

GENDER BALANCE IN COMPUTER SCIENCE

**“There are (plenty of) women in
computer science.”
AITP 2021 conference:**



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OCTOBER 18, 2022**

DISCLAIMERS

- * You are welcome to contribute and speak up: share your ideas **respectfully** (and honestly).
- * There are more than two genders. We will mostly focus on women, but a lot of what is said applies to other underrepresented genders as well.
- * I don't have all the answers,
... but I have some knowledge and some answers.

About me

- * Scientific interests:

- * Type theory
- * Proof assistants
- * Automated theorem provers

- * Education:

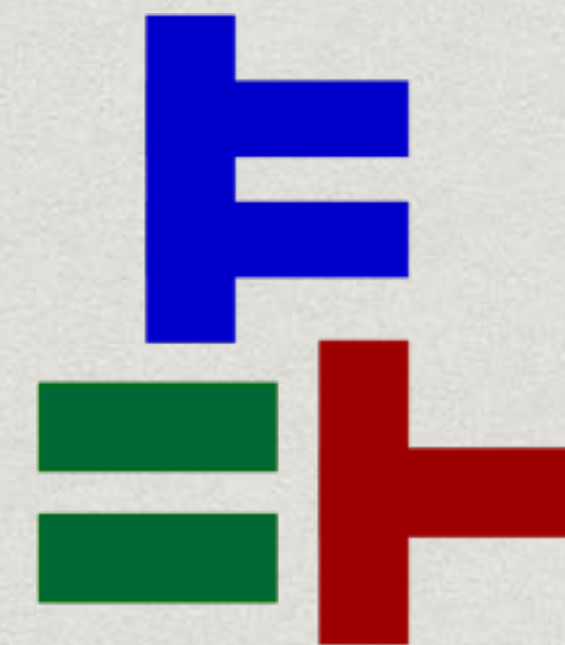
University of Ljubljana
Faculty of *Mathematics and Physics*



EuroProofNet



- * Gender balance:



European Women
in Mathematics



EUGAIN

About me



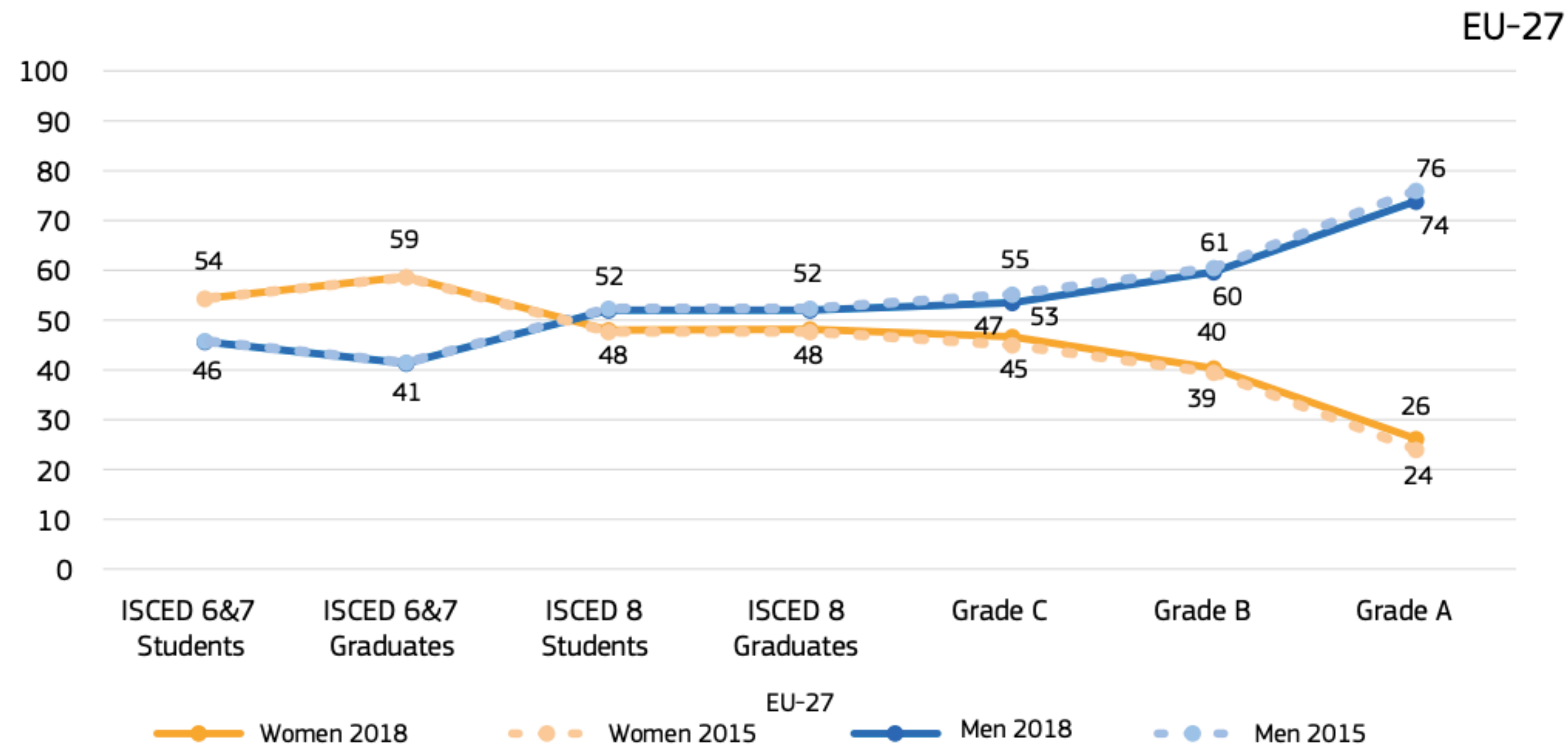
Workshop on Syntax and Semantics of Type Theory, Stockholm, May 2022

Quick head count

- * How many participants of underrepresented genders are here?

Quick peek into the data

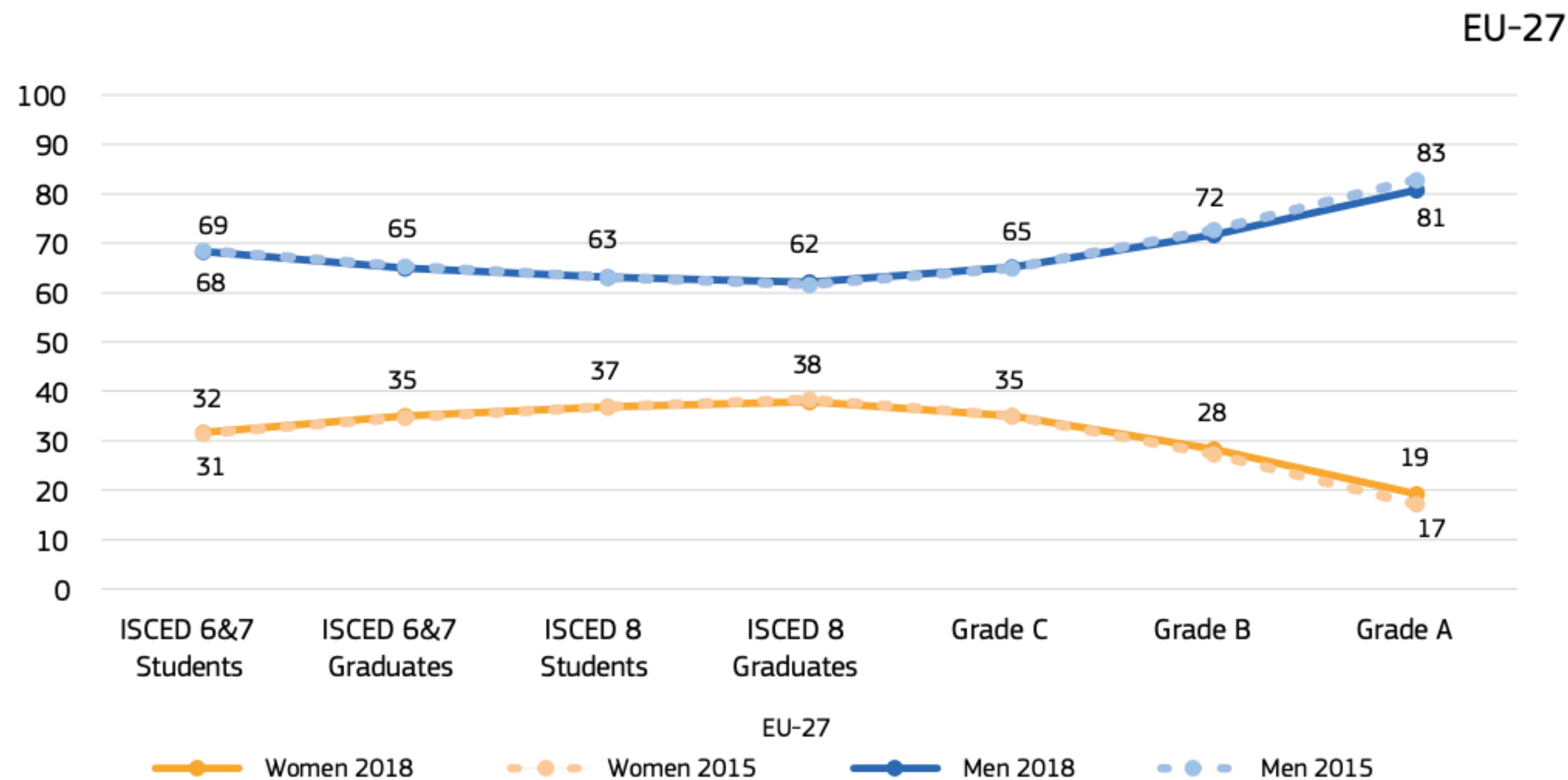
Figure 6.1 Proportion (%) of men and women in a typical academic career, students and academic staff, EU-27 & EU-28, 2015-2018



European Commission and Directorate-General for Research and Innovation (2021). She figures 2021 : gender in research and innovation : statistics and indicators. Publications Office. doi: 10.2777/06090.

Quick peek into the data

Figure 6.2 Proportion (%) of men and women in a typical academic career in science and engineering, students and academic staff, EU-27 & EU-28, 2015-2018



European Commission and Directorate-General for Research and Innovation (2021). She figures 2021 : gender in research and innovation : statistics and indicators. Publications Office. doi: 10.2777/06090.

Quick peek into the data

Table 2.4 Proportion (%) of women among doctoral graduates, by narrow field of study in Natural Sciences, ICT and Engineering, 2015 and 2018

Country	Natural sciences, mathematics and statistics (EF05)							
	Biological and related sciences (EF051)		Environment (EF052)		Physical sciences (EF053)		Mathematics and statistics (EF054)	
	2015	2018	2015	2018	2015	2018	2015	2018
EU-27	57.92	59.7	60.35	56.03	37.94	38.39	32.53	32.49
EU-28	59	59.83	60.35	56.03	37.48	37.96	31.36	32.2

Country	Information and Communication Technologies (EF06)		Engineering, manufacturing and construction (EF07)					
	Information and Communication Technologies (EF061)		Engineering and engineering trades (EF071)		Manufacturing and processing (EF072)		Architecture and construction (EF073)	
	2015	2018	2015	2018	2015	2018	2015	2018
EU-27	21.26	20.8	27.93	27.01	40.55	40.92	38.75	37.24
EU-28	22.57	21.88	26.63	25.28	37.17	35.31	37.72	37.2

European Commission and Directorate-General for Research and Innovation (2021). She figures 2021 : gender in research and innovation : statistics and indicators. Publications Office. doi: 10.2777/06090.

Why improve gender balance?

- * Research shows diversity in teams increases productivity and well-being.
- * We are missing out on potential from excluded groups.
- * Diverse teams/institutes are more attractive to join.
- * Other: _____

How to improve gender balance?

A million dollar question!



Find out **reasons** for the imbalance.



Address the reasons with **actions**.



EUGAIN

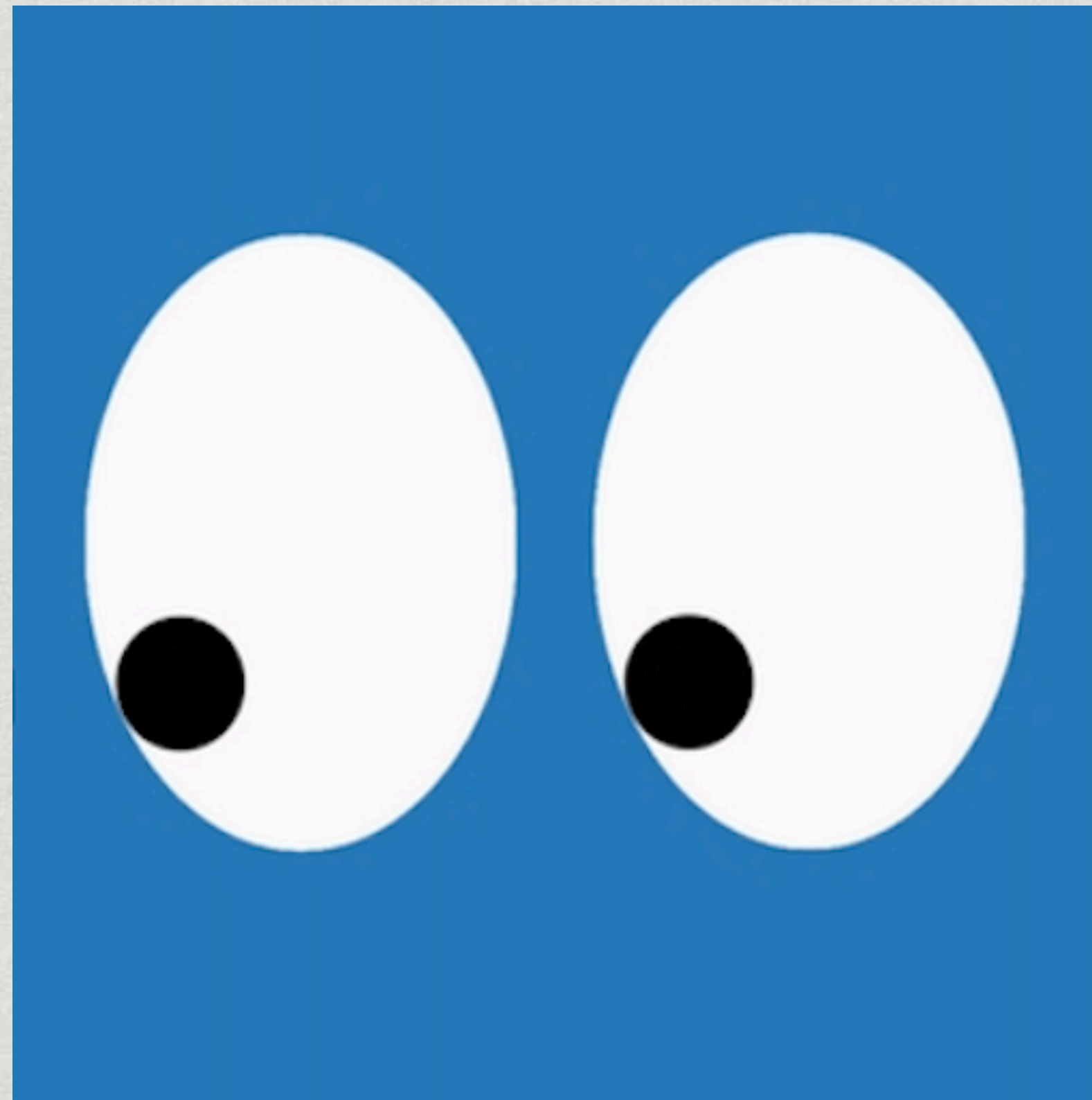
European Network For Gender Balance in Informatics

Addresses the drop of the percentage of women/underrepresented genders on the following levels:

- * From school to university.
- * From university to PhD.
- * From PhD to Professor.

REASONS?

Overlooked



“I pitched an idea for a group project. It was ignored until my male colleague repeated it. Then it was a brilliant idea and it was attributed to him. ”

– *Sandra, researcher in mathematics and computer science*

“I was ignored online when using my female Github and StackExchange profiles. I created a fake profile with a male name to be acknowledged and taken seriously.”

– *Anonymous, woman, software developer*



Dr Valeria dePaiva @valeriadepaiva · 29 Nov 2021

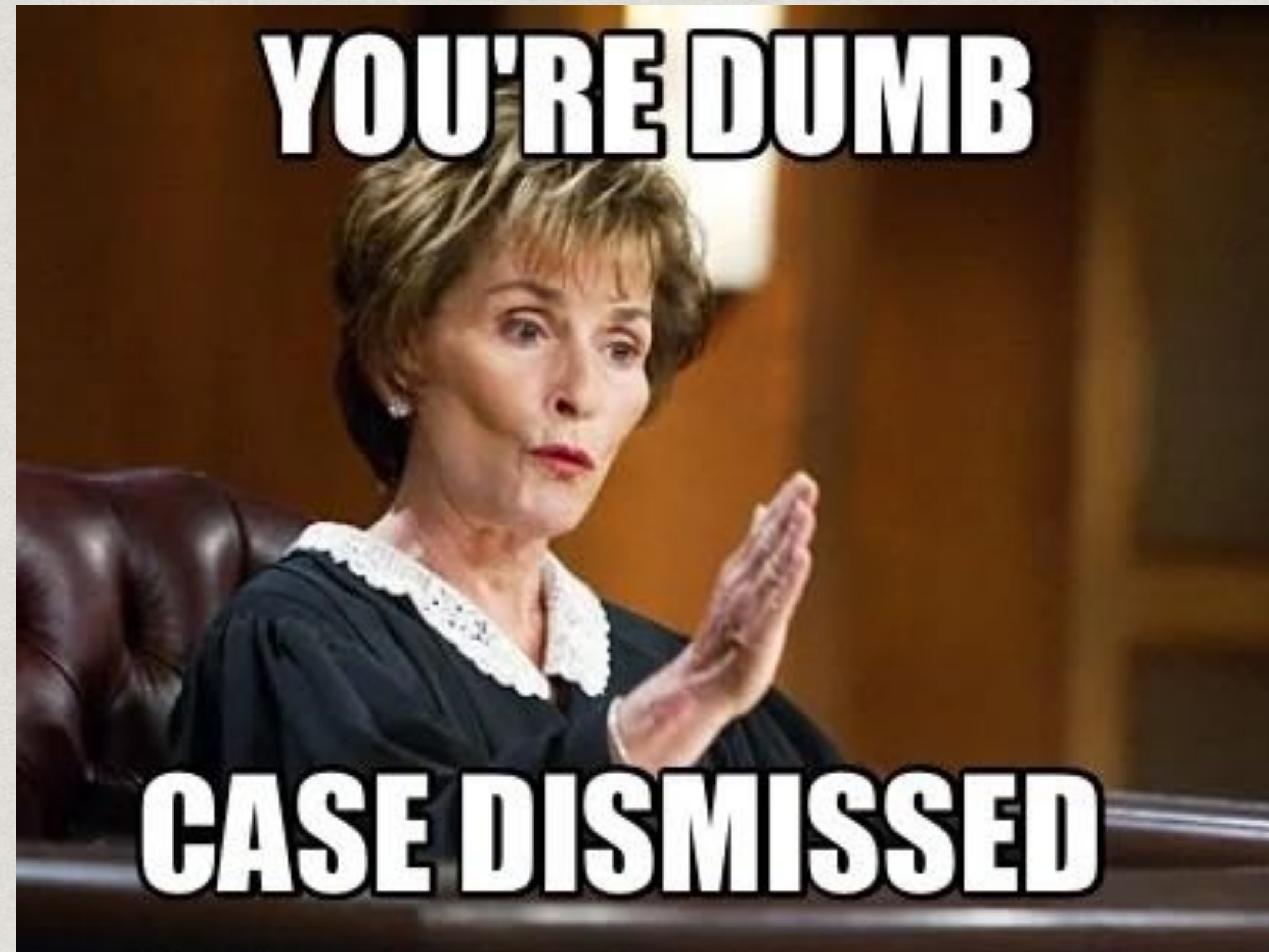


The patriarchy can be subtle: if you cite a woman using a number, but give a full name plus number to the other (male) person who did similar work, everyone will remember the male person. only. it works every time.

Overlooked: actions

- * Pay attention to the unconscious biases.
- * Call out situations, when women colleagues are not attributed their ideas.
- * Promote work done by people of underrepresented genders.
- * Monitor numbers: who gets nominated for lead positions, student committees, awards, ...

Assumed incompetent



https://twitter.com/davenewworld_2/status/1561834373749538816

–astro_alexandra

“She is clearly collaborating a lot with the head of department. She also has a grant together with him. So I would like to see some evidence she actually has some ideas of her own. ”

–ERC panel awareness training video

Assumed incompetent: actions

- * Pay attention to the unconscious biases.
- * Call out situations, when colleagues are not attributed their ideas or their contributions are unjustly doubted (collaborative student projects, homework, etc.)

Confidence



“I was just starting a new postdoc position and my university offered a course on how to write project proposals. The course administrators explained that the ideal participant has a good research idea for the proposal, is willing to invest a lot of work and absolutely has to attend all the sessions. I just switched to a new field and had to travel to a conference on the last two days of the course, so I didn’t tick off all the boxes and I decided not to apply. Luckily, my colleague convinced me to apply anyway. It was one of the most useful courses I ever attended and I ended up writing one of the few proposals that would obtain funding.”

– *Anja, junior researcher in mathematics and computer science*

Confidence

Research shows



- * To apply for a position/grant, there are certain requirements. If a woman does not tick off at least 80% of the requirements, she will not apply. Men tend to apply after fulfilling 30%.
- * Women are less likely to ask questions during seminars/lectures.
- * Comprehensive way of learning: less tinkering and need for smaller tasks to gain reassurance.
- * If women fail, they blame themselves, instead of finding other (actual) external reasons.
- * Women tend to doubt themselves more during learning process.

Confidence: actions

- * **Encourage** women to apply (at all stages: school, uni, PhD, postdoc, professor).
- * Question asking:
 - * no limit on time for questions
 - * choose questions from women first (see the entire room)
 - * if applicable, provide a small break between the lecture and time for questions
- * Incorporate comprehensive learning in teaching and software (GenderMag).
- * Take action if too few suitable women apply for a project/position. (For example, extend the deadline for applications and re-advertise the position. Actively search for applicants of underrepresented genders.)

Stereotypes



“I worked as a software developer on a project on computation analysis. In the group I was the only woman. there were only three women in the department of about a hundred people and the other two women were administrative workers. Mostly I wore jeans and hoodies to fit in. I would never put on a dress or a skirt, I would not feel comfortable.

After a few years I changed to a teaching-related area of computer science and to a more gender-balanced team. My appearance has completely changed, I am now finally comfortable wearing clothes that I actually like.”

–Stephanie, software developer, researcher

“During my studies at university I only had male professors until the very last year. Until I met the first female professor I didn’t even consider doing a PhD... I wish I had more role models to look up to.”

–Sophie, PhD candidate in computer science

Stereotypes: actions

- * Inclusive language.

*Especially promoting
in schools!*

- * Role models.



- * A new Netflix series? :)



FACTORS AT LATER STAGES OF AN ACADEMIC CAREER

Factors at later stages (PhD, later stages of academic career)

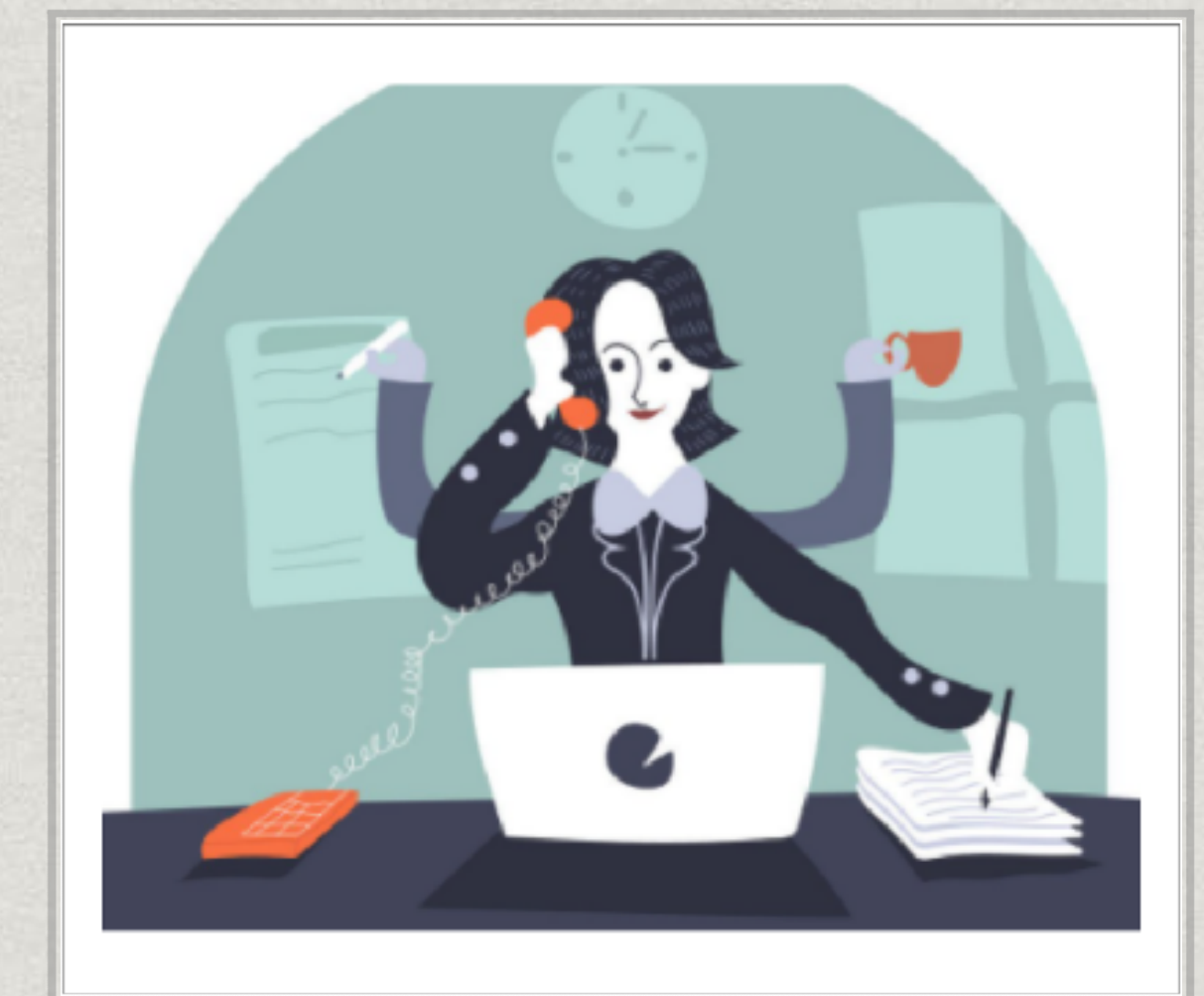
- * Child care

- * Caring for children influences parents of all genders, but not equally.
- * Women tend to have children at earlier stages of their career due to biological factors.



- * Secretary syndrome

- * Drowning in administrative work: thesis committees, organisation of seminars, conferences, events, catering,...
- * Too many committees: It shaves off time for research.



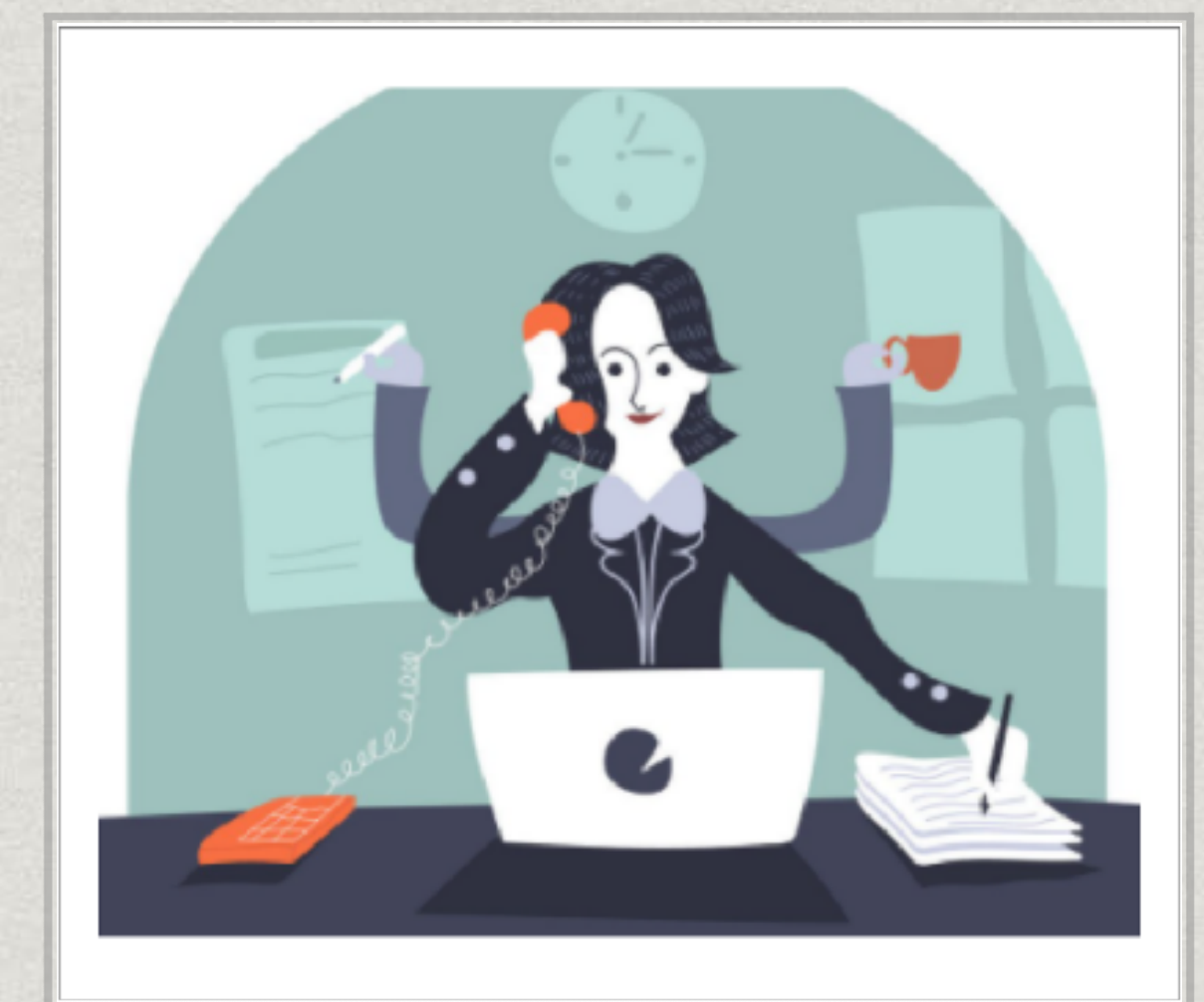
Actions at later stages (PhD, later stages of academic career)

- * Child care

- * Help parents with finding/ensuring childcare at the conferences, workshops, research visits, new job.
- * Take into account career breaks (maternity leave, parental leave) with explicit identifications and rules.
- * Provide help with solving the “two body problem”, that is helping to find a position for the applicant’s partner.
- * Schedule meetings between 09:30 and 16:30, so carers of young children are able to deal with commuting and childcare.

- * Secretary syndrome

- * Monitor distribution of administrative work.
- * Gender-balance efforts should count towards “administrative workload”.



“I didn’t think there is a gender bias in my community. Until I read about the unconscious biases and realised that I am doing most of the administrative work, I was always the secretary, seminar organiser, expected to clean up the catering after an event, when the other researchers were networking, ...”

– Marjeta, woman, senior researcher

“When I organised a conference, I contacted 15 women and invited them to speak. None of them said yes. Despite my best efforts I ended up having an all-male invited speaker list.”

– *Matjaž, man, senior researcher in mathematics*

Don't be discouraged :)