# Gênero e Ciência - onde estamos e para onde vamos?

Data e Horário: 14/03/2017 - 12h15

Local: Auditório IFGW

Lembrando do dia internacional da Mulher, e do recente falecimento da Profa. Mildred Dresselhaus (primeira mulher a receber o cargo de *full professor* no MIT/USA, primeira mulher a receber a *National Medal of Science and Engineering*, em 1990, e a *Presidential Medal of Freedom*, em 2014), uma das pioneiras em defender a participação de mulheres em *STEM* (do inglês, "*Science, Technology, Engineering and Math*"), convidamos noss@s alun@s para um bate-papo sobre gênero e ciência, no primeiro 'pastel meeting' de 2017.

Serviremos pasteizinhos e refrigerantes.



International Women's Day

#BeBoldForChange



WE TRE TIL WONDERWOMEN!





Women's Day – 28/02/1909 Socialist Party of America, NYC



Asch Building. Manhattan, NYC Triangle Shirtwaist Factory Fire, 25/03/1911 146 mortes, 123 mulheres e adolescentes



08/03/1917 - International Women's Day em Petrograd (Saint Petersburg), Russia Greve por "Bread and Peace" pelo fim da I Guerra Mundial, da falta de alimentos na Russia e do czarismo.

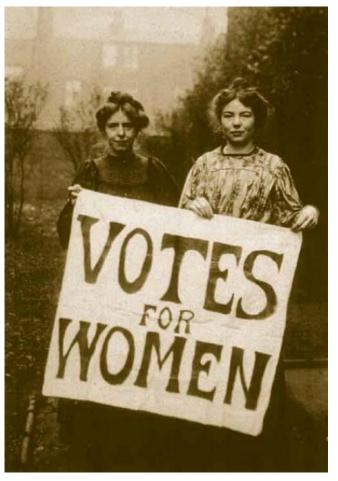
Início da Revolução Socialista de 1917

**1975**:



http://www.un.org/en/events/womensday/index.shtml

# Women's rights:







How long ago???

### Women's suffrage in Switzerland

Date	Canton		
1 February 1959	<u>Vaud</u>		
27 September 1959	<u>Neuchâtel</u>		
6 March 1960	Geneva		
26 June 1966	<u>Basel-Stadt</u>		
23 June 1968	<u>Basel-Landschaft</u>		
19 October 1969	<u>Ticino</u>		
12 April 1970	<u>Valais</u>		
25 October 1970	Lucerne		
15 November 1970	Zurich		
7 February 1971	Aargau, Fribourg, Schaffhausen and Zug		
2 May 1971	Glarus		
6 June 1971	<u>Solothurn</u>		
12 December 1971	Bern, Thurgau		
23 January 1972	St. Gallen		
30 January 1972	<u>Uri</u>		
5 March 1972	Schwyz and Graubünden		
30 April 1972	<u>Nidwalden</u>		
24 September 1972	<u>Obwalden</u>		
30 April 1989	Appenzell Ausserrhoden		
27 November 1990	Appenzell Innerrhoden (by decision of the federal court)		

https://en.wikipedia.org/wiki/Women's\_suffrage\_in\_Switzerland

### Women's movements...



**Gender equality** movement

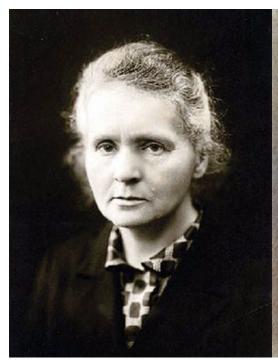


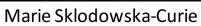


http://www.shesbeautifulwhenshesangry.com/



# Women in (Hard) Sciences







Ada Lovelace

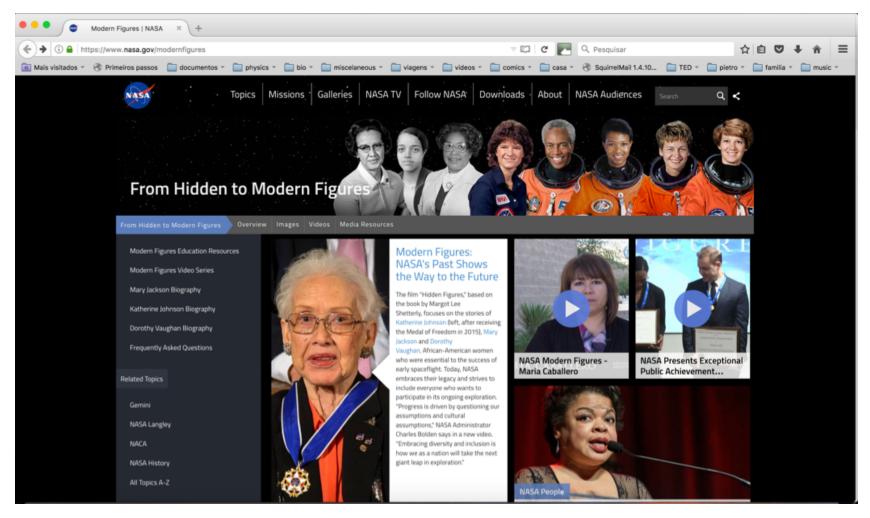


**Emmy Noether** 



Lise Meitner

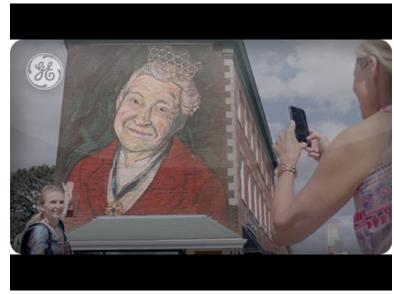




https://www.nasa.gov/modernfigures







What If Millie Dresselhaus, Female Scientist, Was Treated Like A Celebrity?

https://www.youtube.com/watch?v=sQ6\_fOX7ITQ



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#### Topics in this Forum

- ▶ Where to find Laura Hoopes' Women in Science future thoughts?
- LAB GIRL, exciting new womanin-science biography
- Ruth Hubbard, RIP
- ▶ The Ball Is Ending
- ▶ New DNA Learning Game Coming Soon
- ▶ NIH Women in Science Tidbits
- ▶ Woman Put Man on Moon cartoon presentation
- Reviewing the 2015 Nobel Prizes in Chemistry and Physiology or Medicine
- ▶ Women Engineers: How to Retain Them

Next »

▶ Albert Lasker Basic Medical Research Award

« Prev

#### Forums

- Genetics Generation
- Women in Science
- « Prev Next »



#### Women in Science

**\***AAUW nature **EDUCATION** 

Co-curated by Dr. Laura Hoopes, Halstead-Bent professor of Biology at Pomona College, and the American Association of University Women (AAUW), Women in Science is a forum about issues of parity and the female experience in science. Alongside Dr. Hoopes' topics, the AAUW will also introduce topics during one week of every month. Please join in these discussions and share your experiences, perspectives, and opinions.

Moderated by Laura Hoopes













Posted on: February 24, 2011 | Posted By: Christianne Corbett

Why Do We Need Women in STEM Fields?

ла Аа 🗛



Chapter 1.

Women and Girls in Science. Technology, Engineering, and Mathematics

© 2010 AAUW

This is a question that comes up pretty regularly. Here is one

Attracting and retaining more women in the science, technology, engineering, and mathematics (STEM) workforce will maximize innovation, creativity, and competitiveness. Scientists and engineers are working to solve some of the most difficult challenges of our time, and engineers design many of the things we use daily. When women are not involved in science and engineering, experiences, needs, and desires that are unique to women may be overlooked.

For example, Unlocking the Clubhouse: Women in Computing discusses the fact that "some early voice-recognition systems were calibrated to typical male voices. As a result, women's voices were literally unheard. ... Similar cases are found in many other industries. For instance, a predominantly male group of engineers tailored the first generation of automotive airbags to adult male bodies, resulting in avoidable deaths for women and children" (Margolis & Fisher, 2002, pp. 2-3).

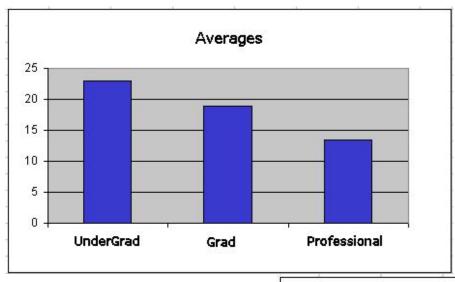
With a more diverse workforce, scientific and technological products, services, and solutions are likely to be better designed and more likely to represent all users, and the direction of

scientific inquiry will be guided by a broader array of experiences.

Why do you think it is important to have women in STEM fields?

Attracting and retaining more women in the science, technology, engineering, and mathematics (STEM) workforce will maximize innovation, creativity, and competitiveness. Scientists and engineers are working to solve some of the most difficult challenges of our time, and engineers design many of the things we use daily. When women are not involved in science and engineering, experiences, needs, and desires that are unique to women may be overlooked.

http://www.nature.com/scitable/forums/women-inscience/why-do-we-need-women-in-stem-18256390



# Women in physics

Marcia Barbosa, UFRGS

#### Cursos Graduação IFGW (2017):

51 - 26%

40 - 22%

04 - 18%

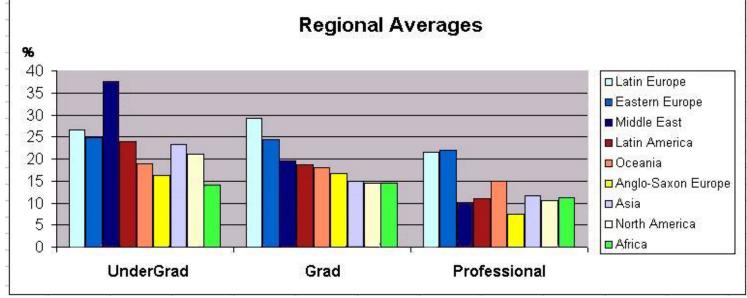
108 - 23%

Total – 22% (736 alunos matric.)

Fis.Médica – 25%

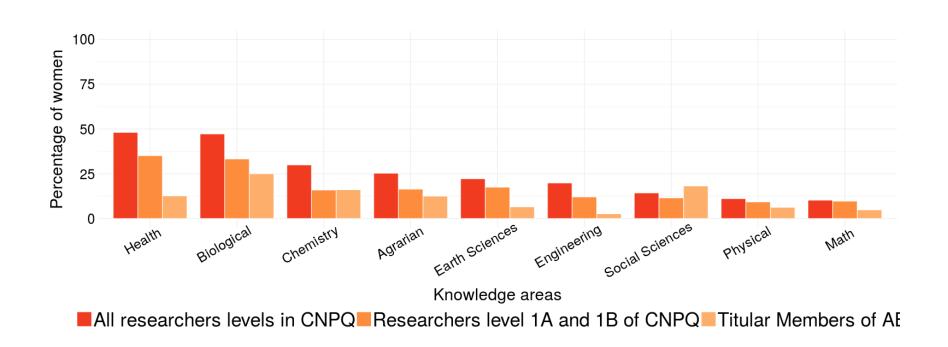
Fís. Biomédica – 13%

Fonte: DAC/UNICAMP, SG/IFGW



# Women - Brazil (2016):

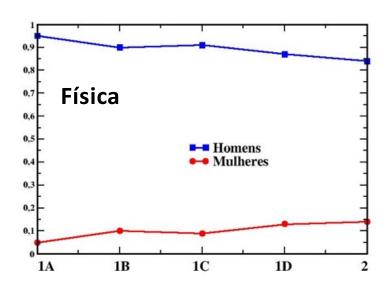
Academia Brasileira de Ciências & Produtividade em Pesquisa CNPq



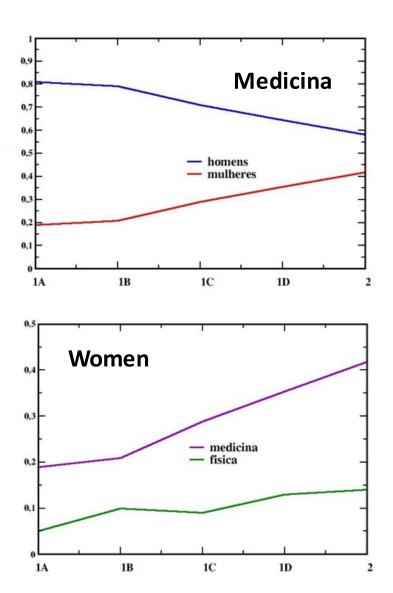
Marcia Barbosa, UFRGS

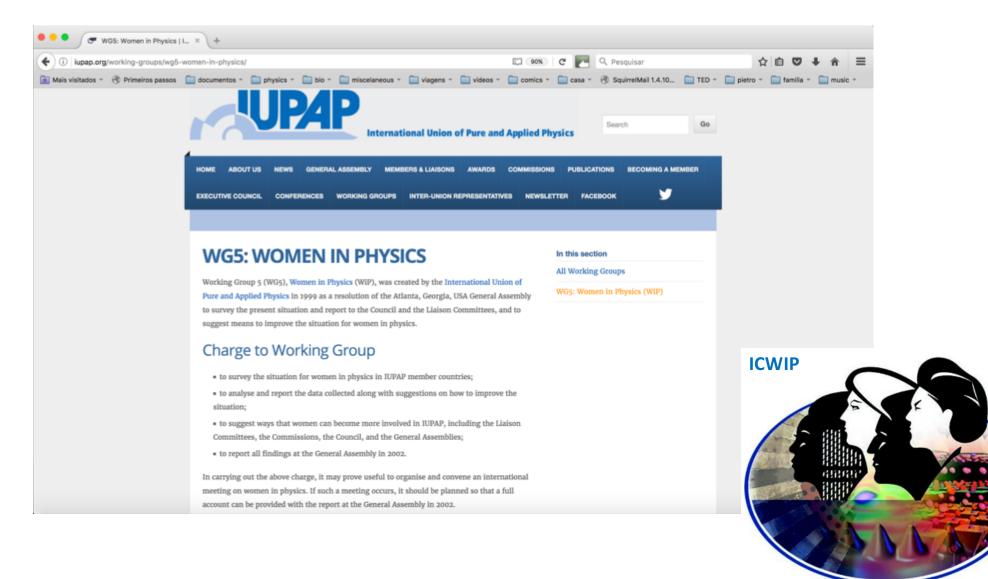
## Women - Brazil:

# Bolsistas Produtividade em Pesquisa CNPq

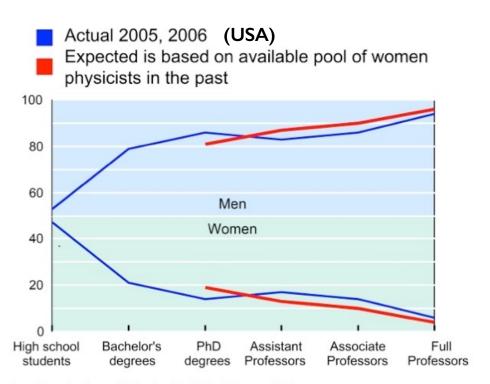


Marcia Barbosa, UFRGS





# The "scissors plot" summarizing these results reveals a relative scarcity of women physicists



Source: American Institute of Physics Statistical Research Center

This is a problem for Physics... and STEM!

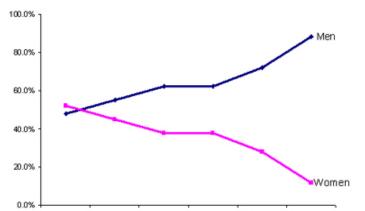


Figure 1. The Gender Scissors

Career Stage

http://www.sciencemag.org/careers/2005/02/cutting-gender-scissors

#### Elizabeth H. Simmons

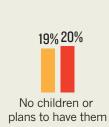
Distinguished Professor of Physics Michigan State University ICTP Workshop for Women in Physics October 12, 2015

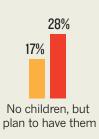
# UCLA/USA 2009

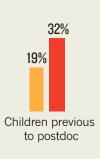
#### POSTGRADUATE POSITIONS

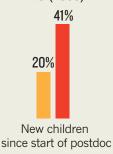
A 2009 survey of postdoctoral fellows at the University of California showed that women who had children or planned to have them were more likely to consider leaving research.

#### POSTDOCS WHO DECIDED AGAINST CAREERS AS RESEARCH FACULTY MEMBERS (2009)









MEN WOMEN

"The plan to have children in the future, or already having them, is responsible for an enormous drop-off in the women who apply for tenure-track jobs."

Wendy Williams, Cornell University

#### **EARLY CAREER**

Female representation among science and engineering faculty members in the United States has lagged behind gains in graduate education, in part because many women do not apply for tenure-track jobs. But women who do apply are more likely than men to receive interviews and offers.

Female

"At least part of the lack of applications is due to the fact that women look at these careers and don't see people like themselves."

Hannah Valantine, Stanford University PhDs (1999–2003)

BIOLOGY 45%

CHEMISTRY 32%

**PHYSICS** 

14%

Female applicants for academic jobs

Female interviewees for academic jobs

26%

28%

18% 25% 19%

First job offers that went to women

29%

20%

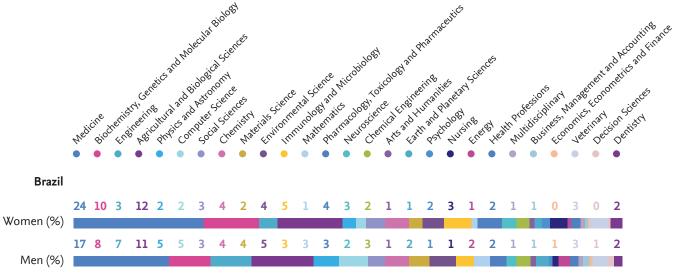
### Surprising New Study: Brazil Now A Global Leader In Gender Equality In Science





Brazilian women take part in the commemoration of the International Women's Day at Paulista Avenue in Sao Paulo, Brazil on March 8, 2017. (Photo: NELSON ALMEIDA/AFP /Getty Images)

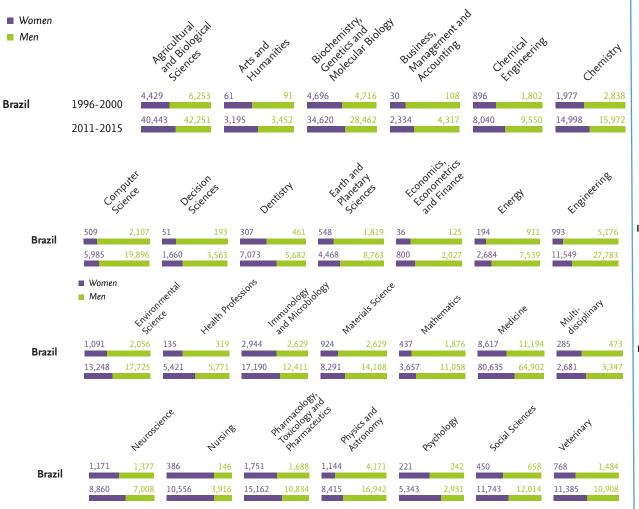
**Figure 1.1** — Proportion and number of researchers by gender (among named and gendered author profiles) for each comparator and period, 1996–2000 vs. 2011–2015.



**Figure 1.2** (continues next page) — Proportion of researchers (among named and gendered author profiles) by subject area for each gender and comparator, 2011–2015. Sources: Scopus, Genderize, NamSor, and Wikipedia

https://www.forbes.com/sites/shannonsims/2017/03/08/surprising-new-study-brazil-now-a-global-leader-in-gender-equality-in-science/#3aef28aa6f44

https://www.elsevier.com/\_\_data/assets/pdf\_file/0008/265661/ElsevierGenderReport\_final\_for-web.pdf



#### **Inventors and Patent Applications**

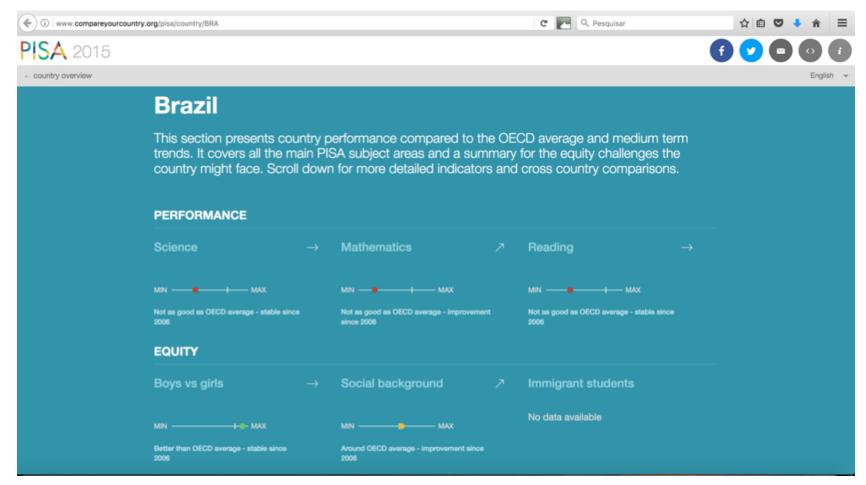
**Figure 1.7** — Proportion and number of inventors by gender (among named and gendered inventors) for each comparator, 1996–2000 vs. 2011–2015.

Source: WIPO Statistics Database, October 2016



**Figure 1.8** — Proportion and number of patent applications with at least one woman or man named among the inventors (among named and gendered inventors), shown for each comparator, 1996–2000 vs. 2011–2015. Source: WIPO Statistics Database, October 2016





#### **PISA 2015 - BRAZIL:**

Boys outperformed girls by 9 score points in 2006 and by 4 score points in 2015. While there was no significant improvement in performance among boys during this period, the mean score of girls is 13 points higher in 2015 than it was in 2006. The gender gap in science performance in Brazil is now similar to the OECD average gap.

# What are the "culprits"?

**Travel & After Hours** 

Aggressivity

Stereotypes



https://www.youtube.com/watch?v=XP3cyRRAfX0



http://www.sciencemag.org/news/2017/01/young-girls-are-less-likely-believe-their-gender-brilliant-they-age

# Science Science Advances Science Immunology Science Robotics Science Signaling Science Translational Medicine

#### SHARE



# Young girls are less likely to believe their gender is brilliant as they age



By Emma Hiolski | Jan. 26, 2017, 2:00 PM





"A person in my office is really, really smart—they solve problems faster and better than anyone else." When 5-year-old girls hear this statement, they're as likely as boys are to assume the smart person is of their own gender. But by age 6 to 7, they're 20%—30% less likely to assume this brilliant individual is a woman, according to a study published today in *Science*. In another experiment, researchers found that the older girls were less interested than their male counterparts in games—one resembling a two-color version of Chinese checkers—that the team described as being designed for "really, really smart children." They remained equally interested in games for "children who try really, really hard," though. The researchers say these early ideas about gender and intelligence could steer young women away from high-profile careers associated with high intelligence, like neuroscience or engineering. One surprising find? Boys and girls both acknowledged that girls get better grades, indicating that children don't necessarily associate success in school with brilliance. The scientists hope to determine where else kids' perceptions of intelligence might originate. In the meantime, they suggest emphasizing perseverance, rather than smarts, when promoting activities for both girls and

Posted in: Social Sciences DOI: 10.1126/science.aal0663

boys.

#### SHARE REPORT



Gender stereotypes about intellectual ability emerge early and influence children's interests



Lin Bian<sup>1,2,\*</sup>, Sarah-Jane Leslie<sup>3</sup>, Andrei Cimpian<sup>1,2,\*</sup>
+ See all authors and affiliations



Science 27 Jan 2017: Vol. 355, Issue 6323, pp. 389-391 DOI: 10.1126/science.aah6524



Article

Figures & Data

Info & Metrics

eLetters

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#### Abstract

Common stereotypes associate high-level intellectual ability (brilliance, genius, etc.) with men more than women. These stereotypes discourage women's pursuit of many prestigious careers; that is, women are underrepresented in fields whose members cherish brilliance (such as physics and philosophy). Here we show that these stereotypes are endorsed by, and influence the interests of, children as young as 6. Specifically, 6-year-old girls are less likely than boys to believe that members of their gender are "really, really smart." Also at age 6, girls begin to avoid activities said to be for children who are "really, really smart." These findings suggest that gendered notions of brilliance are acquired early and have an immediate effect on children's interests.

# #LikeAGirl



https://www.youtube.com/watch?v=XjJQBjWYDTs

# #RedrawTheBalance

https://www.youtube.com/watch?v=kJP1zPOfq\_0



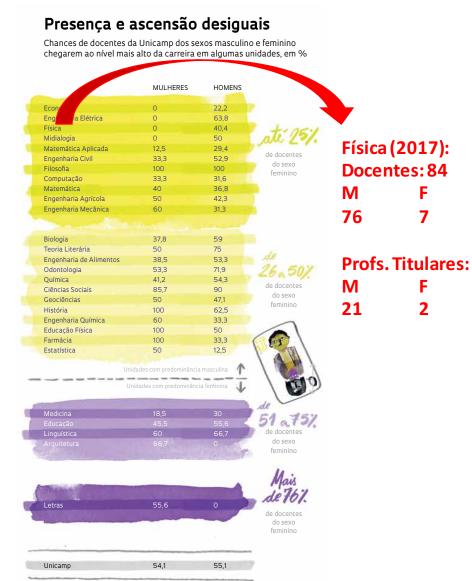
# What are the "culprits"?

**Lack of Role Models** 

# As chances das mulheres na universidade

Estudo sugere que disciplinas com alta presença feminina não garantem às pesquisadoras vantagem para chegar ao topo da carreira

Pesquisa Fapesp 238 (dez/2015)



# Myths: Women are not good in Exact Sciences Women are not Interested in Exact Sciences It is a question of time....



http://www.sciencemag.org/careers/2016/07/low-math-confidence-discourages-female-students-pursuing-stem-disciplines

SHARE

Low math confidence discourages female students from pursuing STEM disciplines



By Maggie Kuo | Jul. 22, 2016, 10:00 AM





Female college students are 1.5 times as likely as their male counterparts to leave science, technology, engineering, and mathematics (STEM) after taking the first course in the calculus series, new research finds. The **study**, published last week in *PLOS ONE*, supports what many educators have observed and earlier studies have documented: A lack of confidence in mathematical ability, not mathematical capability itself, is a major factor in dissuading female students from pursuing STEM.

The researchers followed 2266 undergraduate students at 129 2- and 4-year colleges and universities who were enrolled in Calculus I, the first course in a calculus series that is often a prerequisite for studying STEM disciplines in the United States. Overall, students were more likely to continue with calculus if they were planning for careers in engineering, had good instructors, or had previously scored well on math SAT and ACT standardized tests, the researchers found. However, when comparing students with the same background, experience, and plans, female students were on average 50% more likely than males to stop studying calculus, "effectively choosing to exit the STEM pipeline," the authors write. It's very natural for students to start college and realize that they are interested in pursuing a discipline other what they initially expected, says study lead author Jessica Ellis, an assistant professor of mathematics at Colorado State University, Fort Collins, "but there's no reason that it should be happening at different rates in different populations."

# Girls lack self-confidence in maths and science problems, study finds

OECD study suggests school performance could be boosted by parents encouraging girls to consider careers involving subjects such as engineering



The OECD's research found that girls do worse than boys in maths, and that boys come out top even amony high-performing students. Photograph: Peter Macdiarmid/Getty Images



Gender disparities in performance do not stem from innate differences in aptitude OECD report



The OECD said: "What emerges from these analyses is particularly worrying. Even many high-achieving girls have low levels of confidence in their ability to solve science and mathematics problems and express high levels of anxiety towards mathematics."

Yet girls were also found to have more positive attitudes to school in general, did more homework, more often read for pleasure and were less likely to play video games – so that far fewer girls than boys were among underachieving school pupils.

Finland – one of Europe's best performing countries in OECD tests overall – had more than twice as many boys as girls among its low achievers. The UK came out relatively well, with almost no gender gap seen between boys and girls among the worst performing pupils.

https://www.theguardian.com/education/2015/mar/05/girls-lack-self-confidence-maths-science-oecd-school-engineering

OECD report: https://www.oecd.org/pisa/keyfindings/pisa-2012-results-gender-eng.pdf

# So...

Women are under represented in Exact Sciences

It is NOT a question of time!

What to do?

Work Together Network

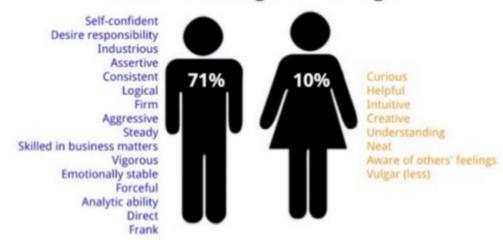
**Identify Barriers** -> CHANGE!!



## Implicit, unconscious ( = cognitive) bias....

# Words attributed to Men and Women

What makes a good manager?





Dr. Bian Welle. Director of People Analytics, Google: www.gv.com/lib/unconscious-bias-at-work



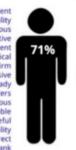
# Implicit, unconscious ( = cognitive) bias....

### Words attributed to Men and Women

What makes a good manager?







Dr. Bian Welle. Director of www.gv.com/lib/uncor

© Banducci Consulti



## Implicit, unconscious ( = cognitive) bias....

#### WELCOME TO THE WALL OF FAILURES

What you are looking at are the hundreds of failures of Harvard students and faculty. At a university that is an international beacon of success, it is really easy to fall into the trap of only focusing on our successes and the successes of others and never accepting or acknowledging our failures. What kind of environment does this create in a community whose hallmark is an overemphasis on some elusive notion of "success"? Do we hold ourselves back from doing things we think we might inevitably fail at? Do we stop our own growth because we fear being anything other than a "success"?

As you read the failures of what many would consider to be the most "successful" community in the country, let them awaken a mindfulness within yourself to recognize that we, as human beings, will inevitably experience and witness failure and that our value as humans cannot be quantified by a resume of our successes. Allow yourself to reflect on your own failures. And as you become more mindful of your own failures and the failures of others, together we can start to break down the fears that stop us from pursuing the unknown, the risky, the challenging, and the potentially rewarding.

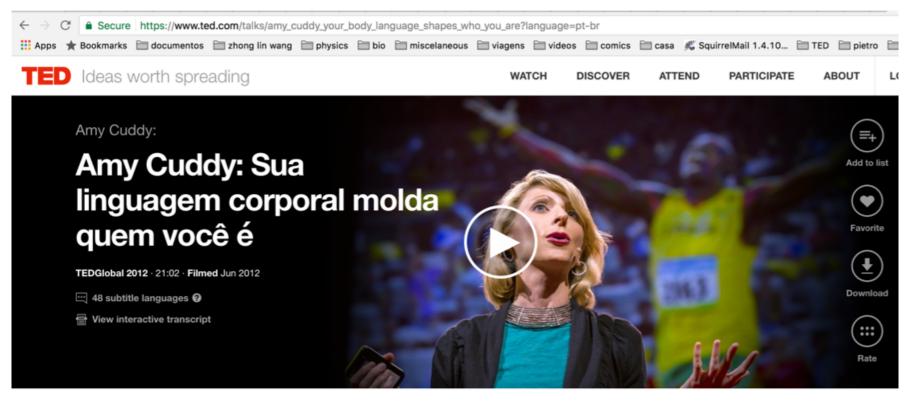
Never forget that you are HERE! Your successes AND your failures have gotten you to where you are now. Embrace them.

Gabby Sims, Sarah Grammar, Eliza Mantz, and Reylon Yount



fail to overcome fear of failure by challenging myself.	I failed both math 1b midterms	I gave up on myself	I dropped out of Harvard.	I have three B minuses on na report card.	concentration at least 3 th
i did no work over thanksgiving break and now i'm scrambling to finish 30					able to choose one makes very difficult to go on with everyday life.
pages of writing for my concentration tutorial	I was not chosen as a Rhodes scholar	I scored 112 in a round of golf after being chosen for the national golf team (for you non-golfers, that's really, really horrendous).	I didn't get the lead in my senior year high school musical.	I let my extracurriculars get in the way of maintaining my friendships.	I dida't get into an HMC abroad conference.
	I didn't get into Harvard the first time.				
I fail to align my actions with my beliefs.		I lost a spelling bee on the word "volt."	I barely passed/got the lowest grade in my class on a psych midterm I studied pretty hard for	Two years ago, I wrote a play about them as a way to dead with any feelings. I produced it and it was 2 hours longer than it was supposed to he, When the lights came up, it was only my most and any heat frends left to the auditores. I have power	I haven't gotten a job yet.
I start dating people I don't actually want to date.		I relapsed.	I didn't make the cut for Expressions.	been able to write a play since then.	
	Felt like I failed others as a captain		I had an interview for a	I got cut from everything I tried to join freshman year.	I've never made a travel team,
I've failed to go to the gym regularly the last few months.	I did not get one of the first two rounds of PBK.	I didn't swim best times my last season of college swimming.	Rhodes Scholarship and didn't get it.		My body isn't what i want it to be.
I got a C+ in math 21a	When my if in gov20 only wrote the comment "underwhelming" and gave me a C on my first ever assignment at this school	I failed one of my PS 11 midterms, and the average was probably a B+	We didn't qualify for nationals my freshman year because I didn't perform.	even trying because I'm th	comped the Advocate three mes and never made it to the tal round before getting cut.
		I failed at keeping my GPA above a 3.5 as a pre-med student	I can recognize the maltreatment and disenfranchisement of others, but I rarely DO anything despite my privilege.		
	是一位				

## Implicit, unconscious (= cognitive) bias....



Share this idea









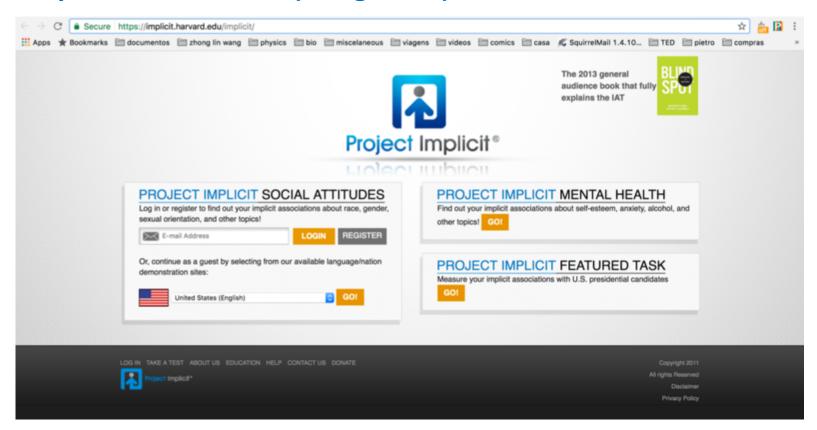




**39,618,158** Total views

## Implicit, unconscious (= cognitive) bias....

https://www.projectimplicit.net/index.html



#### **About Us**

Project Implicit is a non-profit organization and international collaboration between researchers who are interested in <u>implicit social cognition</u> - <u>thoughts and feelings outside of conscious awareness and control</u>. The goal of the organization is to educate the public about hidden biases and to provide a "virtual laboratory" for collecting data on the Internet.