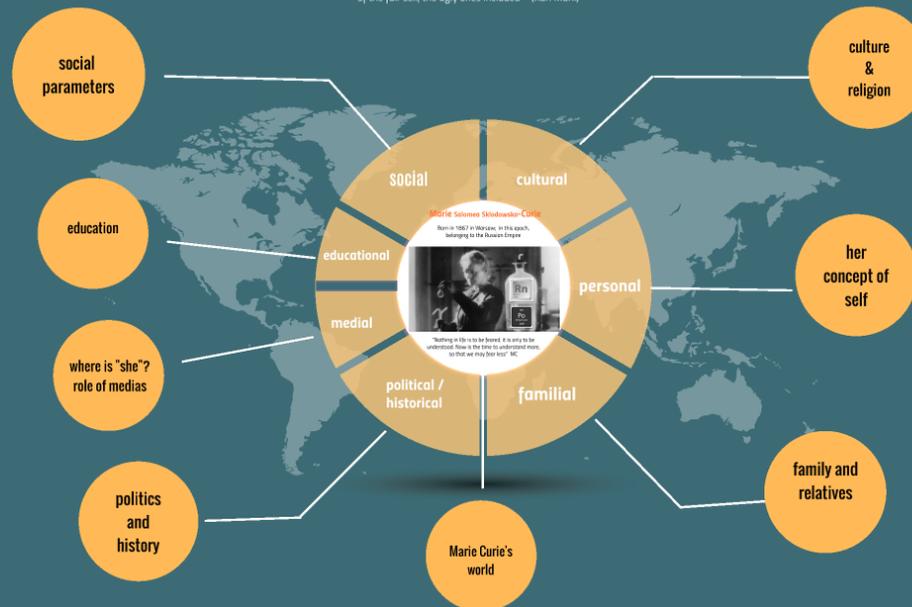


*Aim: to list some **Biases** who lead to what we witness still today:
women as a minority in top research in STEM
many still confronted with discrimination*

Where is the next Marie Curie

by Christine Bürki, T3 Switzerland

"Anyone who knows anything of history knows, that great social changes are impossible without feminine upheaval. Social progress can be measured exactly by the social position of the fair sex, the ugly ones included" (Karl Marx)



*Aim: to list some **Biases** who lead to what we witness still today:
women as a minority in top research in STEM
many still confronted with discrimination*

Where is the next Marie Curie



Where is the next Marie Curie

"Anyone who knows anything of history knows, that great social changes are impossible without feminine upheaval. Social progress can be measured exactly by the social position of the fair sex, the ugly ones included" (Karl Marx)

her life (&) circumstances

- She was born as Marie Salomea Skłodowska in a family with a close relationship to education. In the same year in which she was born, women were admitted to university for the first time in Zürich (1867) few years later in Geneva and Bern
- Her father introduced his 5 children to many natural phenomenons, to history, physical instruments...
- she could profit of a good education as undergraduate, although she had to go to Russian speaking schools. By this time in "Poland" she had as a women no access to Universities (invention of flying Universities)
- Marie made an agreement with her sister, Bronislawa, that she would give her financial assistance during Bronislawa's medical studies in Paris, in exchange for similar assistance two years later --> her father could only finance the studies of her brother... --> !!!
- She left Warsaw at young age and went to Paris, where she could study @ the University of Sorbonne (1891)
by this time, only a couple Universities in France and Switzerland permitted access to women
- She met her later husband and supporter/promoter Pierre Curie as a young student in Paris (got married 1894)

she got 2 Nobel Prizes and she was the first women to obtain one at all! -one in physics an one in chemistry, she is still the only person to have won 2 Nobel Prizes in 2 different fields.

she had 2 daughters, Irene and Eve. Irene followed in the mothers footsteps and got merited with the Nobel Prize, too in 1935 in Chemistry with her husband)



education

first University was founded by a women
~859, by Fatima al-Fihiri

first textual records from Mesopotamia the author was a
women --> Enebuanna (~2285-2250 BC), who lived in the
city of Ur --> (today Iraq)

Many research women did, were by the values of
"modern" understanding not anymore appreciated as
science

inferior equipment for female students and researchers

history of educational discrimination lasts more than
1000 years

families often could afford only to support one child with
his studies - they picked always a boy...

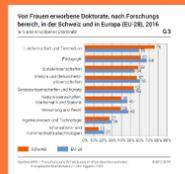
idea, that college impairs a woman's fertility

theories of the psychology of the 19th and early 20th
century claimed inferior abilities and intellect of women;
such "facts" always have been helpful for centuries to
exclude women... --> *actually once a real conspiracy
theory...*

**and
today?**

today ?

educational politics
understanding of education



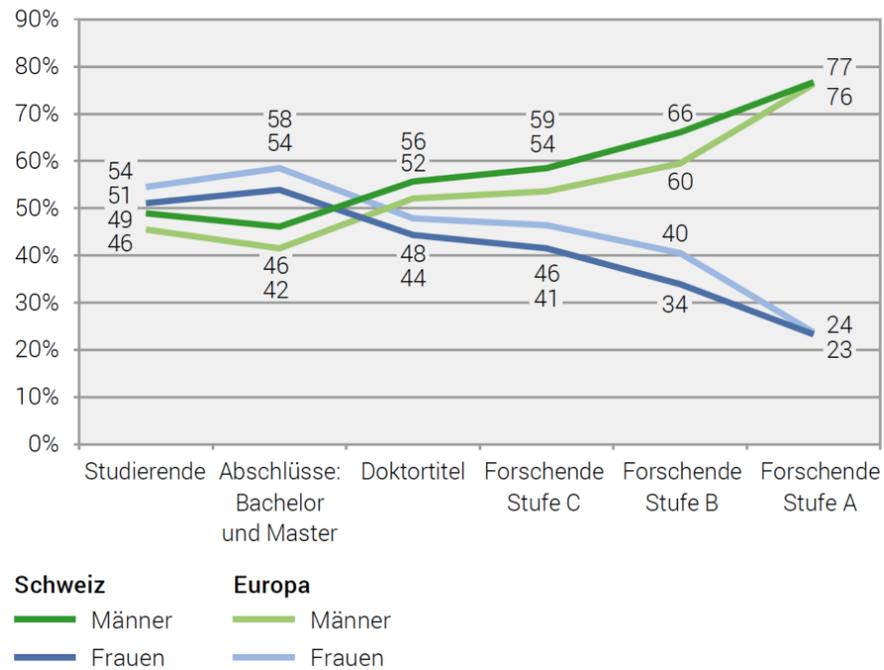
- The contributions of women are often overlooked by history
- because we tend to look at the past through "modern" eyes. The so called "presentism".
 - what is the gender of those researchers who have worked up the findings and achievements in the natural sciences of women of the past millennia?
 - Women were active f.ex. in astronomy and also in medical practice in **all periods** of history.
 - We also now know that their exclusion had *little to do* with women's practices and *everything to do with their gender*.

If we have a look at a table of current and former women presidents, I find it interesting to see, that those are found mostly in eastern or south-american countries:
https://de.wikipedia.org/wiki/Liste_weiblicher_Staatsoberrh aupter_und_Regierungschefs

Frauen und Männer in der akademischen Laufbahn, in der Schweiz und in Europa (EU-28), 2016

In % am Total jedes Abschnitts

G1



Quellen: BFS – SIUS, Forschung und Entwicklung (F+E) in den Hochschulen;
Europäische Kommission – She Figures 2018

© BFS 2019

Europäische Union: Anteil der in Forschung und Entwicklung (FuE) tätigen Frauen, aufgeschlüsselt nach Mitgliedstaat^{1 2} im Jahr 2020



DOWNLOAD

PDF XLS PNG PPT

Quelle
Eurostat → [Weitere Quellenangaben anzeigen](#)
→ [Veröffentlichungsangaben anzeigen](#)
→ [Ask Statista Research nutzen](#)

Veröffentlichungsdatum
März 2022

Region
EU

Erhebungszeitraum
2020

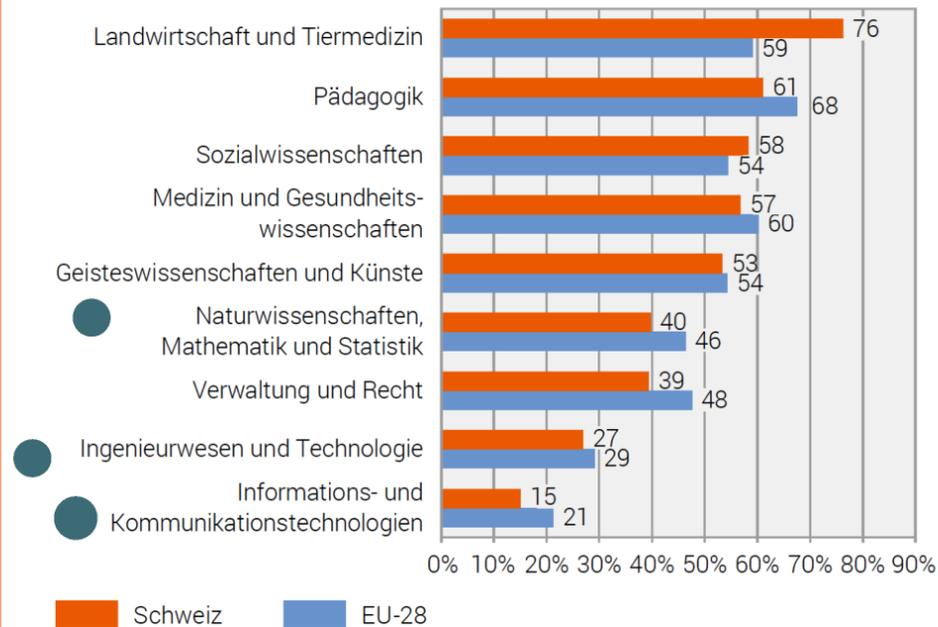
Hinweise und Anmerkungen
Die Berechnung erfolgt auf Basis von jährlichen Vollzeitäquivalenten(VZÄ). Hinsichtlich der Reichweite ist laut Quelle "der Anteil der Forscherinnen an der Gesamtzahl der Forscher in Pro-Kopf-Zahlen für alle institutionellen Sektoren" angegeben. Laut Quelle sind für Belgien, Finnland und Großbritannien keine Daten verfügbar.

¹ Großbritannien hat die Europäische Union (EU) zum 31. Januar 2020 verlassen (Brexit). Angaben zur

Von Frauen erworbene Doktorate, nach Forschungsbereich, in der Schweiz und in Europa (EU-28), 2016

In % aller erworbenen Doktorate

G3



Quellen: BFS – Forschung und Entwicklung (F+E) in den Hochschulen;
Europäische Kommission – She Figures 2018

© BFS 2019

The contributions of women are often overlooked by history

- because we tend to look at the past through "modern" eyes. The so called "presentism".
- what is the gender of those researchers who have worked up the findings and achievements in the natural sciences of women of the past millennia?
- Women were active f.ex. in astronomy and also in medical practice in ***all periods*** of history.
- We also now know that their exclusion had /has little to do with women's practices and *everything to do with their gender.*

Francis Bacon's essay, 1663, shorturl.at/fAKP9,



Bacon criticized the *contemplative view of nature* before his time as "weak" and "feminine" and called for the age of the "supermen", who as researchers would make nature their slave. Until today the natural sciences are considered as the "proper" science and are opposed to the "soft" sciences, the humanities.

keep in mind the following for:
reinterpretation and reassessment of some still vivid ideas...

- From "Gaia" to the Babylonian confusion about the term "Mother Earth" --> "Gaia", was a great Goddess Earth who was not yet a slave.
- **Demeter and Kore** were peasant gender figures and before Zeus moved into Olympia, priestesses of **Demeter** still presides over the Olympic games.
- Archaeological research has opened up for us the **sacred art** of early mankind in all parts of the world and shows, that **their expressions worldwide relate to female symbols**.
- The matricentric worldview **knows no polarization between heaven and earth** and therefore no fixed allocation to lower and upper Gods
- with the further rise of **agrarian culture, this previous worldview was torn apart**.
- the **restructuring of the worldview, implementing patriarchal structures** provoked a new **myth of birth**: not only the turn of the matrilineal to the patrilineal clan organization was sealed, but also the **degradation of the earth**, in which man no longer saw the archetype of creativity...
- this new understanding of **spirit-nature**, provided the idea of: "**Be fruitful, multiply and subdue the earth**" and both orders go primarily to the man --> until back to the Phoenician...
- The **simple work** of maintaining life was **delegated** to those **who did not share in the male spirit: to women, to animal slaves**
- The most important **transition** from a **nature-bound to a nature-dominated society** occurred at the beginning of the modern era, when Francis Bacon (1561-1626) laid the foundations for modern natural science
- Enlightenment culture of the eighteenth century encouraged improvement through education including science and mathematics.

and today?

today

many hardcore believes from ancient times still are part of our culture - became a sealed part of religion:

--> women have to look after the kids; they will get married anyhow, they change their personality if they are educated, they have to serve the men, they are not gifted for higher education...

The Gender Social Norms Index (GSNI), covering over 80% of the world's population, shows that:

- almost 50 % of the world's men and women feel that men make better political leaders
- over 40% feel that men make better business and that men have more right to a job when jobs are scarce.
- 28% think it is justified for a man to beat his wife.

other numbers: (UNICEF)

- 129 -132 '000'000 girls do not go to school
- 781' 000'000 illiterate worldwide among 2/3 are women

**although: > the right of education is declared as a human right
by the UN**

Quellen: human development report: <https://hdr.undp.org/content/2020-gender-social-norms-index-gsni>
education at glance: https://www.oecd-ilibrary.org/education/education-at-a-glance_19991487
OECD-Indikatoren: <https://www.destatis.de/DE/Themen/Laender-Regionen/Internationales/Thema/bevoelkerung-arbeit-soziales/bildung/>
Bildung_auf_einen_Blick.html?sessionid=FE35911A5F14866F90883728D6ED7228.live?41

what was her character like?

- She was a hard worker with a sharp brain
- she had a vision / idea / an aim
- Already as child she had an urge to prove herself but also an uncanny thirst for knowledge
- she had the idea that science should give some more cognition and on the other hand serve mankind.
- she lived in a modest way: she earned very little money with being a tutor
- she had self-confidence --> *see quote...*
- she merely had to look for herself

ex. of her quotes:

"In science, we must be interested in things, not in persons".

She brain-tattooed the following sentence:

"you have to believe in the fact, to be gifted for a certain thing. And you have to achieve that thing, no matter what the cost"

and today?

today:

- chill and easy one should take life; has life to be!
- a striking reduction of knowledge in schools at all ages (thanks, Bologna-reform!)
- an uprise of schoolbooks who even prevent regular training /automation of basic standards - like learning the 1x1 or the konjugation of verbs (do some training ? what for? (except for sports it is still accepted to do (hard) training)
- lack of visions - no future groove
- the urge for consumption of all kind of things
- overconsumption of media --> digital distraction (--> unhealthy neuronal developpment)
- lack of passion and patience a fun society - saturated - comforted

family

- she had a supportive environment from both her parents and some relatives and parents friends, too
- her father could only finance the studies of her brother
- her parents showed their kids, that for every problem there is a solution - if one is looking for it...
- Maria Curie herself transmitted her passion to her daughters; Irene was her most important assistant until her death; together with her husband Frédéric Joliot , Irene, too won a Nobel-Prize (1935)

and a daughter of Irène, *Hélène Langevin-Joliot* (née Joliot-Curie; born 19 September 1927) became a French nuclear physicist known for her research on nuclear reactions in French laboratories... She is also known for her work in encouraging women to join STEM fields through interviews and stories she tells of her mother and grandmother.

and today?

today

- in many cases missing parental support / inspiration or at least they don't get enough.
- Kids are not anymore part of their parents work-life --> knowing where they work and what they do.
- missing vivid, authentic role models
- breaking up of family-bonds
- not many regular contacts to adults (apart from parents and teachers)

**we do encounter a gender- dependent
socialization - for millennia**

- Based on the different biases of culture/religion, the bourgeois woman in particular had clear guidelines on how she had to be and to behave.
- characteristics of men and women are clearly defined by traditional social norms.
- genes and the environment shape our personality.
- at the beginning of the 20th century, Psychology has constructed theories about women without evidence.
- The very interest in the investigation of nature by women was often seen as distasteful or suspicious.
- it was believed, that knowledge of the world was an unfit for feminine sensibilities.

and today?

today

- in many countries as we could see, access to education for women is still not allowed or limited.
- Because of gender stereotypes, girls and boys take advantage of different learning opportunities from an early age

which leads to:

- the development of different perceptions of one's own abilities.

thereafter: where is she?

finding her is a very multi-factorial adventure:

- gender stereotypes are one thing
- genetic inheritance of old social patterns the other

but cross your heart:

- MC had an unbroken will, intrinsic interest, perseverance
- was very disciplined - and was also willing to make sacrifices, to work hard
- she knew that only she was the master of her life/future
- she had an educational family environment
- no competing distractions (club activities, sports, peer groups, cell phone, TV, radio, etc.)
- no environment that tried to make her believe that even high goals can be achieved easily - on the contrary, she always had to prove that she could do it.

**and last
but not
least:**

the role of medias...

- Medias by any kind do have a crucial impact for the propagation of the discovery of women in STEM and else where.
- The visibility of STEM women in the media is still low, with a percentage of women surveyed of **25-29%** and a citation rate that is half that of men, even in science journalism (source: Sara Reardon, Nature 2021)
- the high presence of Marie Curie in the medias has neither only positive effects
- Vera Rubin (1928 - 2016) and many many others.

other early STEM women:

Jeanne Baret (1740-1807)

Nicole-Reine Étable de la Brière Lepaute. (5 janvier 1723 - 6. Dez. 1788)

Maria Gaetana Agnesi (16. Mai 1718 in Mailand - 9. Januar 1799)

Marie-Anne Paulze (1758 - 1836) mit Lavoisier (gunpowder) 1794 Guillotine, Gemälde von Jacques-Louis David, Frankreich

Caroline Lucretia Herschel. (March 16, 1750– January 9, 1848)

Anna Morandi (January 21, 1714–July 9, 1774)

Laura Bassi (1711–1778)

my conclusion: "new" Marie Curie's are around. Despite all the hurdles still present these days.
BUT again,
we have to overcome the traditional Biases I was trying to point at.

Not only because of us, women - but also because of nature in general. We are 100% dependent on a healthy environment.
If man dominates something he is actually 100% dependent on, it can only go wrong. And this fact we see today everywhere in this world - in the shape of **the different environmental crises.**