



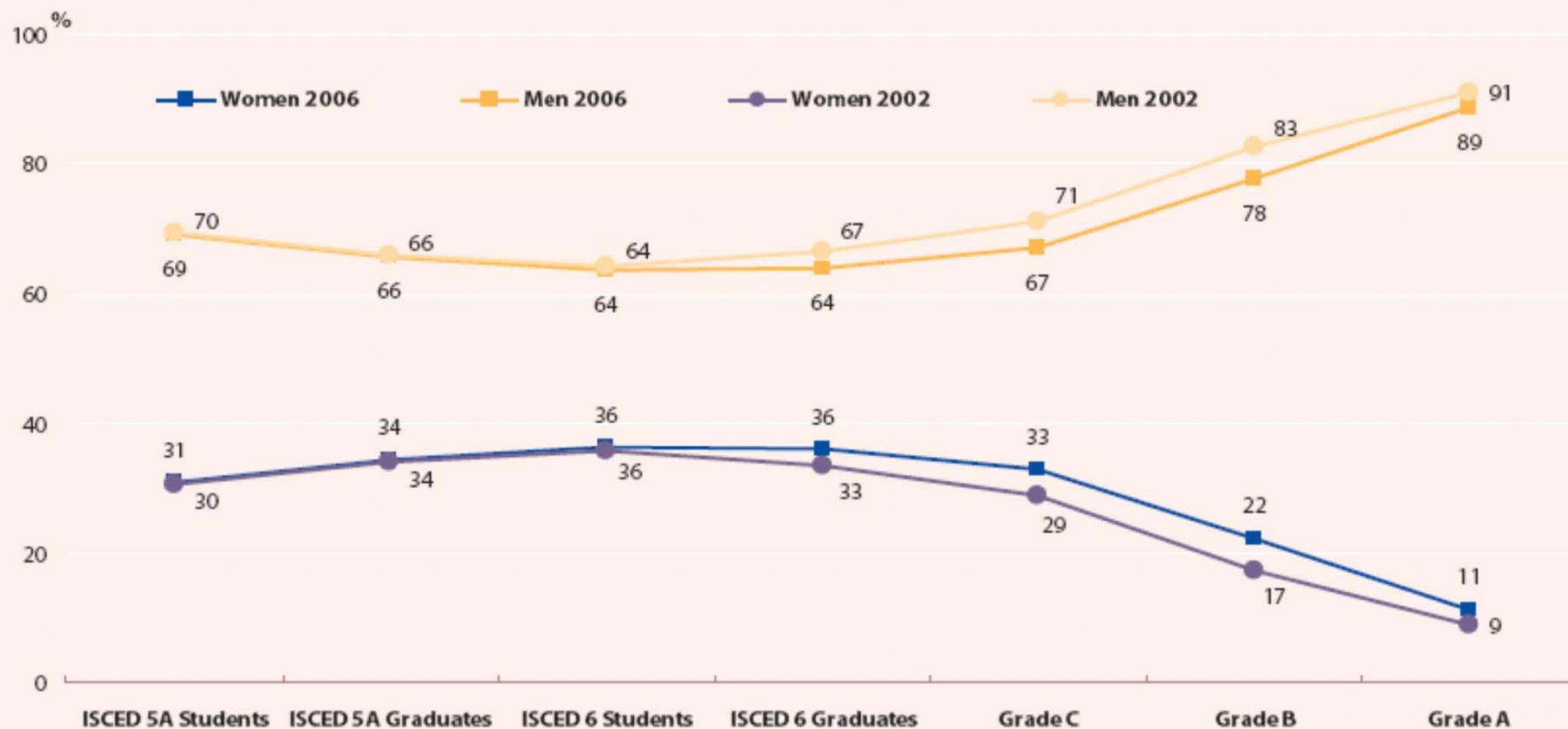
How to keep Women (and Men) in Science?

Petra Rudolf

Zernike Institute for Advanced Materials, University
of Groningen, The Netherlands



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



Ba

Ma

PhD

**Assistant
Professor**

**Associated
Professor**

**Full
prof**



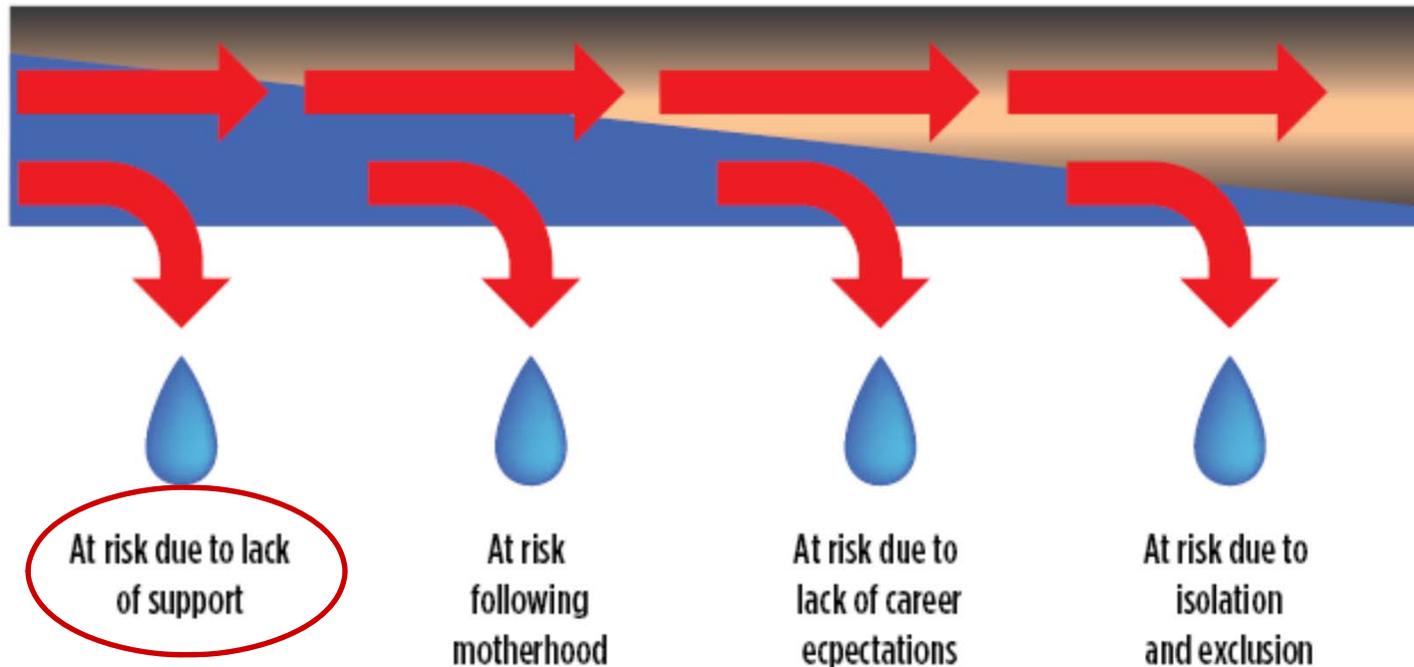
The leaky pipeline

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Janez Potočnik, former European Commissioner responsible for Research, Innovation and Science:

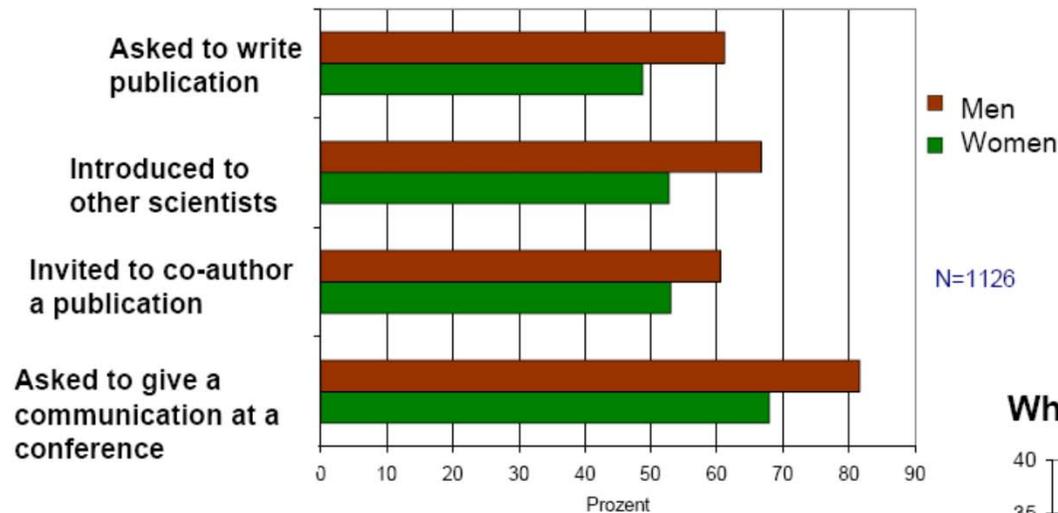
“ Women in science, it’s a little like being a magician - take a look at the upper levels of the occupational ladder in science and technology: women disappear!”





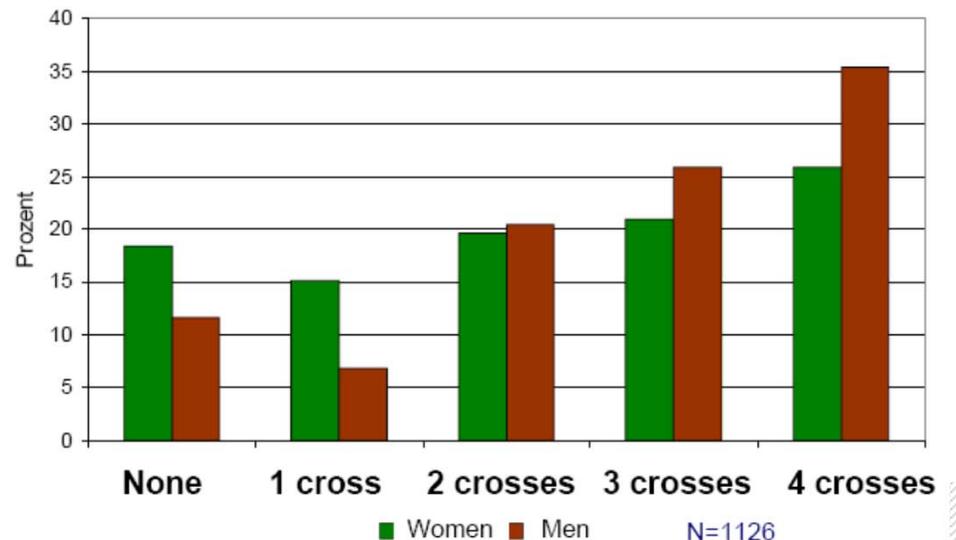
PhD & Postdoc phase: At risk due to lack of support | 4

Scientific Mentoring



Inquiry Arbeitskreis Chancengleichheit Deutsche Physikalische Gesellschaft 2001

What scientific mentoring did you receive?





Find a good mentor/supervisor !

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Apart from giving scientific guidance, he/she should

- **provide training in presentation of results, paper writing**
- **find funding / help you find funding**
- **teach you how to write successful proposals**
- **teach you the « rules of the game » and how to change it**
- **introduce you to important professional contacts**
- **give you challenging assignments and opportunities**
- **provide constructive feedback on unsuccessful proposals or interviews**
- **give you credit, and advocate you in the academic community**

If you don't get these things from your supervisor/ mentor, ask for them. If you still don't get them, try someone/somewhere else.



What do we do at RUG?

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- Important role for Graduate Schools – **Soft skill courses**
- **Monthly lunch** of female PhDs/postdocs:
Physics/Chemistry/Biology – **maybe inspiration for others?**

Difficulty: young researchers do not want “something special for women”

I am good – I shall succeed : unfortunately not always true!

“Carnegie Institute of Technology’s Report on knowledge and career advancement in technological professions” (2003)
Career success is determined for only 15% by the technical and scientific knowledge but depends for 85% on “human engineering”.



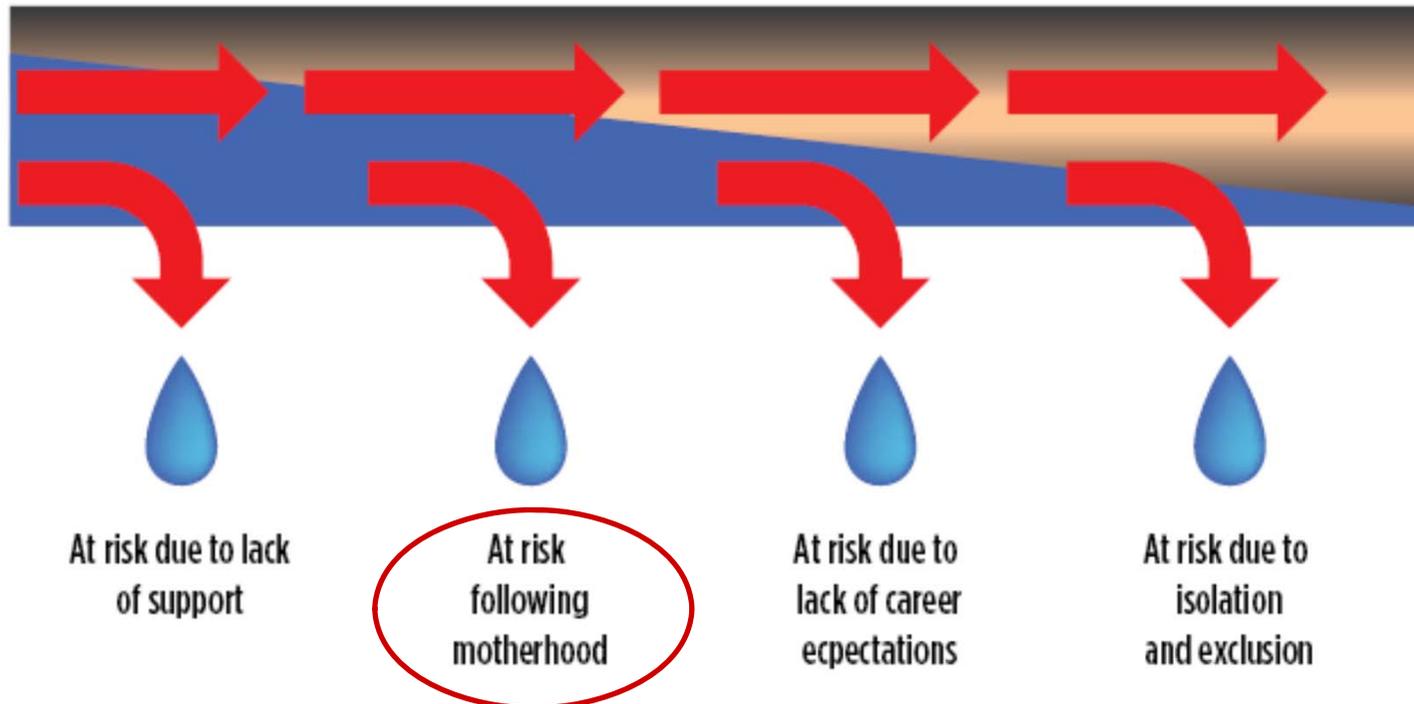
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Difficulties in combining family life and career 20-3-2013 | 8

- Family/career : no easy equilibrium
- 2 body problem: not each location offers opportunity for both

How important is this?

85% of German female physicists have a partner who is also in academia, 54,6% of the German female physicists are married to physicists while among the male colleagues only 9% are in an equivalent situation.

USA: <http://www.physics.wm.edu/dualcareer.html>

Only one of the more than 3000 female physicists had a husband who was not professionally active but took care of the home and the family while 25% of the male physicists are in an equivalent situation.





Yes, clever women do have babies

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J.M. Hoem, G.R. Meyer, G. Andersson, Max-Planck-Institut für Demografische Forschung, Rostock, Working Paper *WP-2005-014*, 2005. **Childlessness and educational attainment among Swedish women born 1955-59**
(<http://www.demogr.mpg.de/Papers/Working/wp-2005-014.pdf>)

It is not so much the qualification but the branch of studies which decides whether women do have babies at all : **“Women who followed studies which lead to jobs with little job security seem to have less children“**.

Women with PhD in Natural Sciences and Engineering	Women with PhD in social sciences and humanites
29.0 % never marries or lives in in a permanent partnership	34.0 % never marries or lives in in a permanent partnership
25.1 % remains without children	31.9 % remains without children
62.7% two or more children	47.6 % two or more children
first child at 31.25 years of age	first child at 30.31 years of age
education finished at 34.67 years of age	education finished at 36.91 years of age



What do we do at RUG?

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- **Alumni network** used to help finding jobs for partners
- Partners considered **internal candidates** for RUG vacancies
- Good babysitting/kindergarden facilities in Groningen
- Reimbursement for **babysitting service for emergency situations and conference participation** of RUG employees and babysitting routinely offered at RUG-organized conferences/workshops. Financing: Elsevier Foundation.
- **Still more attention needed for:** family friendly working conditions: no meetings at hours that create conflict with family obligations....



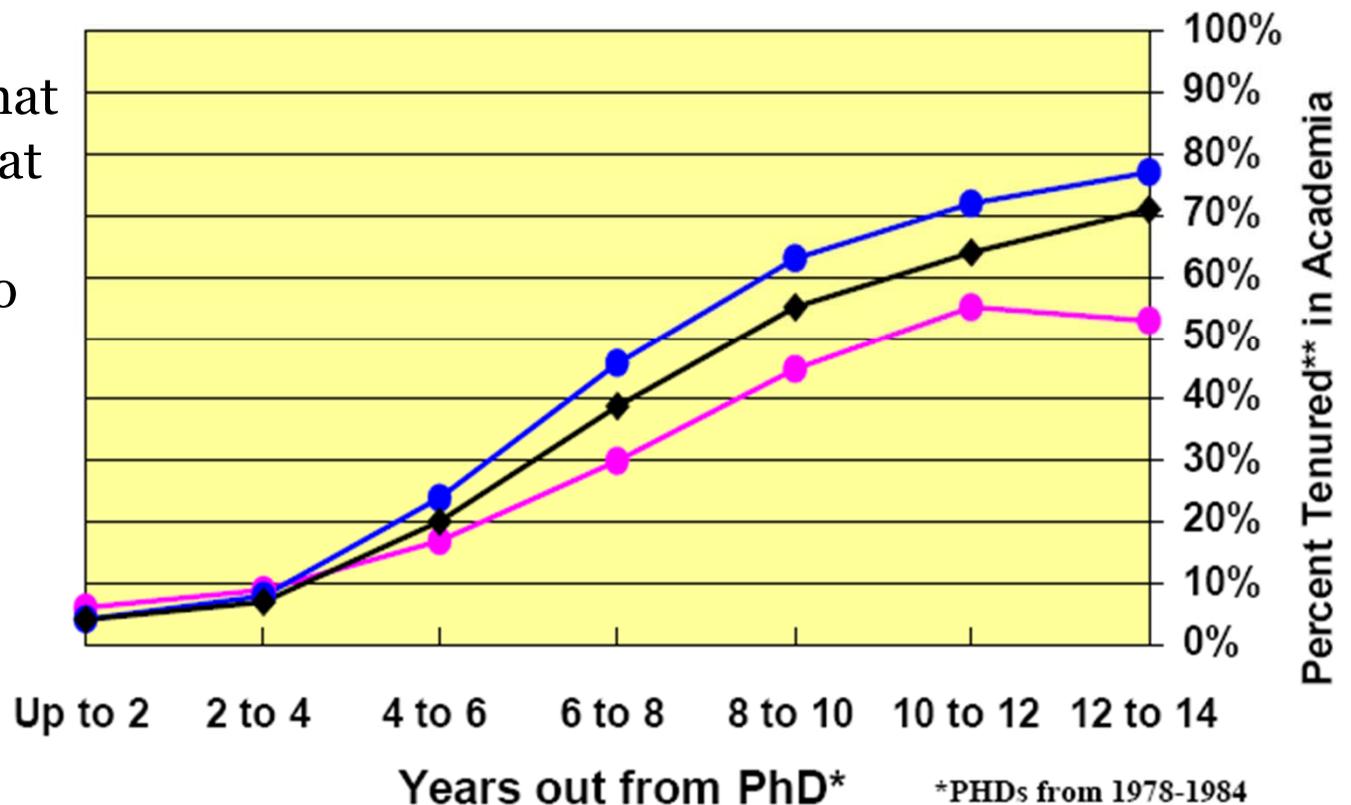
•"Do Babies Matter?" by Mary Ann Mason (UC Berkeley) and Marc Goulden. *Academe*, Nov-Dec 2002 (see

<http://gradresearch.berkeley.edu/babiesmatter.pdf>)

Early Baby Gap in the Sciences

● Women, Early Babies ● Men, Early Babies ◆ All

Early babies means that a woman or man has at least one child within the household prior to five years post-PhD.



Source: Survey of Doctorate Recipients. Sciences, 1979-1999.

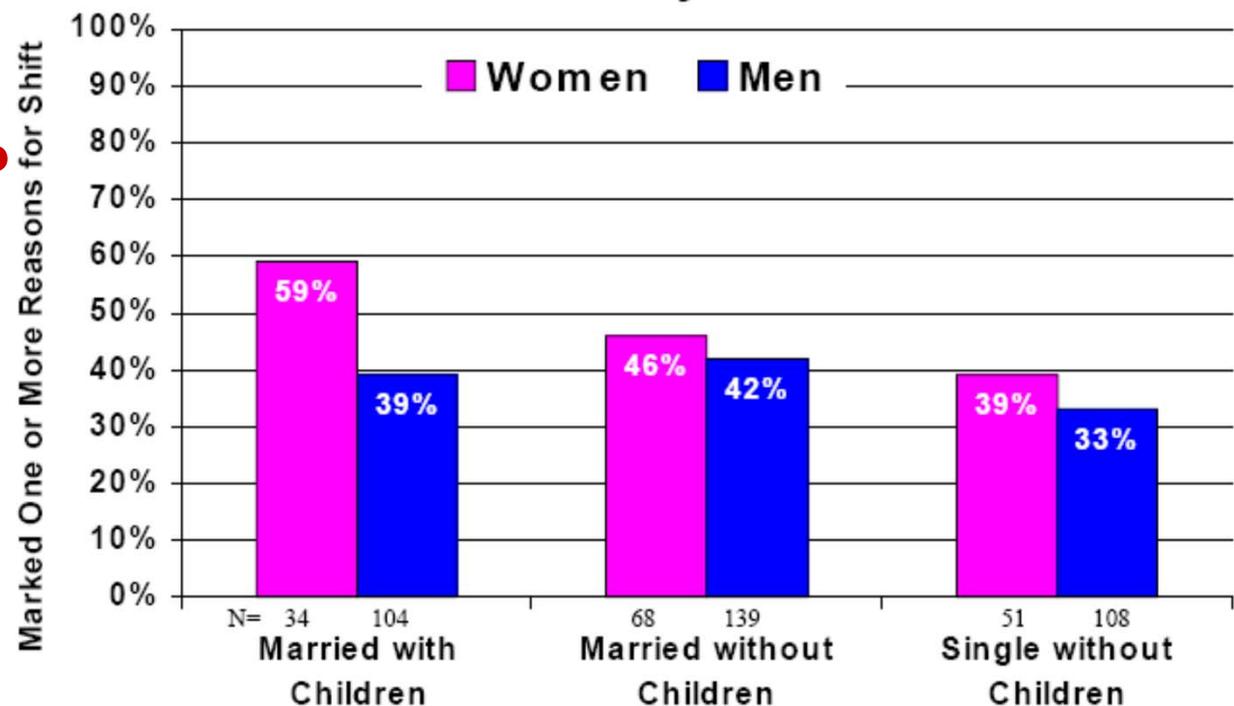
*PHDs from 1978-1984
**Tenured at 4-Year Institutions



"Do Babies Matter?" by Mary Ann Mason (UC Berkeley) and Marc Goulden. *Academe*, Nov-Dec 2002 (see <http://gradresearch.berkeley.edu/babiesmatter.pdf>)
800 postdoctoral fellows University of California, Berkeley surveyed (mostly biological and physical sciences), about 35% women; and of these, 32% already have at least one child. The majority of these postdocs, both men and women, are married.

“Single women without children were also more likely than men to be considering a career direction away from academia. There was less of a predictable pattern here, but some of these women mentioned social isolation as a negative factor.”

Percentage of UCB Postdocs Who Indicated a Career Goal Shift Away from Academia*



*Among all survey participants.



If you as supervisor think you do everything right but your young team member decides to quit science although you think he/she got a very good talent for it, maybe you should read:

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NATURE | Vol 438 | 24 November 2005

ESSAY



D. ROBERT GILL FRANZ/CORBIS

Pushing for power

Tales of brilliant scientists and their heroic discoveries can overshadow the true nature of scientific communities, which are often dominated by battles for power and success.

Ad Lagendijk

desired effect: a high-tempered, ultra-fast, absolutely unintelligible reply. Target neu-

whether they will be first author on resulting publications.



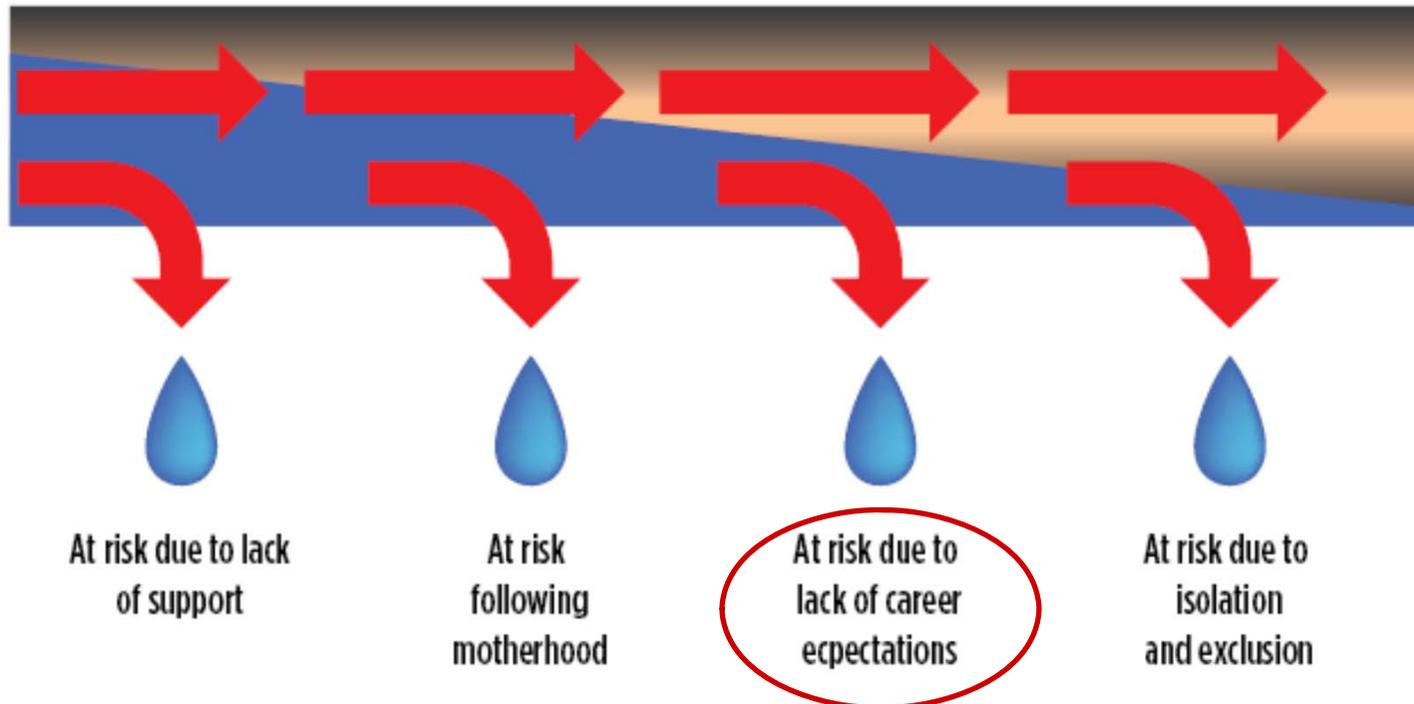
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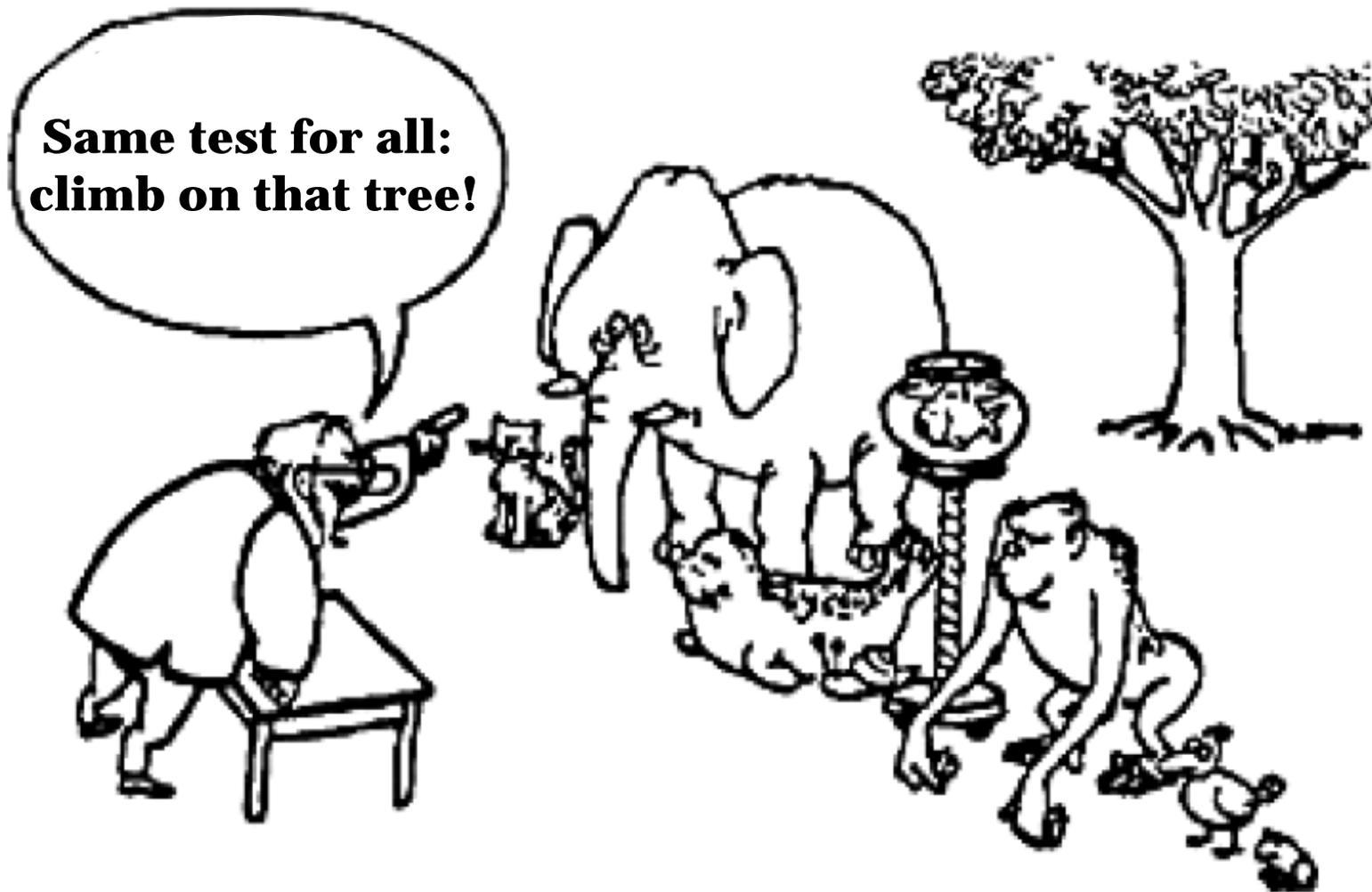
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Fair selection?

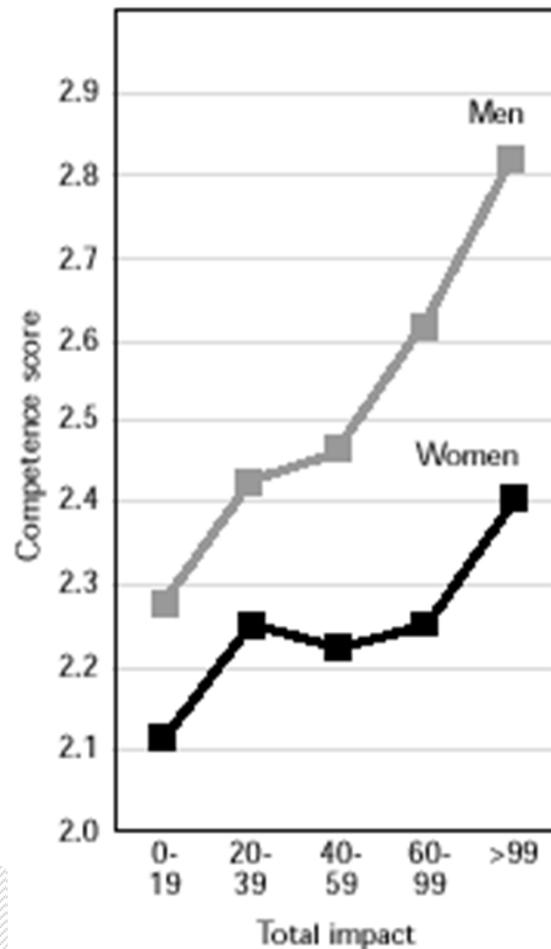
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Your productivity might be judged differently when you are a woman...

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Nature 387, 341 (1997)
Christine Wennerås & Agnes
Wold, « Nepotism and Sexism in
Peer Review »

Impact point = one paper
published in Journals
impact factor 1

Competence score MRC:

- scientific productivity
- gender
- affiliation to jury member



Your productivity might be judged differently when you are a woman...

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P. Goldberg, “Are Women Prejudiced Against Women?” *Trans-Action* 5 (1968), pp. 28-30.

M. A. Paludi and W. D. Bauer, “Goldberg Revisited: What's in an Author's Name”, *Sex Roles: A Journal of Research*, 9 (1983) pp. 387-390.

180 women & 180 men asked to review math paper authored as below and rate 1=best, 5=worst mark

	author		
	John T. McKay	Joan T. McKay	J. T. McKay
Men	1.9	3.0	2.7
Women	2.3	3.0	2.6



Are there gender differences in productivity? 20-3-2013 | 18

Report by Gerhard Sonnert and Gerald Holton

(American Scientist Jan/Feb 1996, p. 63)

probed attitudes of more than 800 scientists:

Women in general publish slightly less - 2,3 papers per year compared to 2,8 paper per year of their male colleagues.

Citation rate is significantly higher: Women's papers cited 24,4 times on average, compared with 14,4 times for men.

Authors of report: higher citation rate = more noteworthy content

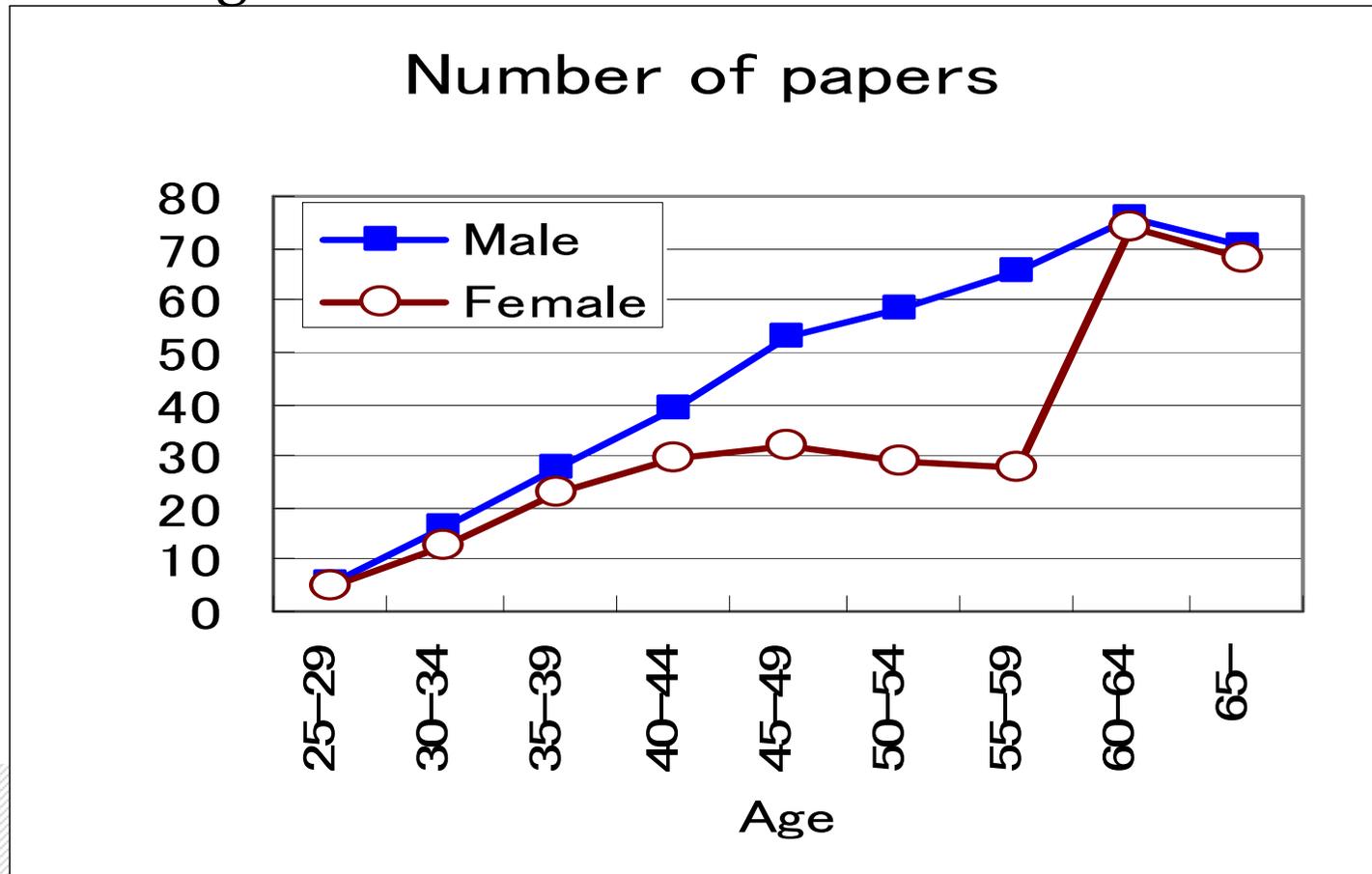
“Women scientists are inclined toward more comprehensive and synthetic work and more likely to find a scientific ‘niche’ rather than compete with colleagues in the same area of expertise”.

Sonnert and Holton's study also found that while 70% of the men considered their own scientific ability as being above average, only 50% of the women did.



JPS & JSAP Survey on the Status of Women Physicists, 2002 (see http://www.aapps.org/archive/bulletin/vol13/13_3/13_3_p18p31.pdf)

Women (those who stay in science) above 35 publish less than men but women over 50 more than men – at the end of the career the integral is the same !



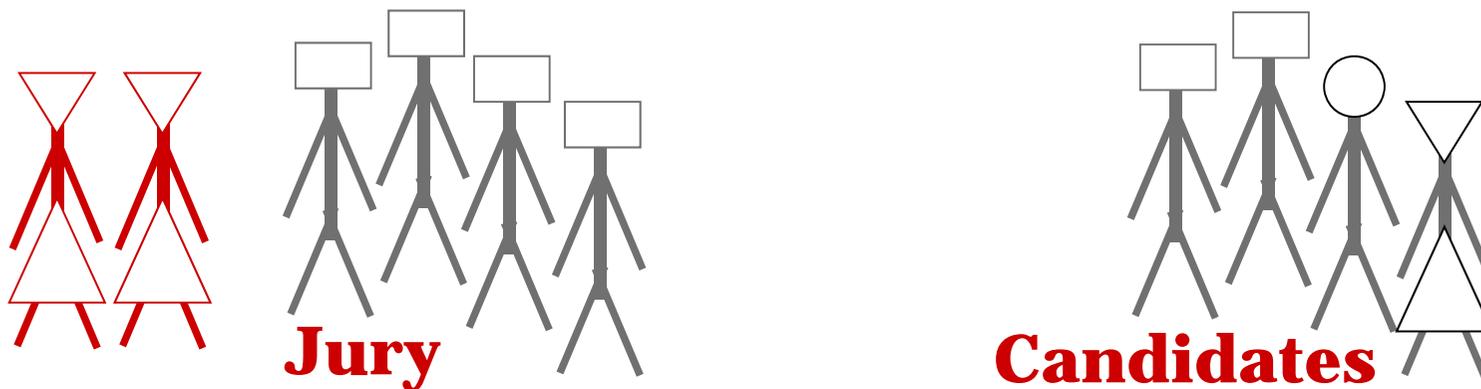


How do things work out in the NL?

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Marieke van den Brink (Radboud Universiteit Nijmegen, 2008) concludes from analysis of **3.322** nomination decisions at 13 NL universities between 1999 -2005 : **Overestimation of men** and **underestimation of women** are at the origin of the lack of female candidates being chosen.

Contributing factor: When scouting for talent, **special rules** are made for **'excellent candidates'** - **64%** of positions not openly advertised.



Men are trusted more ... Women have to prove that they can do it.

Women professors work not more often part-time - less ambitious?



Special circumstances require special measures: What do we do at RUG?

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The Rosalind
Franklin
Fellows

**tenure track
assistant
professorships
exclusively for
women.**

**First 5 years
paid by
University
Board then by
Faculty.**





From the advertisement:

APPLICANTS MUST HAVE:

- a Ph.D and post-doctoral experience, preferably in different research institutions (Dutch applicants should have minimally 2 years post-doctoral experience outside the Netherlands).
- publications in first rate international scientific journals
- experience in supervising research projects
- the ability to successfully compete for external research funding
- affinity to teaching
- evidence of international recognition

We are looking for **ambitious, creative women who aim for a successful independent career towards full professorship** in a European top research university. Successful candidates will be expected to establish an **independent, externally funded research program** in collaboration with colleagues at our university and elsewhere. They will also be expected to participate in and contribute to the development of the **teaching** programme of the Faculty (**20% of time**). RF Fellowships are funded with a generous **startup package**, worth around **200,000 euro**.



University wide program – for FWN:

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- Up to now 4 rounds: 2003, 2005, 2008, 2010 (**NEXT ROUND END 2012!!**)
- About **115 applicants each time (140 in last round)** ! 20 invited for interview and a research seminar – 5-6 selected in each round (on average: 50 publ., H-index 17)
- 16 RFFs currently active in FWN and very successful (VICI, VIDI, ERC, European projects...)
- **Promotion to adjunct professor/UHD: 80%**
- Conditions: successful research line developed, at least 3 papers/year, 3 PhD supervised (1 finished), 1 larger grant, course development, good student evaluation, service to community, training courses for teaching and management followed, can teach in Dutch and English, competences (*Creativity, Communication, Guiding and Inspiring Leadership, Strategic Activities, Managerial skills, International visibility, Didactic qualities, Collegiality, Vision*)



The example is followed...

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- University of Twente: **Tenure Track UTwist3 Woman in Science**
More than 100 applicants for four positions
- Uva: **Carolina MacGillavry fellowship**
217 applicants for 5 positions
- TU/e **Women in Science tenure tracks** 5 positions
- NWO is thinking about organizing a national program



Difference Rosalind Franklin Fellows – ‘normal’ tenure trackers (FWN, anecdotal evidence)

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Rosalind Franklin Fellows

Average age at appointment of 14 RFFs: 37 years

Average number of publications at appointment: 48

Average H – index at appointment 17

Tenure Trackers (m/f)

Average age at appointment of 8 normal TTs: 33 years;

Average number of publications at appointment: 27;

Average H – index at appointment 13

Points which need attention: salary, career progress



Teaching: two points need attention!

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Do RUG female tenure track/associate/full professors have the same teaching load as their male colleagues? Anecdotal evidence suggests that the answer is not always YES – women have a harder time when it comes to saying NO...



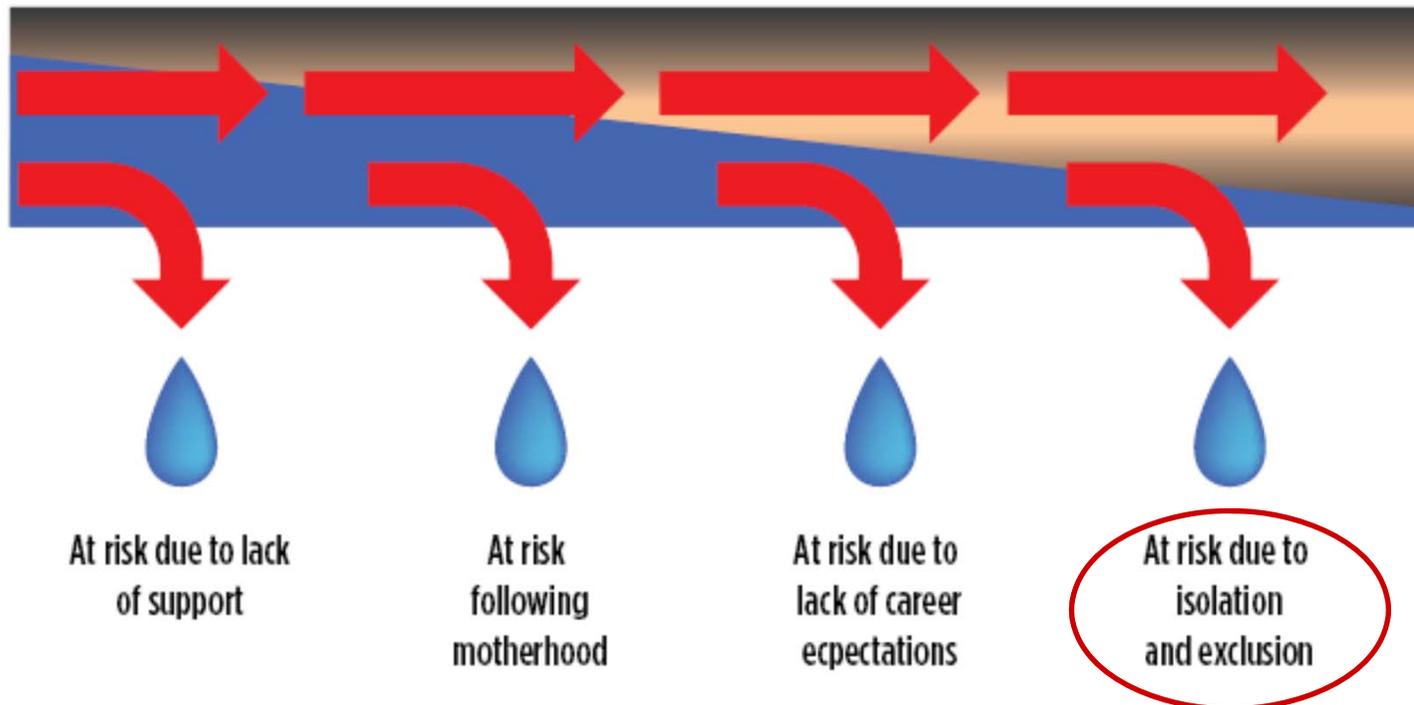
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What do we do at RUG?

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The number of female professors goes up considerably!

60 invited for
 opening 2006/2007

Now: 122 invited for
 female professors'
 dinner 2011 – not a
 complete list...



But...



Point of attention: female professor as manager

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Not all the staff is used to a “woman boss”

Beste Ria, heren, dames van de secretariaten,

Het ziet er naar uit dat verzetten van de bestuursvergadering van



"That's an excellent suggestion, Ms Triggs. Perhaps one of the men here would like to make it."



Point of attention: female professor as manager

Not all the staff is used to a “woman boss”

- Unwelcome comments, insubordinate behaviour, even cases of bullying and mobbing
- Women tend to attribute these problems to their own inaptness, hardly ever talk about them.

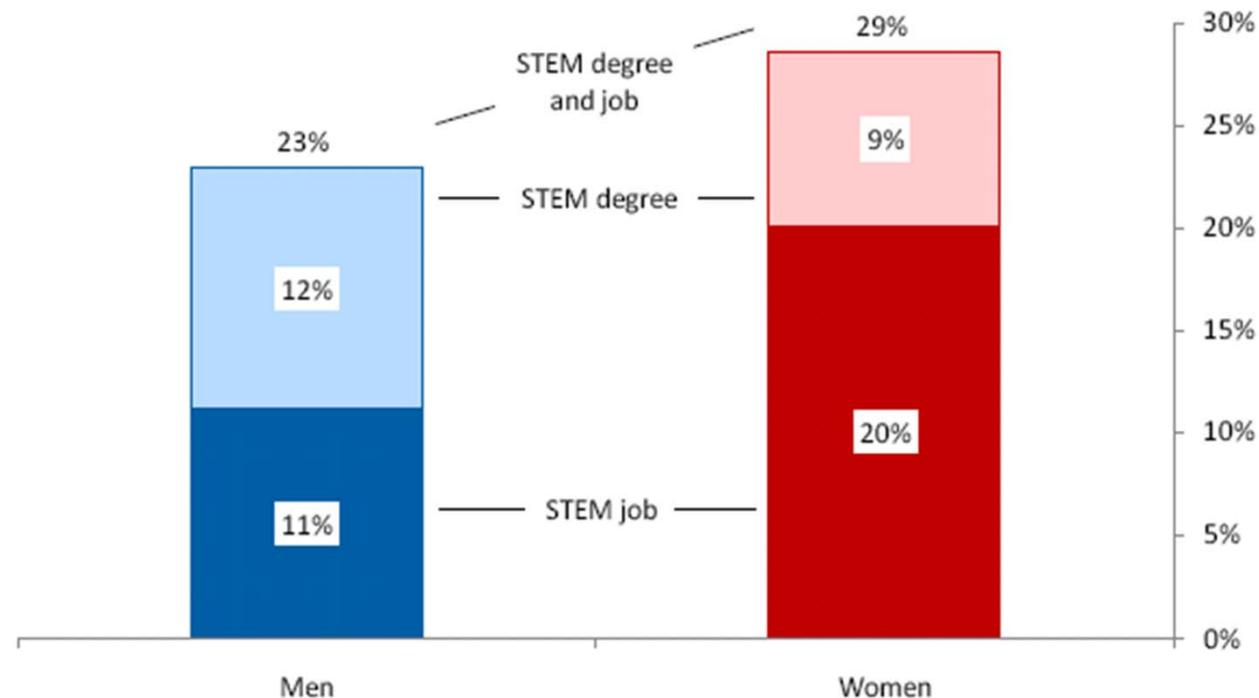


Coaching has to become standard, Intervision is offered to specifically address this.



Wage Premium from having a STEM Job or degree

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Source: ESA calculations from American Community Survey public-use microdata.

Note: Estimates are for full-time year-round private wage and salary workers who have at least a bachelor's degree and are age 25 and over.

**U.S. Department of Commerce
Economics and Statistics Administration**

Report "Women in STEM: A Gender Gap to Innovation"

<http://www.esa.doc.gov/sites/default/files/reports/documents/womeninstemagaptoinnovation8311.pdf>



Maire Geoghegan-Quinn, European Commissioner responsible for Research, Innovation and Science

We cannot afford to waste talent. I will make a major effort to increase women's role in technological progress. We need a campaign, using positive female role models, but nice adverts are not enough. Women are well represented in scientific education but not in the profession – they tend to drop out when they have family commitments. We need to make science careers - and entrepreneurship - more attractive and more family friendly.



Never give up!



***The future is bright for
women in Science!***



Women in Science – Why so few?

**A lot has to do with what goes on in our minds –
test yourself: test on gender and science**

<https://implicit.harvard.edu/implicit/>



Thank you for your
 attention!