as senior as top position (A) but more senior than newly qualified PhD holders.

C: The first grade/post into which a newly qualified PhD graduate would normally be recruited.

ISCED 5A: Tertiary programmes to provide sufficient qualifications to enter into advanced research programmes & professions with high skills requirements.

ISCED 6: Tertiary programmes which lead to an advanced research qualification (PhD).

SET fields of education = 400 Science, maths and computing + 500 Engineering, manufacturing and construction.

SET fields of science = Engineering and Technology + Natural Sciences.

Women in EE

- **IEEE: Institute of Electrical and Electronics Engineers**
- **Total of 397,001 members in 2009**



TABLE 4 - IEEE WOMEN MEMBERS BY GRADE* - 3 YEAR COMPARISON, 2007-2009

	<u>31 DECEMBER 2009</u>	<u>31 DECEMBER 2008</u>	<u>31 DECEMBER 2007</u>
HONORARY FELLOW	1	1	1
SENIOR MEMBER	187	167	145
MEMBER	1,587	1,469	1,372
GRADUATE STUDENT MEMBER	17,054	16,198	15,535
ASSOCIATE MEMBER	5,082	4,229	3,732
STUDENT MEMBER	1,826	1,891	2,317
TOTAL	12,140	10,841	9,295
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	37,877	34,796	32,397

- **% women: 9.54% 9.10% 8.61%**

So, where do we stand?

- While women's participation in science and technology employment is still not sufficient, the trends show great improvement over the years, and in many countries and fields women reached the 50% level in Ph.D. graduates.
- There is a glass ceiling.
- The main problem within STEM is in **engineering**, where women are still absent.
- **Where are we going?**

Why so few women in engineering and what should we do about it?

- No single bottleneck!



- But, the observations suggest some *good news*:



Why So Few?

Women in Science, Technology, Engineering,
and Mathematics

Catherine Hill, Ph.D. Christianne Corbett Andresse St. Rose, Ed.D.



2010

1. The retention of women scientists and engineers will increase

- **“Women tend to express a preference for professions that directly benefit society or individuals”**
- Since the green revolution forces technology to take responsibility to society (e.g., global warming) and to individuals (e.g., cellular radiation), technology is changed into an attractive field to women, and **the retention of women in engineering will increase**

A closer look at women in Engineering: students in TAU (2011)

Women %		# of students	Degree
17.1	EE/ECE/EE + Physics	1,073	B.Sc.
14.5	Mechanical Eng.	455	B.Sc.
59.5	Bio-med Eng.	389	B.Sc.
50.6	Industrial Eng. & Management	208	B.Sc.

It is happening!

2. The recognition of women scientists and engineers will improve

- More and more business leaders realize that gender diversity yields a competitive advantage

Airbus, Air Liquide, EADS, Hewlett Packard, Rolls Royce, Schlumberger, Siemens

Women in Science and Technology in the Private Sector

A Wake-up Call from CEOs

2003

This position paper is a joint, public commitment of Chief Executive Officers of companies based in Europe, who are eager to enlarge the reservoir of talent in Europe¹. We want to see, in the first instance, twice as many women graduating in science and engineering. At the same time, we want to ensure that their skills are used by industry to the best advantage. We sense an urgency to tackle this problem, but we also need to make a commitment to longer-term strategies.

- CEOs acknowledge: having more women in key industrial positions is beneficial to companies.

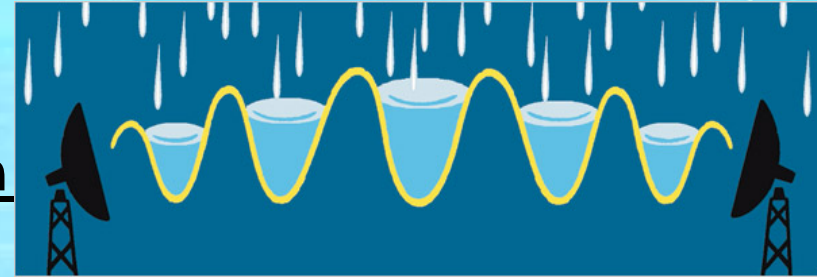
3. The presence of more women in Engineering will lead to more innovation

The New York Times

May 9, 2006

Counting Dropped Calls and Drops of Rain

By [HENRY FOUNTAIN](#)



Take heart, cellphone users. All those dropped calls you experience may someday be used for a greater good: to help forecast the weather.

That's the suggestion of an Israeli electrical engineer, **Hagit Messer**, who has demonstrated that the ups and downs of signal strength in wireless communications can be used to measure rainfall accurately and continuously over a wide area .

Raindrops and other particles in the atmosphere can weaken electromagnetic signals. Satellite TV viewers who lose the signal when a thunderhead passes know this well. Wireless companies know it, too. "To ensure reliable communications, they need to cope with disturbances caused by weather and other effects," said Dr. Messer, a professor at Tel Aviv University .

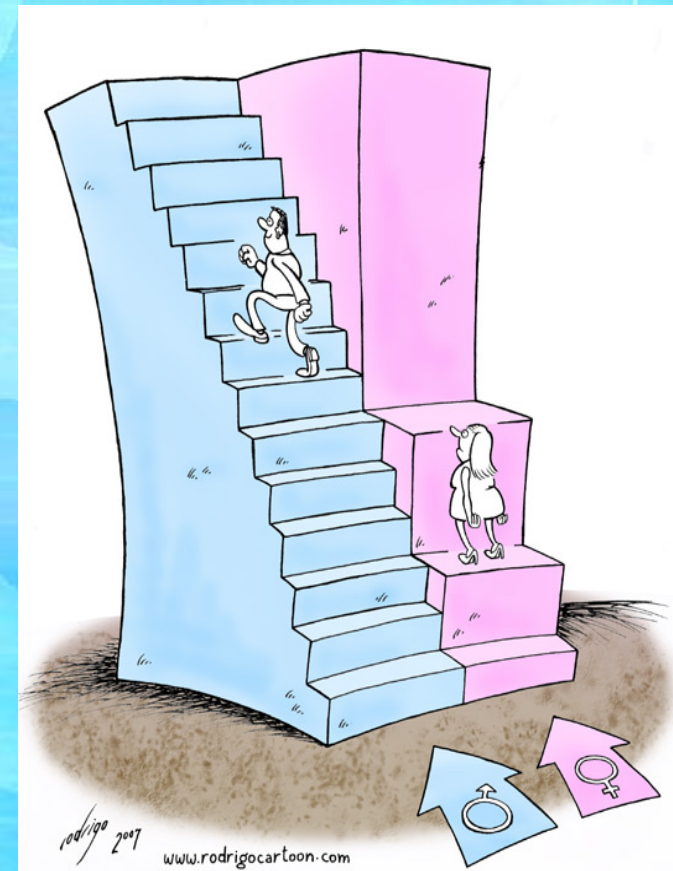
Wireless companies constantly analyze signal strength so they know, for example, when to increase the power at their base stations. Dr. Messer's idea, reported in the journal *Science*, was to analyze those same data to determine the rainfall that is causing the disturbance. "All we need to do is exploit this information to get better monitoring of environmental conditions," she said. It may also be possible to track pollution using the technique, she added.

The bad news:

Unfortunately, the glass ceiling for women in STEM is not different from the glass ceiling in other professions, and it will not disappear without a change in the status of women => TO DO!

Thank You

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<http://www.amonet.org/>