Experimental test of a new global discrete symmetry

I will present biblio-metric data about "fundamental theory and gender", and interpret what data means and answer the big question:

The $M \leftrightarrow F$ symmetry (S_2 generalized to gender S_n)

C) is explicitly broken (namely, it's not a symmetry, $M \neq F$)?

M) is spontaneously broken (namely, due to discrimination)?

M(ainstream?) Theory

[In string gender conferences, check links]

"All women share the same kind of sad and unfair experiences since the beginning of their scientific career". "Mansplaning. Gaslighting. White Male Hetero Privilege. Sexual harassment at epidemic levels. Micro-aggressions". Men mobilize their masculinity supporting ... men in ways that advance careers.

You don't see? You have (unconscious) bias and steal credit to women. "Evaluators tend to favour men". "Scientific quality is a gender social construction".

"Excellence is the current buzzword. Gender equality should achieve the same".

"I have a dream: that ... excellence in science is no more distorted and sweletred by gender stereotypes or creeping discrimination". "Positive discrimination and gender mainstreaming", "We have to help women at all levels ... to academic positions", "programmes for women ... challenged in court for discrimination" [vs men]. "People and culture can be obstacles for change".

C(onservative?) Theory

Physics is a community of interest, optimised to understand nature.

1. Physics does not depend on nation, race, sex $\Rightarrow$

   open to good people from any background.

   Indeed physics was international when 'culture' served nationalism.
2. Pushing the limits of human brain, physicists heavily selected on

   interest (1 person every 10?) and ability (1 person every 1000?).

   Indeed science created the modern world. Not easy.
3. It required developing tough selective rules and a great culture

   intellectual honesty + quantitative evidence.

Predictions

Both theories have unpleasant implications. Usually we don't care why physicists are not distributed uniformly. But now we have gender conferences.

M: "Science (especially physics) is not only sexist but also racist" [S. Harding].
$\Rightarrow$ Discrimination against women in citations, conferences, hirings...
$\Rightarrow$ More 'gender equality' gives more women in STEM.
$\Rightarrow$ Less women closer to power and where merit is more subjective.

C: some groups over-represented because over-performing.
$\Rightarrow$ Interest and ability not uniformly distributed;
$\Rightarrow$ in a way that explains observations.
$\Rightarrow$ Smarter people less affected by implicit bias, traps, etc.

Use data to see what is right

InSpire can be dowloaded getting big data for sociology in fundamental physics, including gender: 30 Mreferences, 1 Mpapers, 70 Kauthors, 7 Kinstitutes. Add:

- Sex from name and country: 85% coverage. Miss old/unknown authors.

- 9K 1st hirings in InSpire. Complete? To check, "hirings" $\equiv$ 5 (or 10) years with the same affiliation: 19K (40K). Main results unchanged.

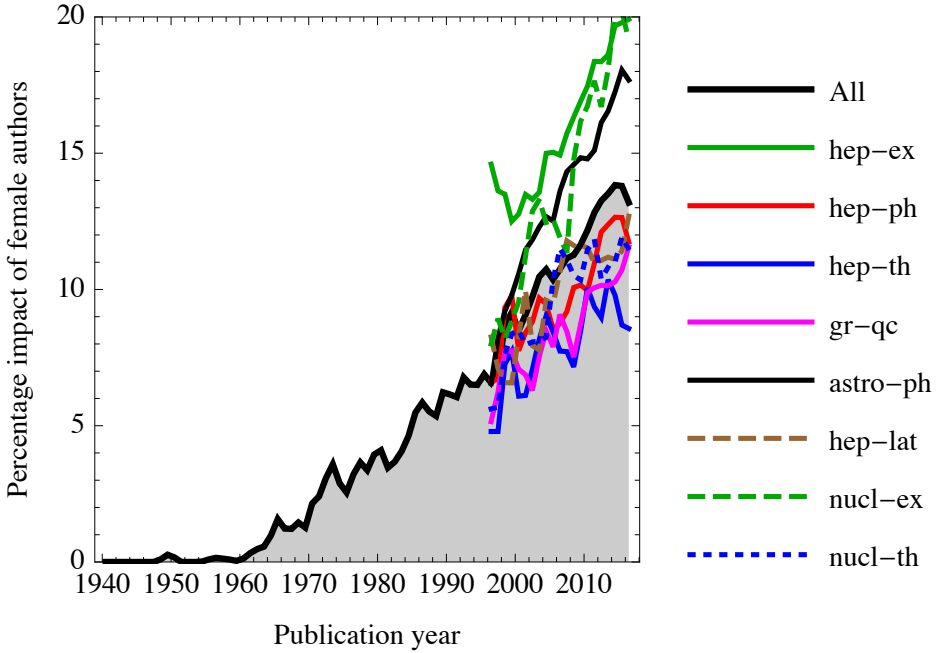
- Fractional counting i.e. unitarity: replace $N_{\rm cit}$ with $N_{\rm cit}/N_{\rm aut}$ or "individual citations" $N_{\rm icit} \equiv N_{\rm cit}/N_{\rm aut}N_{\rm ref}$. Works. Big difference for experimentalists with many $N_{\rm aut}$. 50% of citations after 2000: dominated by recent times.

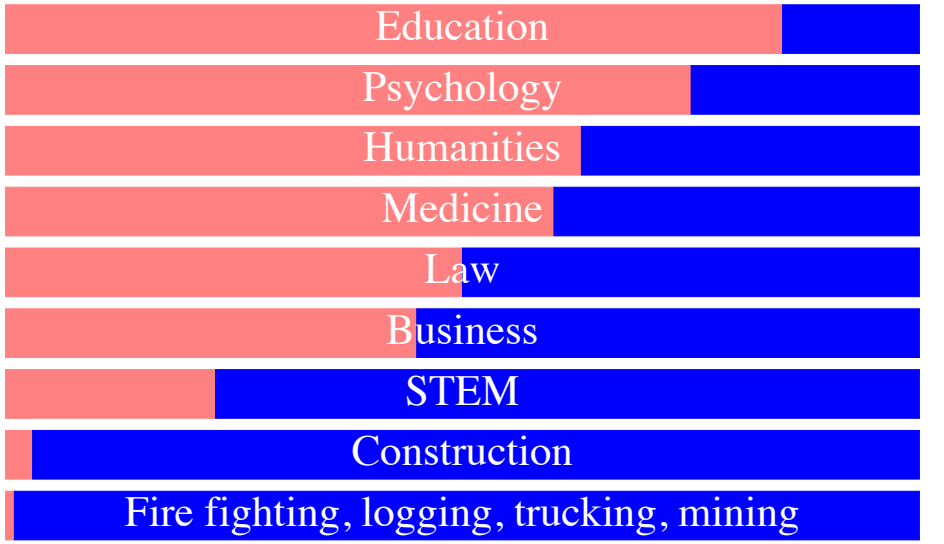
- Some statistics, like for Higgs discovery.

  [Strumia, Torre, *Biblioranking fundamental physics*, arXiv:1803.10713]

% of women in different fields

Less women in STEM than in humanities (where right/wrong good/bad distinctions is less clear) or ∼legal professions (where real power is).



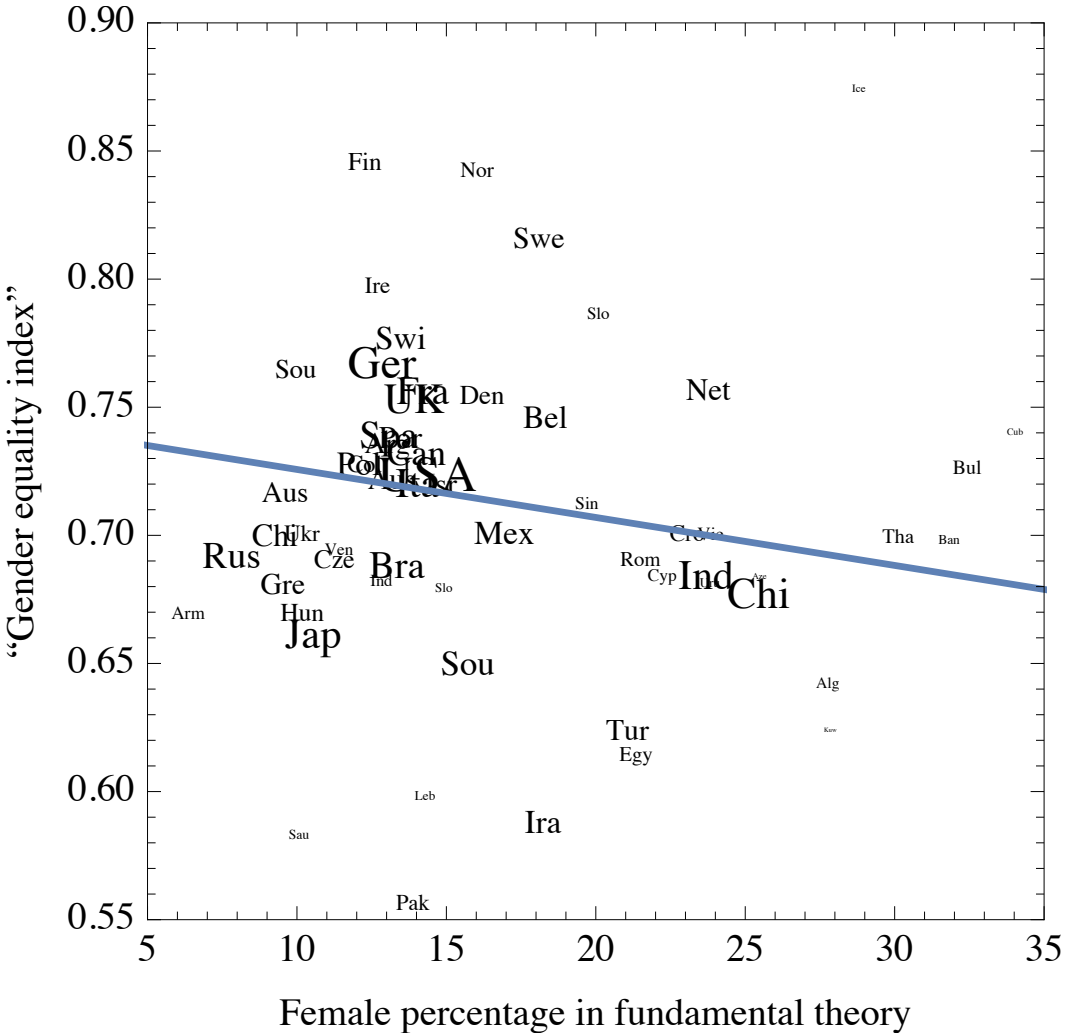


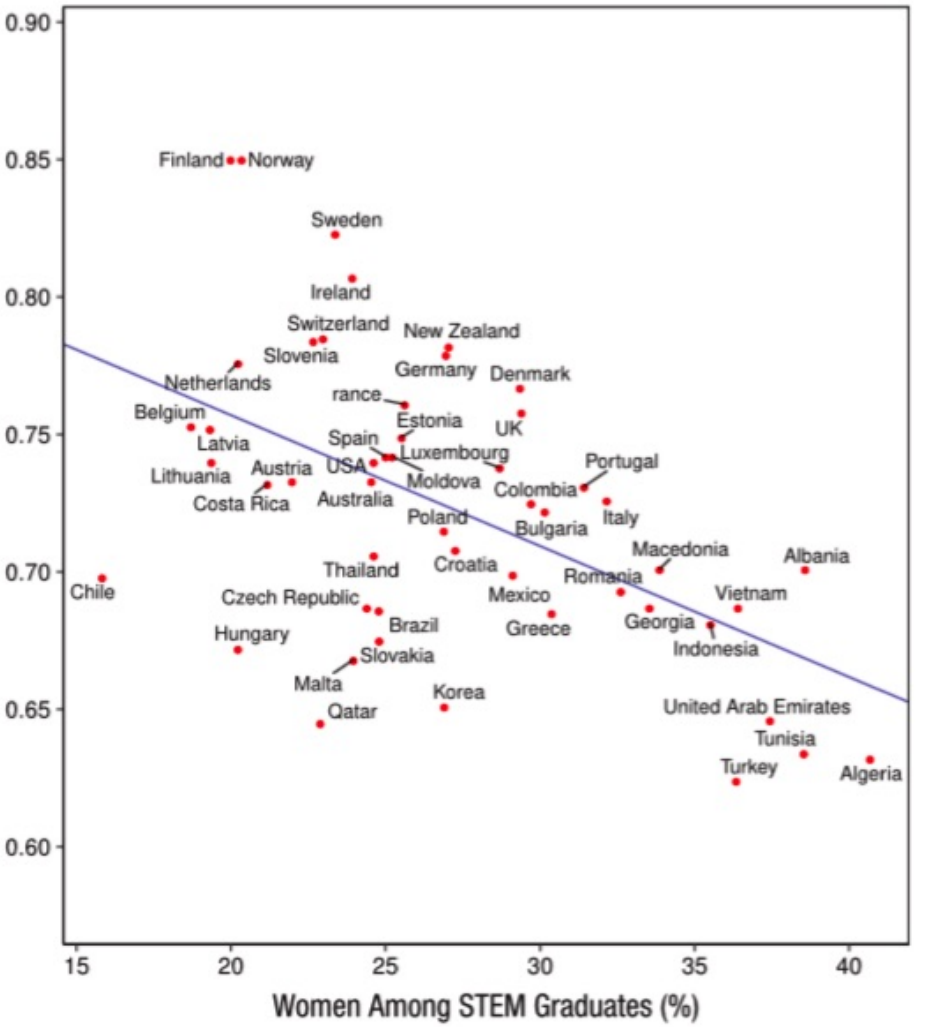
Also at CERN: female $\%_{\text{admin}} \gg \%_{\text{physicists}} \gg \%_{\text{technicians}}$.

Does not look discrimination

% of women in theory

% of women in theory and STEM **anti**-correlated with "gender equality index"





Known as 'gender equality paradox', but only if you believe in the wrong theory.

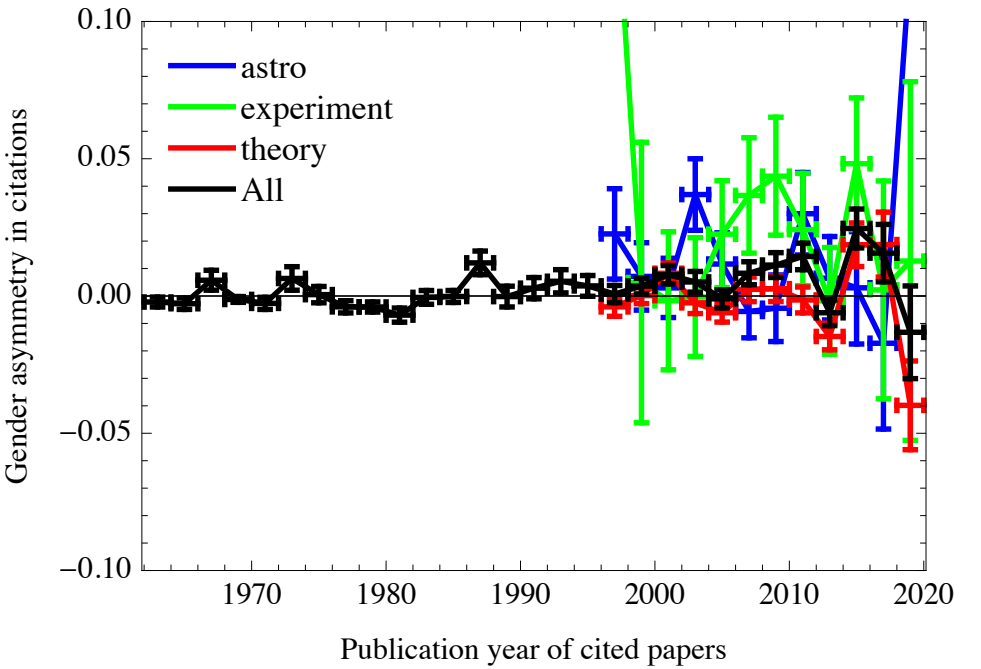
Sexism in citations?

Count single-author that cites different single-author, define

$$\text{Gender asymmetry} = A \equiv \frac{1}{N^{\text{cit}}_{M\to} N^{\text{cit}}_{F\to}} \det \begin{pmatrix} N^{\text{cit}}_{M\to M} & N^{\text{cit}}_{M\to F} \\ N^{\text{cit}}_{F\to M} & N^{\text{cit}}_{F\to F} \end{pmatrix} \qquad -1 \le A \le 1$$

InSpire, after 2010

category	A
hep-ex	$(-1.2 \pm 1.7)\%$
hep-ph	$(0.1 \pm 0.6)\%$
hep-th	$(-0.1 \pm 0.7)\%$,
astro-ph	$(0.6 \pm 1.1)\%$
hep-lat	$(0.2 \pm 2.2)\%$
nucl-ex	$(0.2 \pm 2.1)\%$
gr-qc	$(0.2 \pm 1.2)\%$



No gender preference in citations in any category at any time, down to % level.

M more cited than F, equally by M and F: it's merit, not sexism. Ed $\neq$ Rocco.

Similar analysis applied to countries finds instead significant asymmetries.

Sexism in citations?

A speaker claims sexism in citations quoting 1610.08984:

QUANTITATIVE EVALUATION OF GENDER BIAS IN ASTRONOMICAL PUBLICATIONS FROM CITATION COUNTS

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Institute for Astronomy, Department of Physics, ETH Zurich, CH-8093 Zurich, Switzerland

October 31, 2016

Abstract

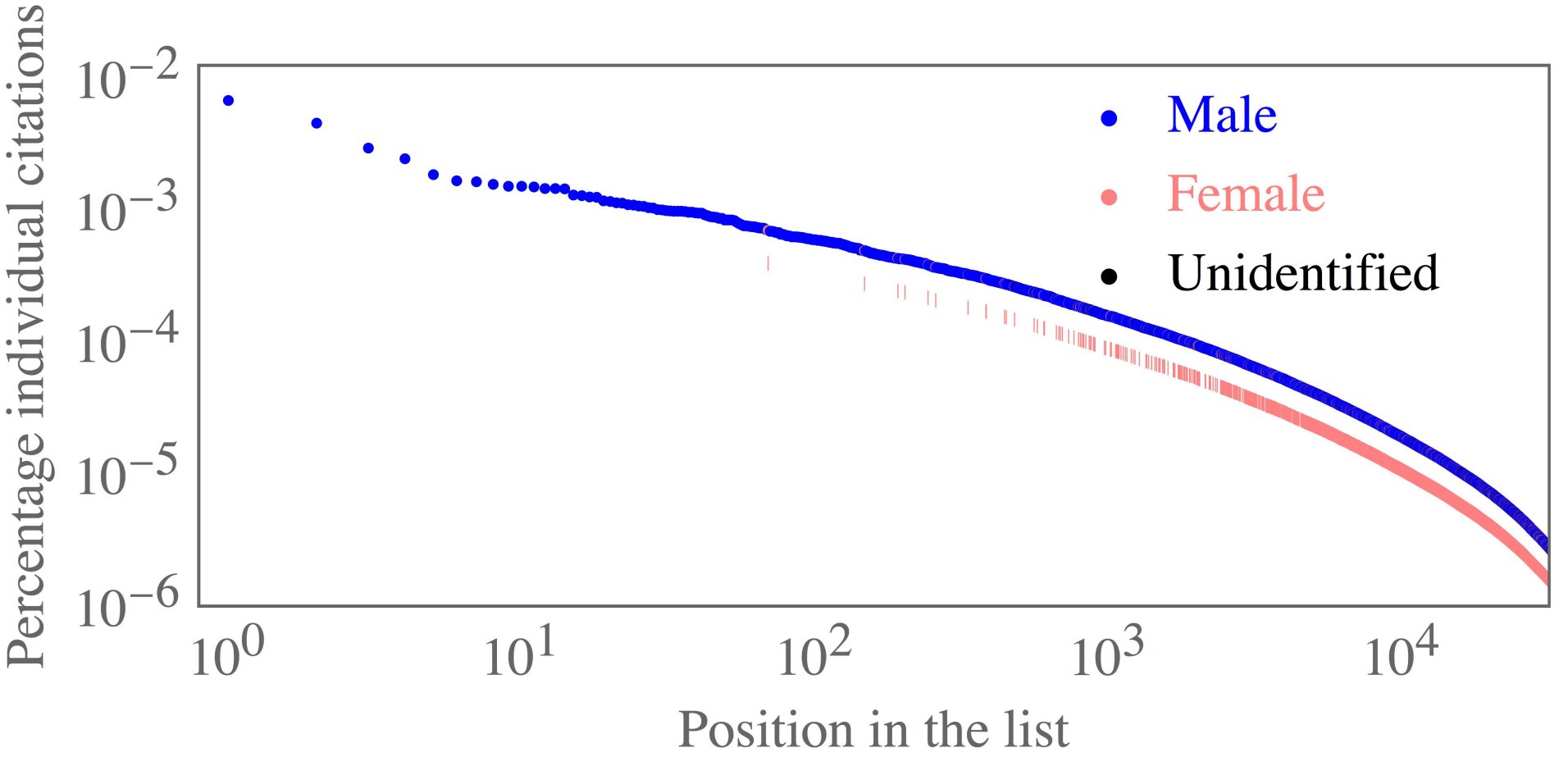
We analyze the role of first (leading) author gender on the number of citations that a paper receives, on the publishing frequency and on the self-citing tendency. We consider a complete sample of over 200,000 publications from 1950 to 2015 from five major astronomy journals. We determine the gender of the first author for over 70% of all publications. The fraction of papers which have a female first author has increased from less than 5% in the 1960s to about 25% today. We find that the increase of the fraction of papers authored by females is slowest in the most prestigious journals such as Science and Nature. Furthermore, female authors write $19 \pm 7\%$ fewer papers in seven years following their first paper than their male colleagues. At all times papers with male first authors receive more citations than papers with female first authors. This difference has been decreasing with time and amounts to $\sim$6% measured over the last 30 years. To account for the fact that the properties of female and male first author papers differ intrinsically, we use a random forest algorithm to control for the non-gender specific properties of these papers which include seniority of the first author, number of references, total number of authors, year of publication, publication journal, field of study and region of the first author's institution. We show that papers authored by females receive $10.4 \pm 0.9\%$ fewer citations than what would be expected if the papers with the same non-gender specific properties were written by the male authors. Finally, we also find that female authors in our sample tend to self-cite more, but that this effect disappears when controlled for non-gender specific variables.

Reading it

Of course we cannot claim that we have actually measured gender bias. One could imagine numerous

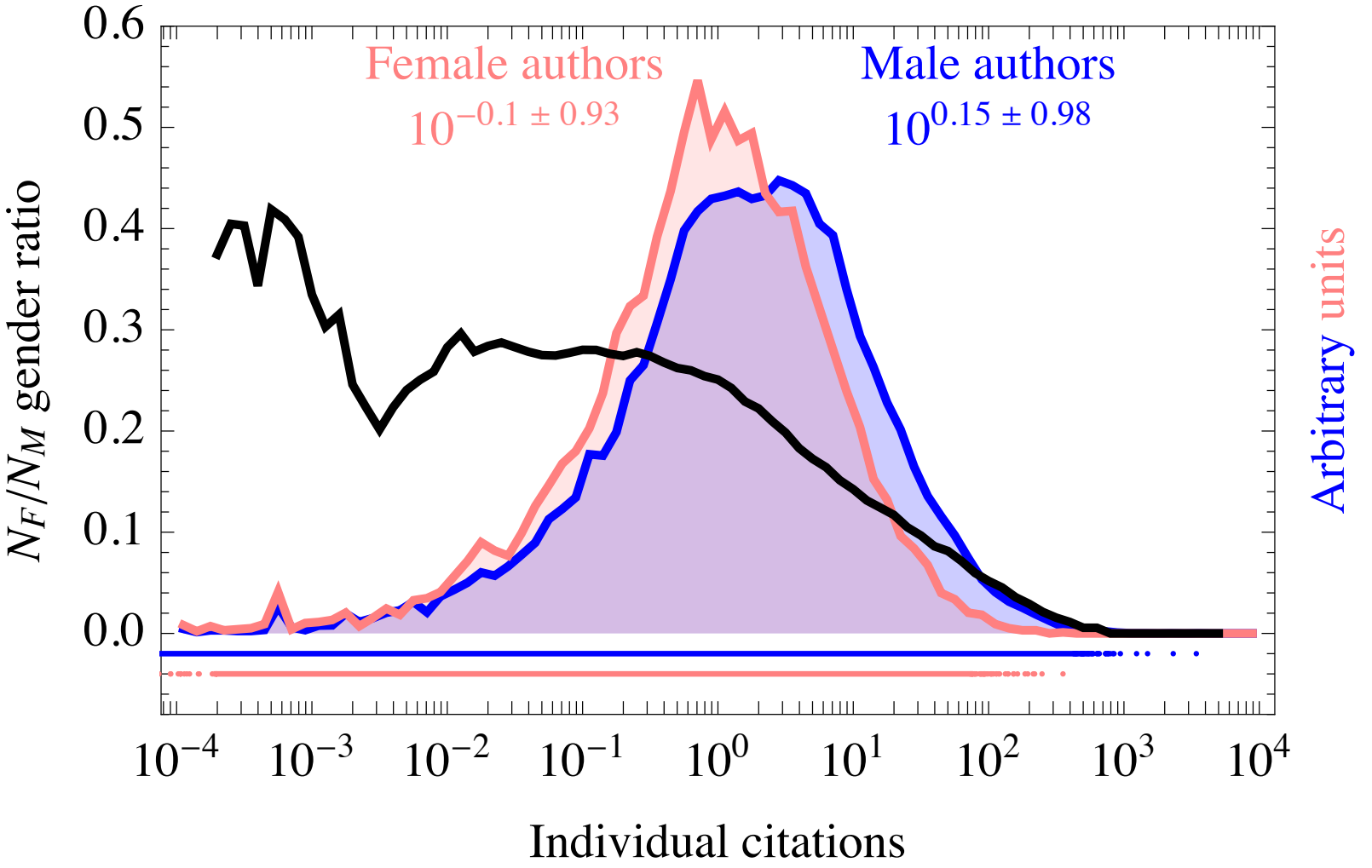
Sexism in conferences?

Silvia Penati et al. complain when key speakers at conference are men.
Key speakers are top-authors invited to attract participants.
Top authors are man, man, . . . man and produced 10%, as the bottom 50000.



Why female-only physics speakers at "gender equality" conferences?

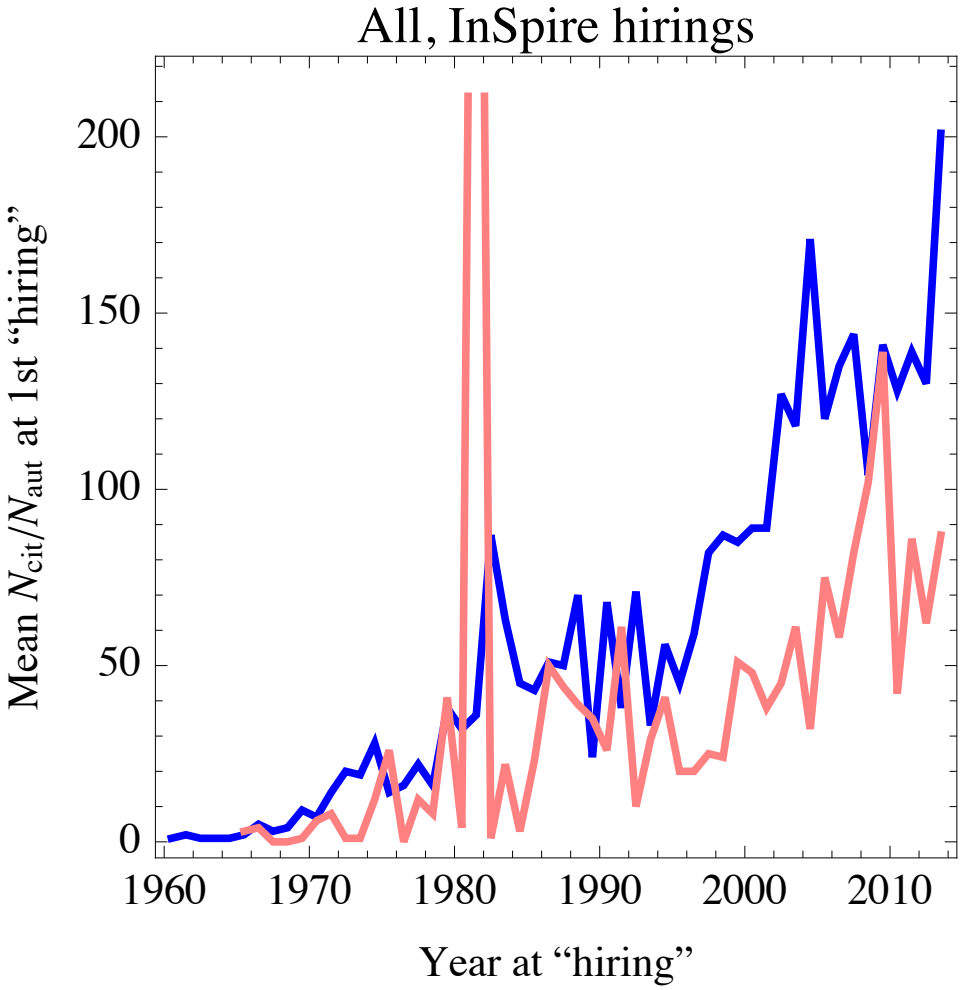
Distribution of individual citations

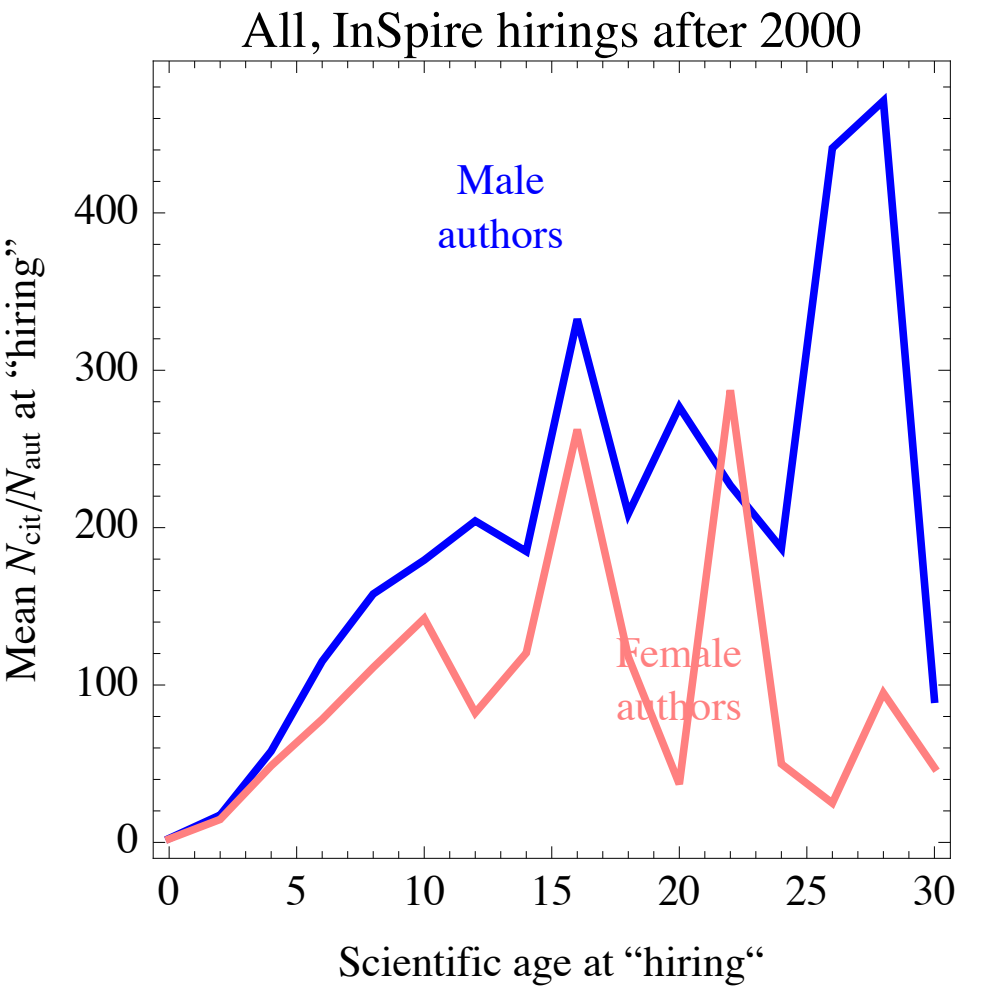


Less women around the top (log scale!).

Persists restricting to fixed time (not due to $N_{F/M}(t)$), to hired/unhired, theory.

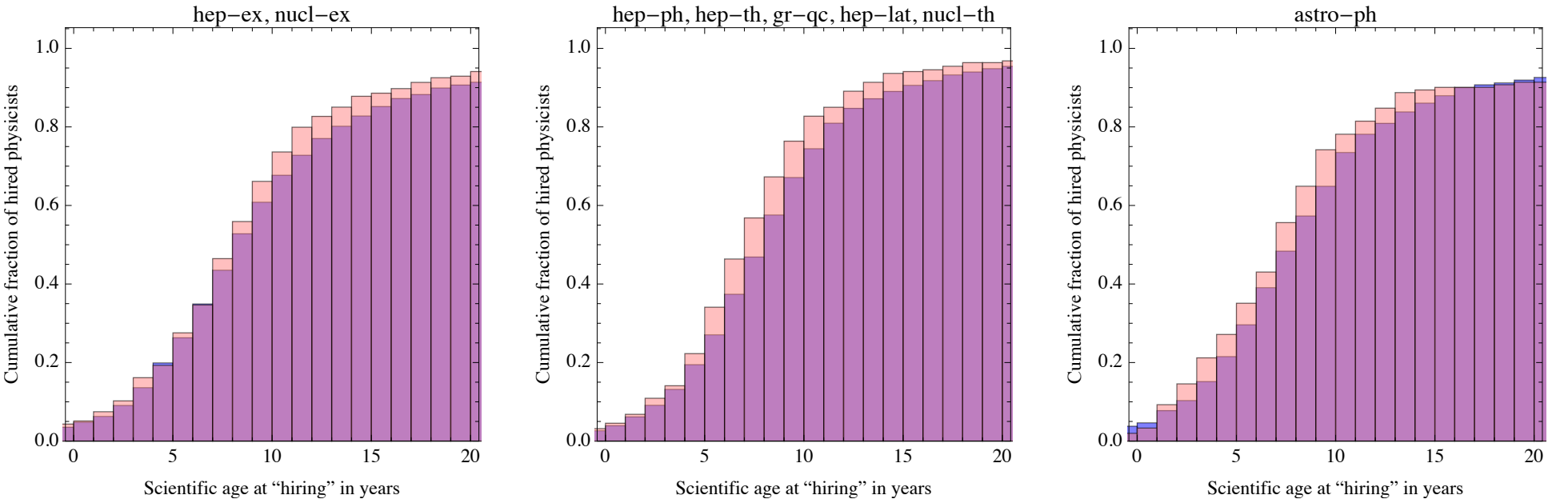
Gender asymmetry in hiring





On average, women "hired" with less citations.

Gender asymmetry in hirings: by age



Women "hired" $\mathcal{O}(1)$ year earlier than men with similar biblio-metric.

Gender asymmetry in hiring: by country

Mean number of citations at 1st InSpire hiring, all authors, after 2000:

country	Male		Female		Male/Female	
	"hirings"	$\langle N_{\text{cit}}/N_{\text{aut}} \rangle$	"hirings"	$\langle N_{\text{cit}}/N_{\text{aut}} \rangle$	"hirings"	$\langle N_{\text{cit}}/N_{\text{aut}} \rangle$
US	729	119	161	59	5:1	2.0:1
China	176?	44	49?	82	4:1	0.5:1
France	172	134	38	49	5:1	2.7:1
Japan	262	123	22	69	12:1	1.8:1
UK	165	199	34	129	5:1	1.5:1
Germany	164	183	25	81	7:1	2.3:1
Italy	150	121	23	82	7:1	1.5:1
India	71	91	24	51	3:1	1.8:1
Spain	80	193	14	163	6:1	1.2:1
Canada	58	152	11	112	5:1	1.4:1
Brazil	60	57	6	35	10:1	1.6:1
Russia	38	132	5	8	8:1	16:1
Australia	22	158	6	49	4:1	3.2:1
Netherlands	20	312	5	42	4:1	7:1
Turkey	26	51	3	5	9:1	10:1
Mexico	26	70	3	50	9:1	1.4:1
Chile	19	109	3	22	6:1	5.0:1
Sweden	25	129	2	16	12:1	8:1

Recent: case studies

INFN positions in theory, 2018. Gender 'experts' only:

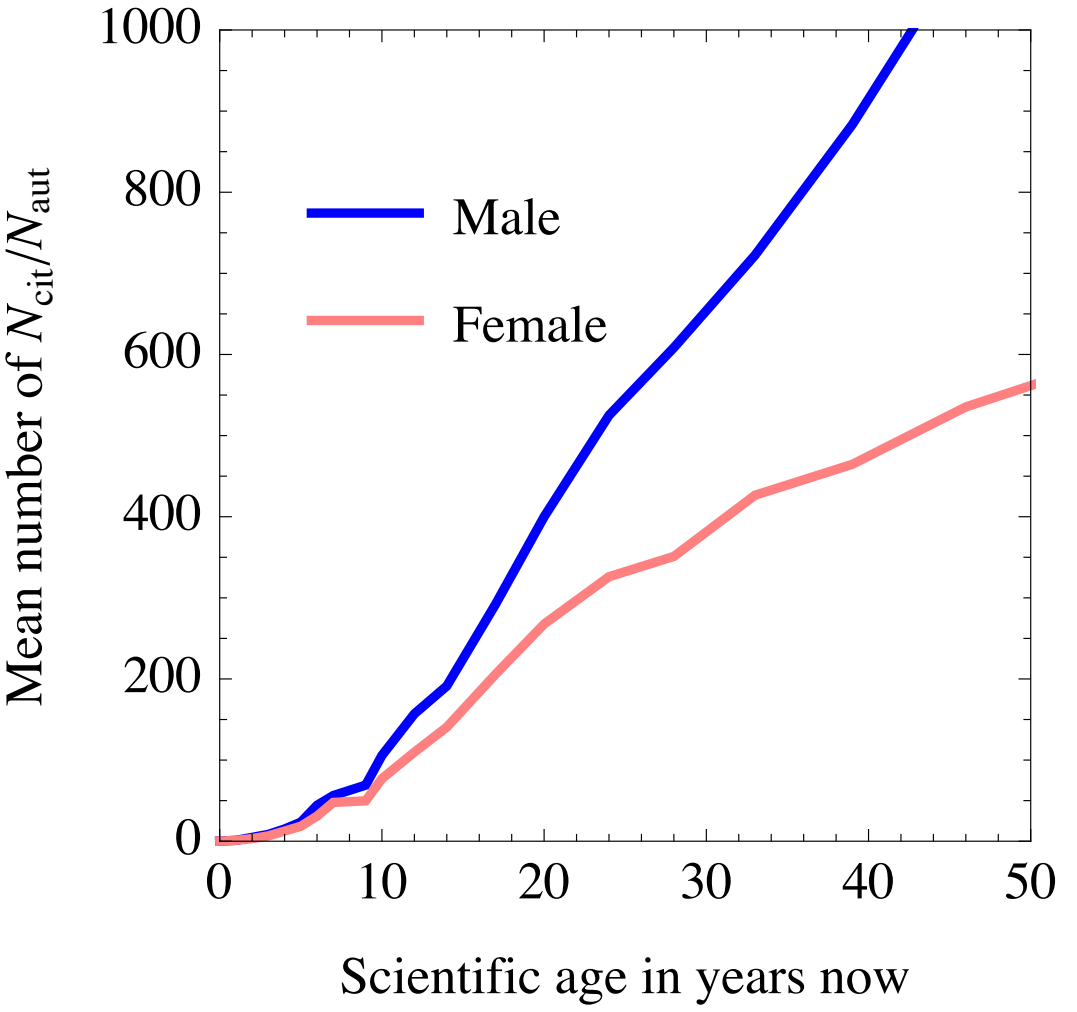
Role	Name	N_{cit}
Commissar	Silvia Penati	2130
Hired	Anna Ceresole	3231
Not Hired	Alessandro Strumia	30785

"The oppressive ambient started to open".

All present CERN fellows:

Sex	$\langle N_{\text{pap}} \rangle$	$\langle N_{\text{cit}} \rangle$	$\langle N_{\text{icit}} \rangle$	$\langle$1st paper$\rangle$
Male	22.6	1464	5.9	2008.7
Female	14.4	853	3.0	2010.6

Mean career path



Smaller gap at post-doc level. Similar difference restricting to hired/unhired.

Discrimination against women

Physics invented and built by men, it's not by invitation.

Curie etc. welcomed after showing what they can do, got Nobels...

Discrimination against men

Moseley, Schwarzwild, ... killed in WW.

⋮

"Oxford University extends exam times for women's benefit" (changed title).
"Italy: free or cheaper university for STEM female students".
"Scholarships for women" only.
Melbourne U.: STEM positions for women only.
Many places: administration wants 50% irrespective of merit.
"2:1 faculty preference for women on STEM tenure track".

⋮

"Only adult able-bodied males ... may be called upon for forced or compulsory labour" (old UN convention still valid today).
Discriminations against men "shall not be considered discrimination" (Istanbul convention article 4). Click to check.

⋮

ERC plans: give priority to "specific policy objectives": 40% gender quotas.
In theory this means: 40% of funds to 10% of people rare among top authors.

Quotas in best jobs only is not equality

Men make worst jobs, and 95% of work deaths.

Give a try to Conservative theory

Interest

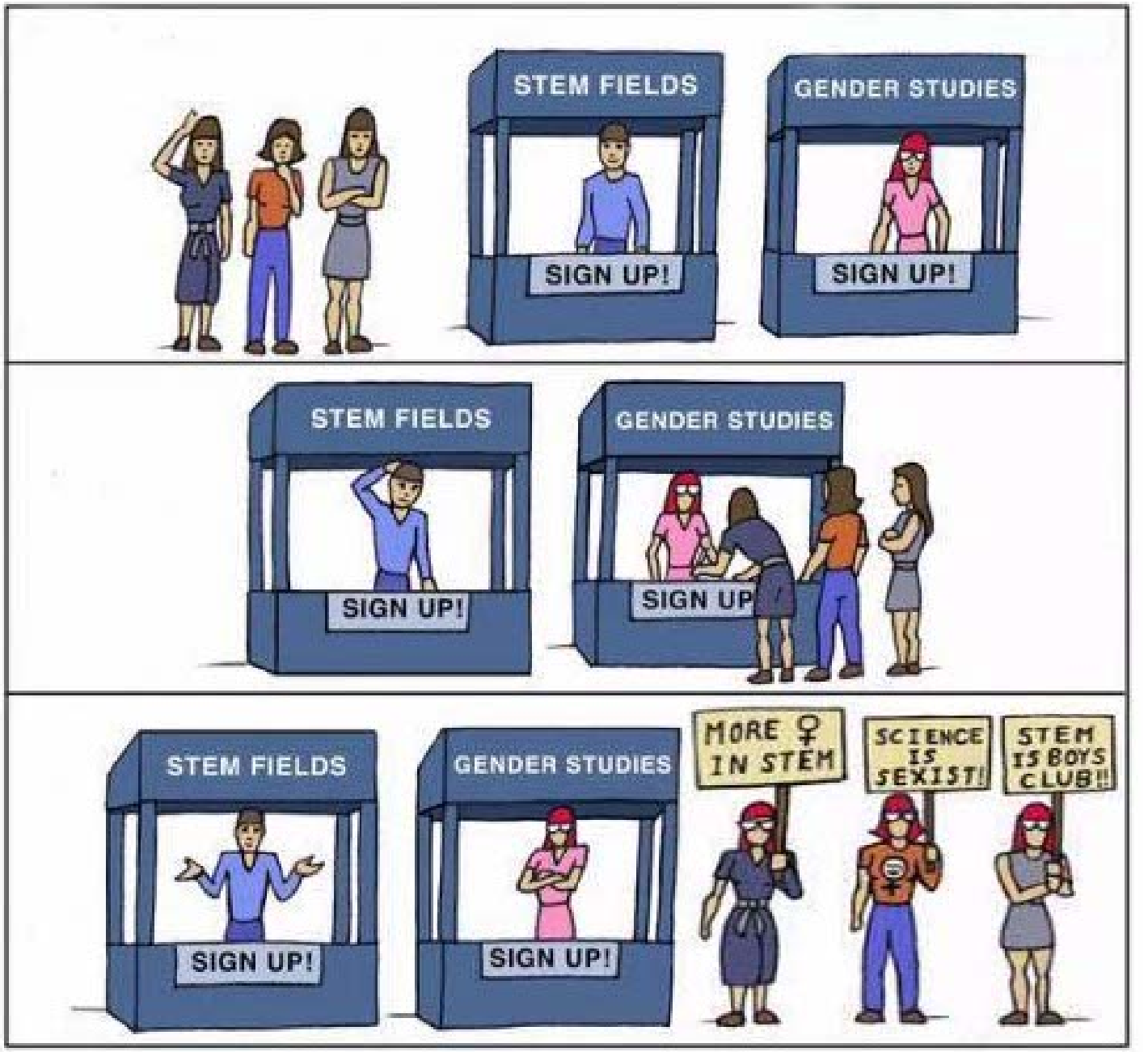
Past gender-string conferences: talks by Gina Rippon (1858 citations), a neurobiologist critical of 'neurotrash' like Simon Baron-Cohen (157000 citations) who claim **observation** that men/women have different average interests

- "Men prefer working with things and women prefer working with people, producing a large effect size ($d = 0.93\sigma$) ... Sex differences favoring men were also found for more specific measures of engineering ($d = 1.11\sigma$), science ($d = 0.36\sigma$), and mathematics ($d = 0.34\sigma$) interests".
- Difference even in children before any social influence.
- Difference even in monkeys.
- Female preference not influenced by gender politics e.g. hiring more females. (Good physicists don't follow role models).

Proposed explanation:

- Empathizing-systemizing brain influenced by level of pre-natal testosterone.
- Test: measure secondary traits like 2D:4D digit ratio in female physicists.

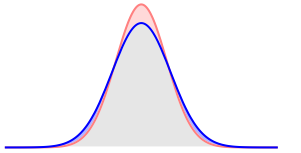
Maybe not fully right. The opposite assumption of identical brains is ideology.


STEM FIELDS
SIGN UP!
GENDER STUDIES
SIGN UP!
STEM FIELDS
SIGN UP!
GENDER STUDIES
SIGN UP
STEM FIELDS
SIGN UP!
GENDER STUDIES
SIGN UP!
MORE ♀ IN STEM
SCIENCE IS SEXIST!
STEM IS BOYS CLUB!!

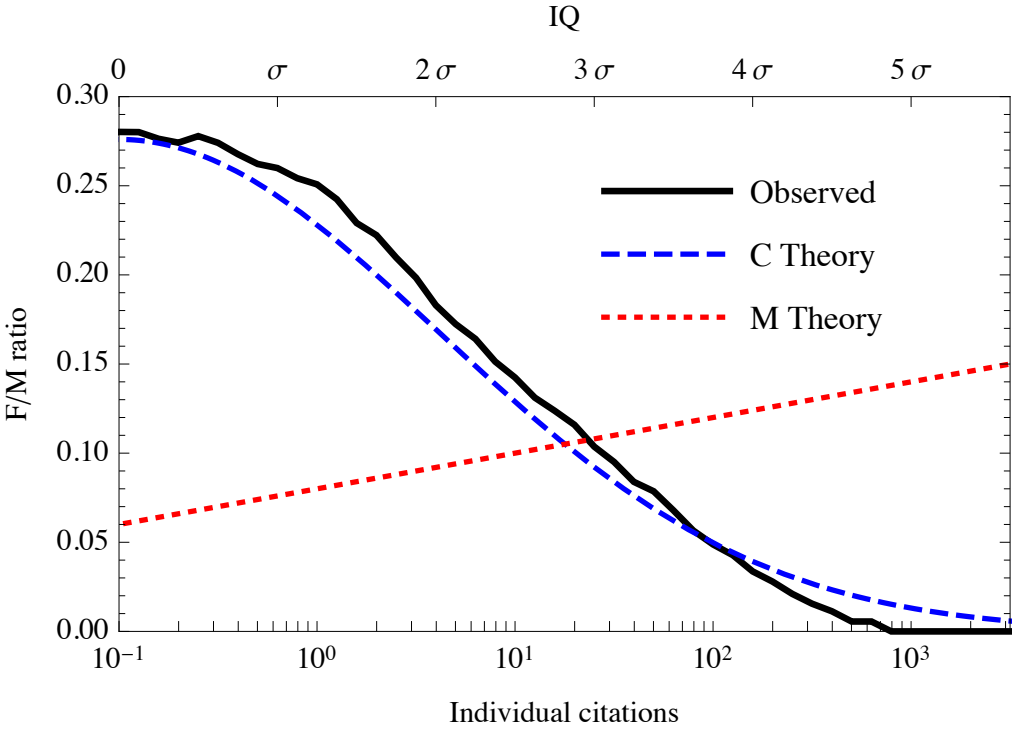
Ability

Physics graduates have top $\langle \text{IQ} \rangle$, it's needed. Men have similar $\langle \text{IQ} \rangle$ as women and $\sim 15\%$ higher standard deviation ('diversity'), as in other traits. C predicts:

$$\frac{N_F}{N_M} = (\text{interest}) \times (\text{ability}) \approx \frac{1}{4} \times \frac{\text{Gaussian}(\sigma = 1)}{\text{Gaussian}(\sigma = 1.15)} = \frac{1}{4} \times$$



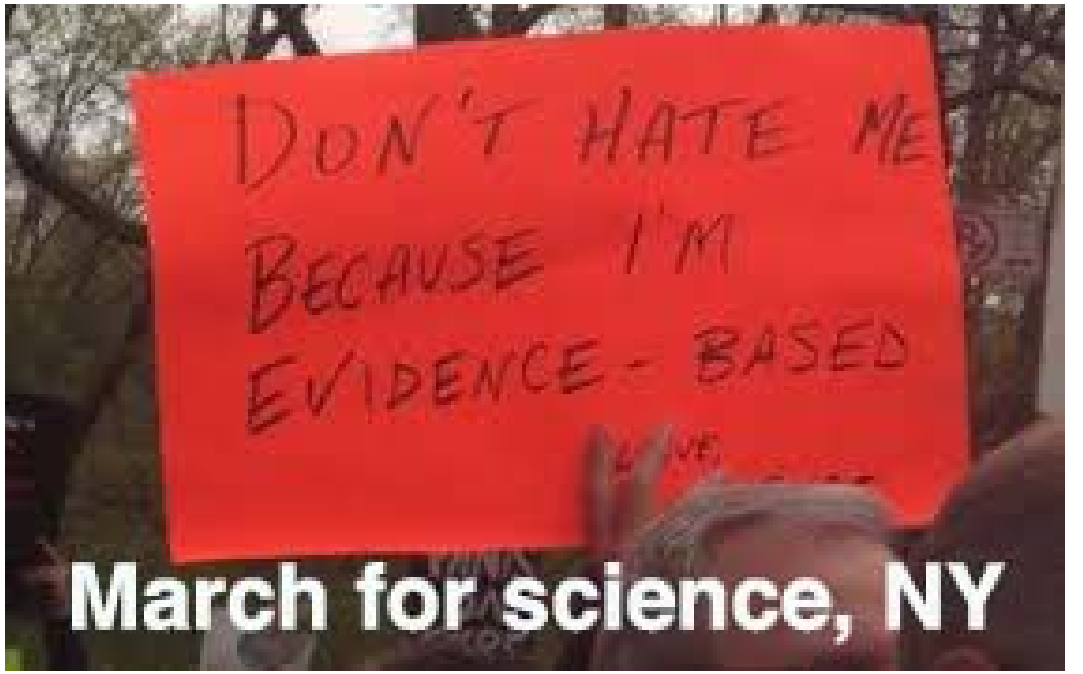
Convert $\langle \text{IQ} \rangle$ to $\langle N_{\text{icit}} \rangle$ assuming one 6σ among 10^9 persons:



Fits well, but...

Harvard fired Summers for telling this!

Summers, Motl had to leave Harvard... Theory of higher variability by T. Hill et *** "suppressed" by NSF, Springer. Nobel Tim Hunt fired for a misreported joke... James Darmore fired by Google... Matt Taylor humiliated for his shirt...



Social scientists list in publications ways used to impose the gender paradigm: fake/selective results/citations, obstructions, funds cut, violence...

In 2016 CERN attacked as "homophobic" by big media for nothing.

What is behind this?

M theory is (cultural) Marxism

Some politicians survived to 1989 promoting a victimocracy of "minorities" and silence who disagrees with their ideology. "Equity" degenerated in "gender".

The goal of this is: □ more women in STEM. □ Indoctrinating to the ideology.

Their "gender equality" works because it's the usual sexism: women and men in their traditional gender roles of victims and protectors/providers. It's blind human biology practiced as in the plains of Africa thousands of years ago.

I said Thoughtcrime according to Minister of Truth and PC Thought Police.

Conclusions

Data consistent with Standard Model: no new S_2 symmetry in Nature.

Physics is not sexist against women. However truth does not matter, because it's part of a political battle coming from outside. Not clear who will win.

PS: many told me "don't speak, it's dangerous". As a student, I wrote that weak-scale SUSY is not right, and I survived. Hope to see you again.