

# Unions and the gender pay gap among university professors in Canada.

## Preliminary results from a recent data collection

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Polytechnique Montreal

# Available data and the need for new data collection

- Until 2011: Mandatory survey from *Statistics Canada*. Data directly collected from higher education institutions.
- 2011-2015: Canadian Association of University Teachers (CAUT) takes over: voluntary basis, gaps in the data.
- 2016: new survey from *Statistics Canada*: still waiting for the results...
  - Data about institution, gender, age, department, salary status, salary, administrative bonus...
- But nothing about
  - other premium and bonuses, and other types of incomes;
  - leaves and career interruptions;
  - career progression;
  - link with research performance or other variables that might explain inequalities

# Survey data

- Survey launched in Alberta, British Columbia, Nova Scotia, Ontario and Quebec.
- First wave in June 2017. Second wave and reminders: July and August 2017
  - => 5 668 answers. Cleaning => **5 243 observations**
- Questionnaire divided in three parts:
  - Educational background, current employment and academic career: highest degree (year and institution), department, discipline, specialty, year of first course, first grant, first article and access to each post in academic hierarchy.
  - Working conditions: teaching hours, salary, bonuses and premium, chair, consulting revenues, research grant, sabbatical, etc.
  - Demographic informations: gender, age, marital status, career interruption, children and dependants.

# Unions

- 78% of the sample are based in institutions with a professor/faculty union
- We have a very similar distribution between men and women among unionized and non-unionized respondents.
- Non-unionized respondents are based in Ontario and Quebec.
  - Ontario (68%): McMaster University, University of Toronto and Waterloo University.
  - Quebec (32%): HEC and McGill University

# General characteristics of the sample according to gender

## • Research field

	Men	Women
Natural sciences, engineering, technology and mathematics	979 <b>72%</b>	373 <b>28%</b>
Social sciences and humanities	1230 <b>46%</b>	1454 <b>54%</b>
Health sciences and biomedical research	543 <b>47%</b>	609 <b>53%</b>

## • Position

Position	Men		Women	
Assistant Prof.	39	52%	36	48%
Associate Prof.	532	45%	638	55%
Full Prof.	1334	<b>62%</b>	815	<b>38%</b>
Grant Tenure Prof.	260	49%	274	51%

## Province

	Men	Women
Alberta	249 54%	212 46%
British Columbia	254 55%	212 45%
Nova Scotia	114 <b>49%</b>	118 <b>51%</b>
Ontario	963 51%	943 49%
Quebec	1172 55%	951 45%

# General characteristics of the sample according to gender

- Career progression begins later for women, with differences according to the discipline:
  - Age highest degree:
    - STEM: 30,8 vs 30,4 (\*\*), SSH: 34,8 vs 33,8 (\*\*\*), Biomed: 33 vs 30 (\*\*\*)
  - Age first course:
    - STEM: 32 vs 31,7 (\*\*), SSH: 31,9 vs 31,1 (\*\*\*), Biomed: 34,2 vs 34,3 (N-S)
  - Age first grant:
    - STEM: 33,9 vs 33,7 (N-S), SSH: 36,7 vs 36,3 (N-S), Biomed: 36,8 vs 35,3 (\*\*\*)
  - Age first article:
    - STEM: 27,5 vs 27 (N-S), SSH: 32,4 vs 31,7 (\*\*), Biomed: 30 vs 28 (\*\*\*)
- Age when reaching each academic positions:
  - STEM:
    - Assistant Prof.: 33,7 vs 33 (\*\*\*), Associate Prof. : 39 vs 38,1 (\*\*\*), Full Prof. : 45,6 vs 43,7 (\*\*\*)
  - SSH:
    - Assistant Prof.: 35,7 vs 34,9 (\*\*\*), Associate Prof. : 41,2 vs 40 (\*\*\*), Full Prof. : 47,6 vs 46,5 (\*\*\*)
  - Biomed:
    - Assistant Prof.: 36,4 vs 35,3 (\*\*\*), Associate Prof. : 42 vs 40,2 (\*\*\*), Full Prof. : 48,3 vs 46,2 (\*\*\*)
- Career interruptions: no surprises: the proportion of women reporting a career interruption is much higher than men, mainly because of maternity leaves:
  - STEM: 57% vs 16%, SSH: 51% vs 20%, Biomed: 57% vs 13%

# Preliminary Results

- Gap between men and women according to position and province

- Full professors:

		Salary	All incomes
Unionized	Quebec	2%	5%
Unionized	Ontario	2%	6%
Non-unionized	Quebec	4%	12%
Non-unionized	Ontario	6%	8%
Unionized	Alberta & B-C	7%	9%

- Associate professors:

		Salary	All incomes
Unionized	Alberta & B-C	2%	0%
Unionized	Quebec	2%	3%
Non-unionized	Quebec	5%	5%
Unionized	Ontario	5%	6%
Non-unionized	Ontario	6%	10%

- Assistant professors:

		Salary	All incomes
Unionized	Ontario	+2%	0%
Unionized	Alberta & B-C	+1%	+3%
Non-unionized	Quebec	1%	2%
Unionized	Quebec	4%	3%
Non-unionized	Ontario	4%	5%

# Preliminary Results

Gap between men and women, unionized or not, for each type of incomes

<b>ONTARIO</b>	<b>Gap non-unionized</b>	<b>p-value</b>	<b>Gap unionized</b>	<b>p-value</b>
Salary	14%	***	7%	***
All incomes	19%	***	10%	***
Bonus Admin.	50%	***	36%	**
Wage market premium	78%	***	51%	0,7300
Performance bonus	23%	0,5282	-15%	0,5696
Bonus Other	79%	0,3100	80%	***
Bonus Chair	5%	0,7650	46%	0,4581
Consulting revenues	50%	***	52%	0,1793

<b>QUEBEC</b>	<b>Gap non-unionized</b>	<b>p-value</b>	<b>Gap unionized</b>	<b>p-value</b>
Salary	6%	***	7%	***
All incomes	9%	**	10%	***
Bonus Admin.	60%	***	24%	**
Wage market premium	74%	**	24%	*
Performance bonus	5%	0,2003	22%	0,1277
Bonus Other	47%	*	30%	0,4473
Bonus Chair	50%	0,5852	5%	0,5991
Consulting revenues	5%	0,1768	45%	***



# Preliminary Results

Gap between men and women, in **ALBERTA and BRITISH COLUMBIA**, for each type of incomes

	Gap	p-value
Salary	13%	***
All incomes	16%	***
Bonus Admin.	42%	0,4061
Wage market premium	2%	0,3646
Performance bonus	-6%	0,8203
Bonus Other	-6%	1,0000
Bonus Chair	0%	0,4743
Consulting revenues	44%	***

	STEM		SSH		Biomed	
	Gap	P-value	Gap	P-value	Gap	P-value
Salary	0%	0,3410	9%	**	24%	***
All incomes	7%	0,1972	13%	**	28%	***
Bonus Admin.	27%	0,4810	23%	0,8998	55%	0,1203
Wage market premium	+50%	0,2190	+11%	0,5779	50%	*
Bonus Perf.	+5%	0,9610	+7%	0,9170	+33%	0,2100
Bonus Other	84%	0,2860	+55%	0,5360	25%	1,0000
Bonus Chair	37%	0,2310	41%	0,4100	51%	**
Consulting revenues	60%	0,3030	71%	***	8%	0,1086

# Preliminary Results

Gap between men and women, unionized or not, in **QUEBEC**, for each type of incomes, according to domain

<b>STEM</b>	<b>Non-unionized</b>	<b>p-value</b>	<b>Unionized</b>	<b>p-value</b>
Salary	11%	***	1%	0,2383
All incomes	14%	***	4%	**
Bonus Admin.	29%	*	-3%	0,4934
Wage market premium	73%	,011b	-6%	0,7467
Performance bonus	-21%	,396b	57%	,064b
Bonus Other	53%	,345b	66%	,049b
Bonus Chair	-6%	,582b	19%	0,3889
Consulting revenues	76%	**	64%	**

<b>Biomed</b>	<b>Non-unionized</b>	<b>p-value</b>	<b>Unionized</b>	<b>p-value</b>
Salary	17%	***	16%	***
All incomes	22%	***	22%	***
Bonus Admin.	50%	**	58%	***
Wage market premium	28%	,688b	53%	*
Performance bonus	28%	0,2745	6%	0,3700
Bonus Other	84%	,018b	53%	,109b
Bonus Chair	14%	,622b	12%	,547b
Consulting revenues	39%	0,1372	44%	***

<b>SSH</b>	<b>Non-unionized</b>	<b>p-value</b>	<b>Unionized</b>	<b>p-value</b>
Salary	6%	***	6%	***
All incomes	12%	***	9%	***
Bonus Admin.	65%	***	24%	0,1210
Wage market premium	87%	***	17%	*
Performance bonus	15%	0,5660	3%	0,7712
Bonus Other	51%	,423b	-16%	0,7352
Bonus Chair	69%	,587b	9%	0,8293
Consulting revenues	43%	*	54%	***

# Conclusions

- Gender pay gap among university professors in Canada could be linked to a delayed career progression for women. This delay derives primarily from maternity leaves and children.
  - We find an impact at the beginning of the career. However, in the long run, the moment when respondents have their first and/or last child does not impact the age at which they attain full professorship.
- The union impact on the differences between men and women for career progression is not straightforward
- There is a common say that women tend to less negotiate their entry in the salary scale or a wage market premium when they get hired, but no studies have documented that issue yet. Although we find that women sometimes get smaller wage market premium, we need both qualitative and quantitative data to investigate that issue.
- Unions might help reducing the gender pay gap, but it is not a straightforward effect. It depends on the discipline, the type of income and the province. Further analysis are needed before we can make any conclusion and recommendations.



# Improving Recognition Through AWARDS

Janet Bandows Koster  
Executive Director & CEO  
Gender Summit 2017

# The AWARDS Project

2010: convened 7 STEM disciplinary societies

2012: +11 new societies for follow-up workshop

First woman to ever win the Fields Medal  
– known as the “Nobel Prize of mathematics”

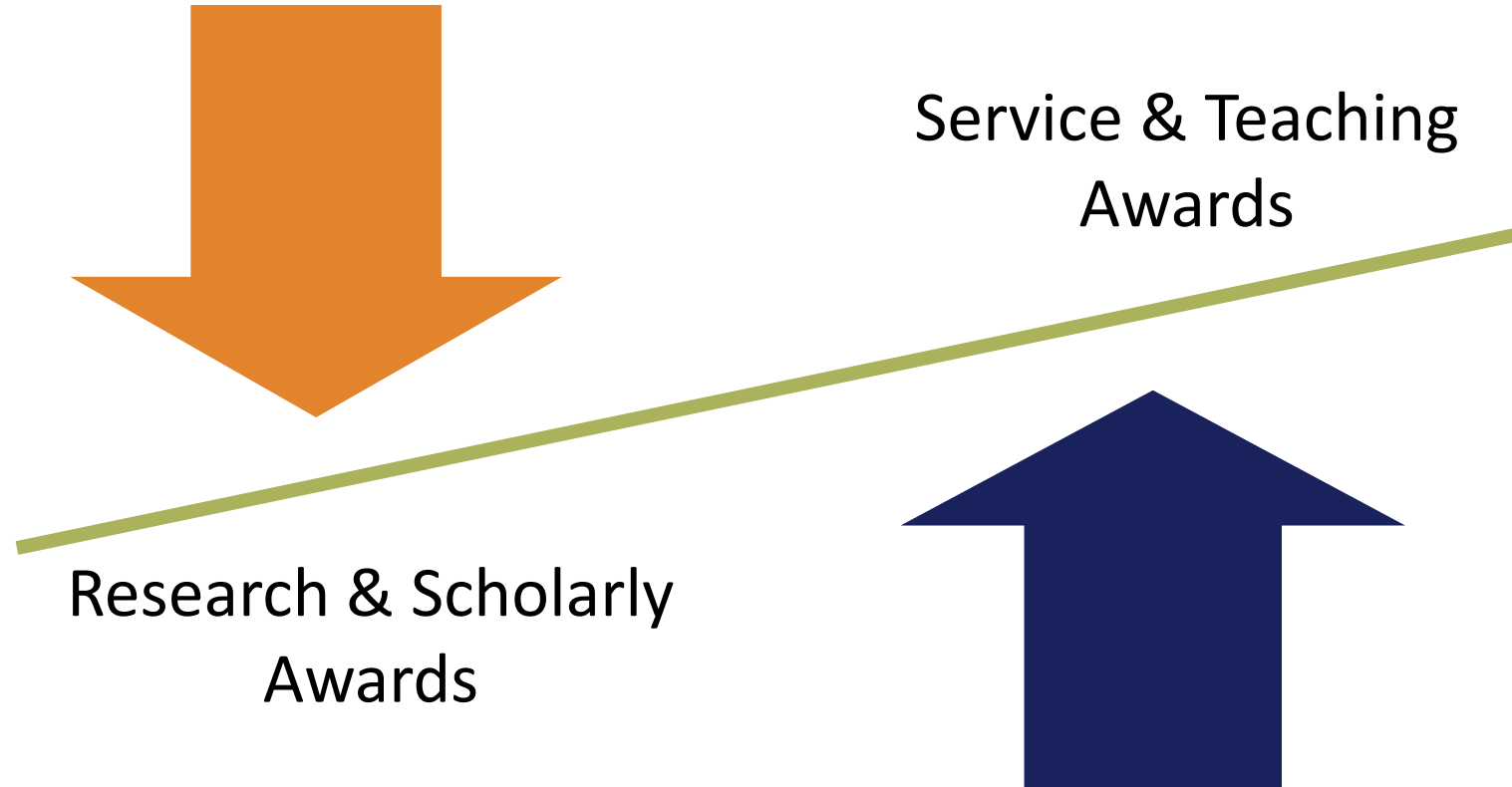
**Maryam Mirzakhani, PhD**  
Professor of Mathematics at Stanford University  
(AWIS Member since 2013)



*The Advancing Ways of Awarding Recognition in Disciplinary Societies (AWARDS) Project is funded by the National Science Foundation ADVANCE program. Grant #0930073*

# Findings

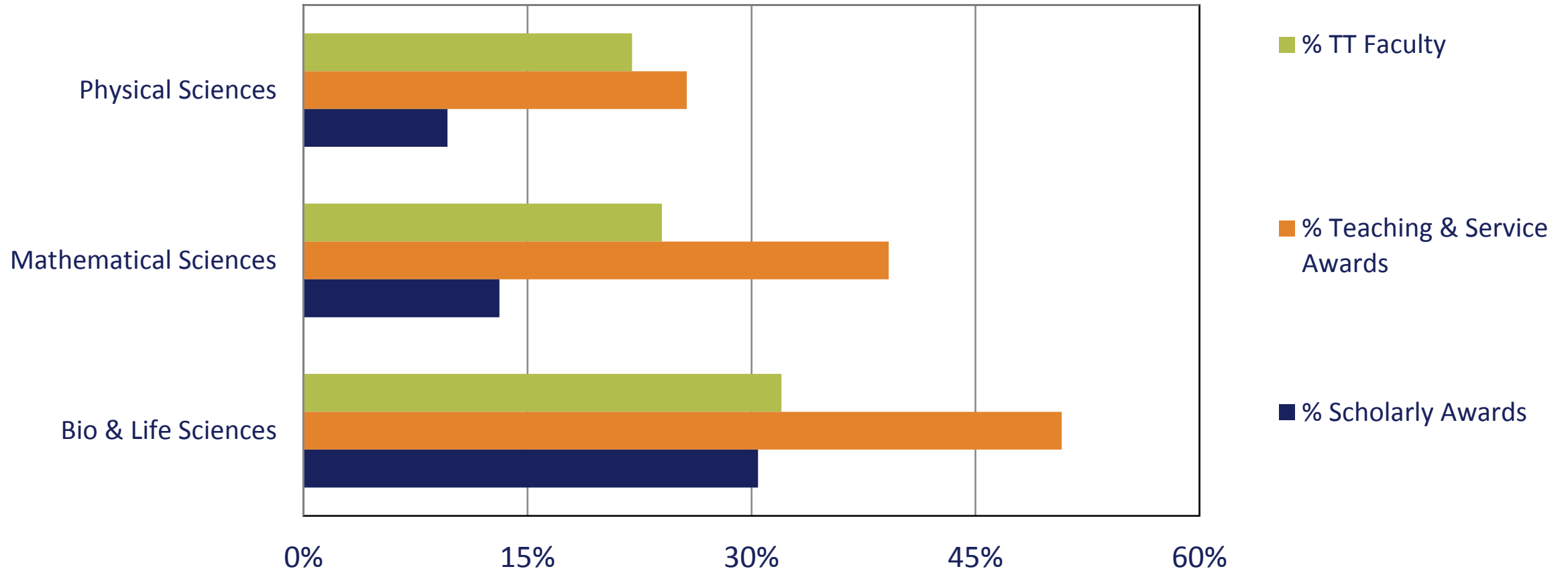
Women were recognized for:



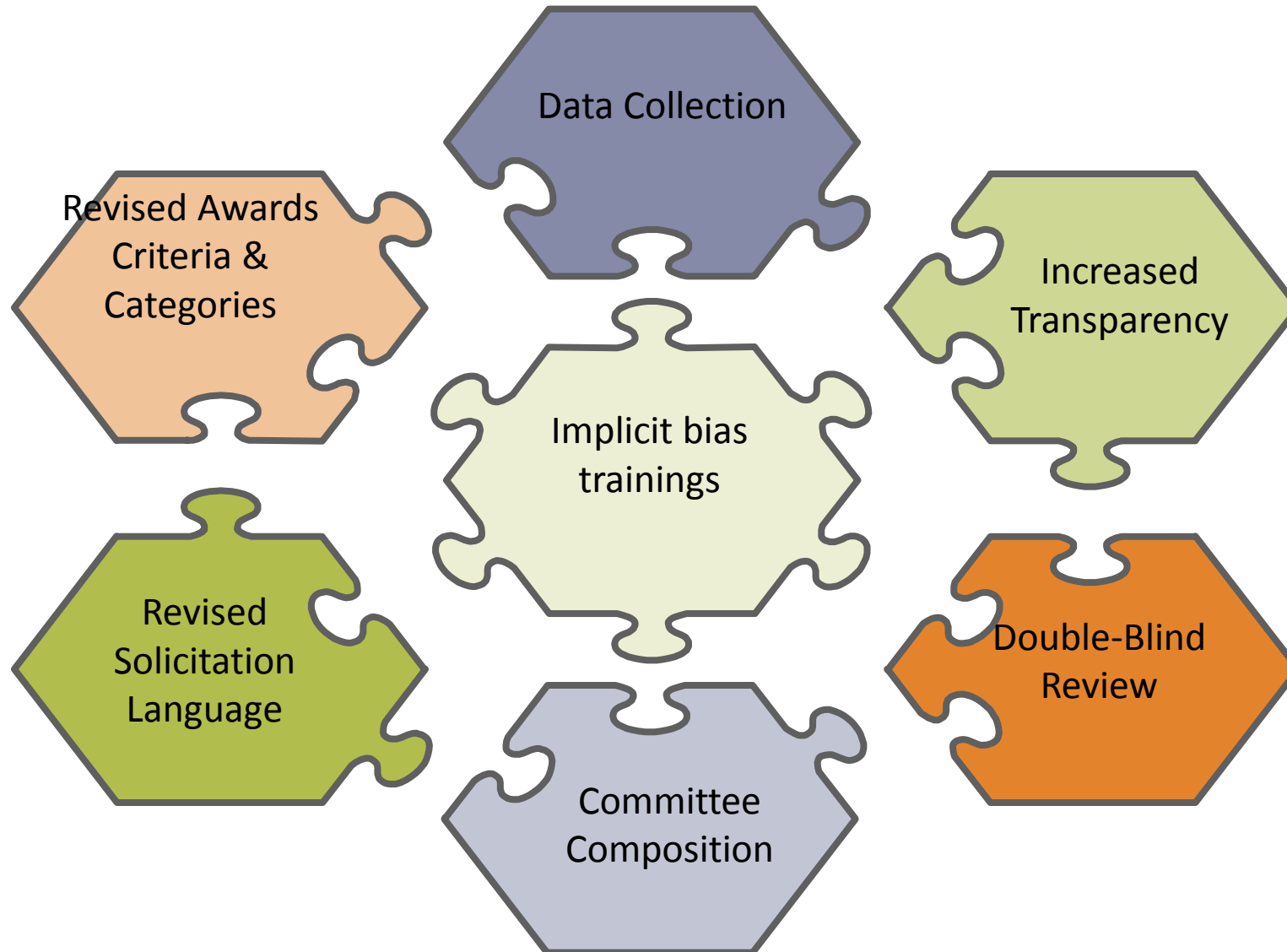
Regardless of representation in the nomination pool, men **twice** as likely to win research awards

# Findings

Women's Proportion of AWARDS 2011-2014



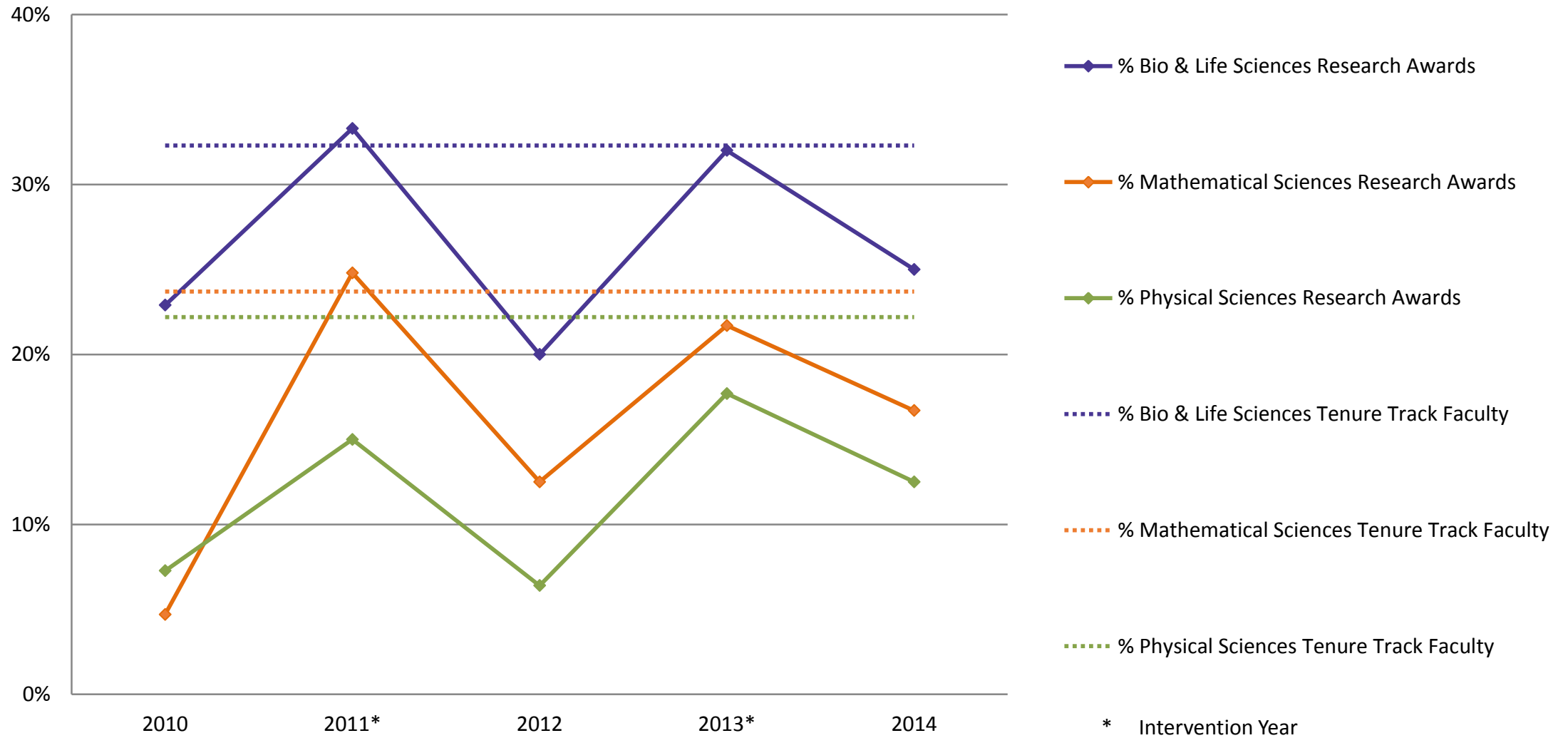
# Example Initiatives





# Challenges in Sustainability

Women Among Awardees and Tenure Track Faculty



# Lessons Learned



Professional Societies are the harbingers of scientific culture.



Data is key to driving change.



Senior leadership must fully engage.



“Best practices” must be tailored to each society.

# Get In Touch

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ASSOCIATION FOR WOMEN IN SCIENCE



# A Framework for Advancing Gender at Elsevier

Insights from the  
Gender Working Group

Ylann Schemm,  
Director of the Elsevier Foundation  
November 2017

## The Elsevier Foundation & Gender Summits: Catalysts for Elsevier's Gender Working Group



### 2016 – 2018

- OWSD Elsevier Foundation Awards for Early Career Women Scientists in Developing Countries
- Portia Ltd Strategic Partnership to promote the Gender Summits as an action oriented platform.
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New Scholars Program 2006 - 2015: 10 years, 50 grants, ca \$2.5 million

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# The Elsevier Gender Working Group



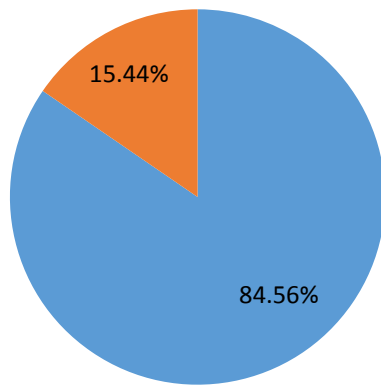
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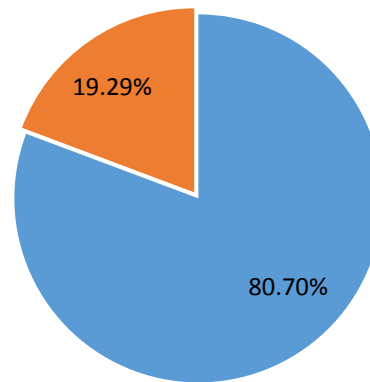
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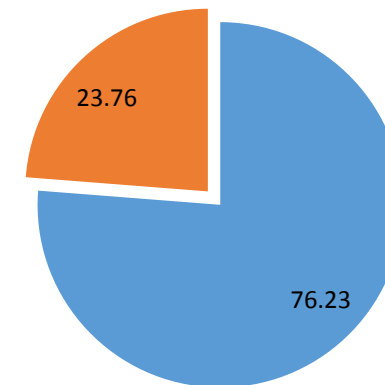
2015



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■ Male  
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- Now piloting unconscious bias training for editors and reviewers across 2 portfolios: Energy & Earth Sciences.
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## 4) Editorial Policies on Sex and Gender in Research

➤ In 2016/2017 Worked with Dr. Londa Schiebinger at Stanford University to develop a white paper on sex and gender in editorial guidelines which was subsequently published as an editorial in the *Lancet*.

1. Correct usage of the terms “sex” and “gender.”

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➤ Presented to the industry bodies International Committee of Medical Journal Editors (ICMJE) and Council of Science Editors (CSE). ICMJE adopted guidelines. Result: Medical journals across Elsevier (and many other publishers) followed. Concurrently Dr. Schiebinger worked with EASE on EU SAGER guidelines.

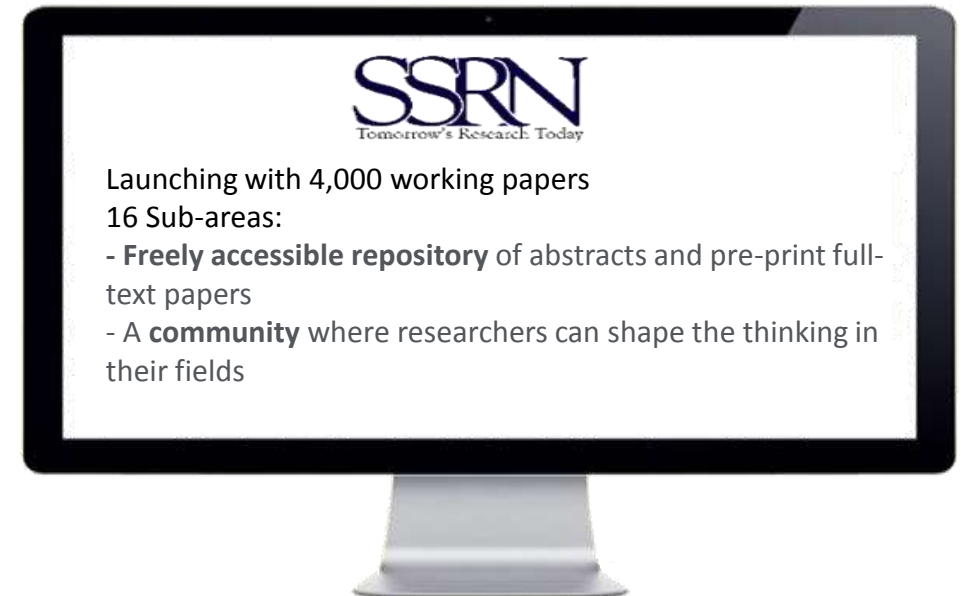
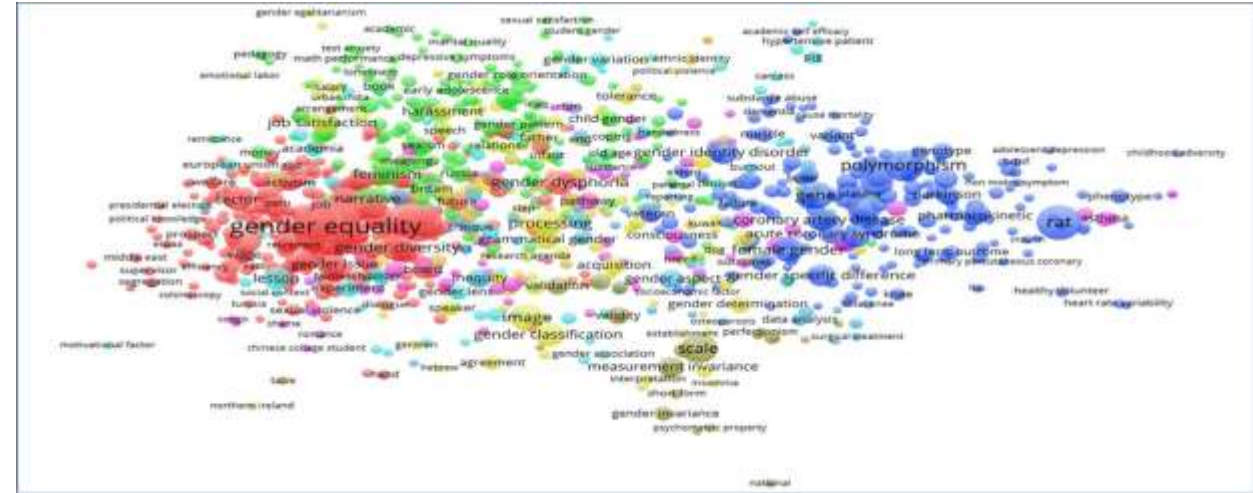
➤ *Cell* adopted the STAR methods, an enhanced set of reporting guidelines for authors for research reporting. The STAR methods indicate that sex and gender must be differentiated for human studies or reasons must be stated why these have not been disclosed; also require that all cell lines report sex.

➤ Next steps: continue working with CSE and other industry bodies to encourage adoption of sex and gender guidelines.



## 4) Promote publishing on sex & gender in research studies and gender in STEM issues

- Explored how we can promote studies exploring the gender dimension in research and diversity in STEM. Canvassed everything we publish in these fields.
- Mapped gender across research topics and trends to examine what has been published and in which domains over the last 5 years via Scopus.
- Presented at the 2016 EU Gender Summit and incorporated as a key chapter in the 2017 Global Gender Report.
- Women's and Gender Studies Research Network (WGSRN)  
\*Coming Soon\* to SSRN—launching with 4000 working papers on gender.



# Gender in the Global Research Landscape

Elsevier's comprehensive report on research performance through a gender lens, *Gender in the Global Research Landscape*, spans 20 years, 12 geographies, and 27 disciplines. This global study draws upon data and analytics, a unique gender disambiguation methodology, and involvement of global experts. Illustrated below are some of the report's key findings.

NEW METHOD & RESEARCH BY ELSEVIER

**>40%**  
Women

Comparator countries and regions analyzed where women comprise more than 40% of researchers.



## There is incremental progress towards gender balance in research

Between 1996-2000 and 2011-2015, the proportion of women among researchers increases in all 12 comparator countries and regions.

The share of women among researchers differs across fields of research: Health and Life Sciences fields are found to have the highest representation of women.

Women's scholarly output includes a slightly larger proportion of highly interdisciplinary research than men's.

Women are slightly less likely than men to collaborate across academic and corporate sectors on papers.

Among researchers, women are generally less internationally mobile than men.

Although women tend to publish fewer research articles than men, their articles are downloaded and cited at similar rates, and at slightly higher rates in the US.



Field-Weighted\* Download Impact in the US by gender 2011-15

■ 1.12  
■ 1.08

Field-Weighted\* Citation Impact in the US by gender 2011-15

■ 1.57  
■ 1.52

■ Women ■ Men

\*Field-Weighted Impact indicators normalize the data to account for different download and citation rates and practices across articles' fields, types, and ages.

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Among researchers in the selected comparator countries or regions, women are slightly less likely to collaborate internationally on research papers.

In Japan, the number of women in research is relatively low; however their scholarly output tends to be higher than that of the men.

Proportion of researchers by gender 2011-15

Women:  $\frac{1}{5}$

Scholarly output per researcher 2011-15



## 5) Analytics on gender in research and publishing

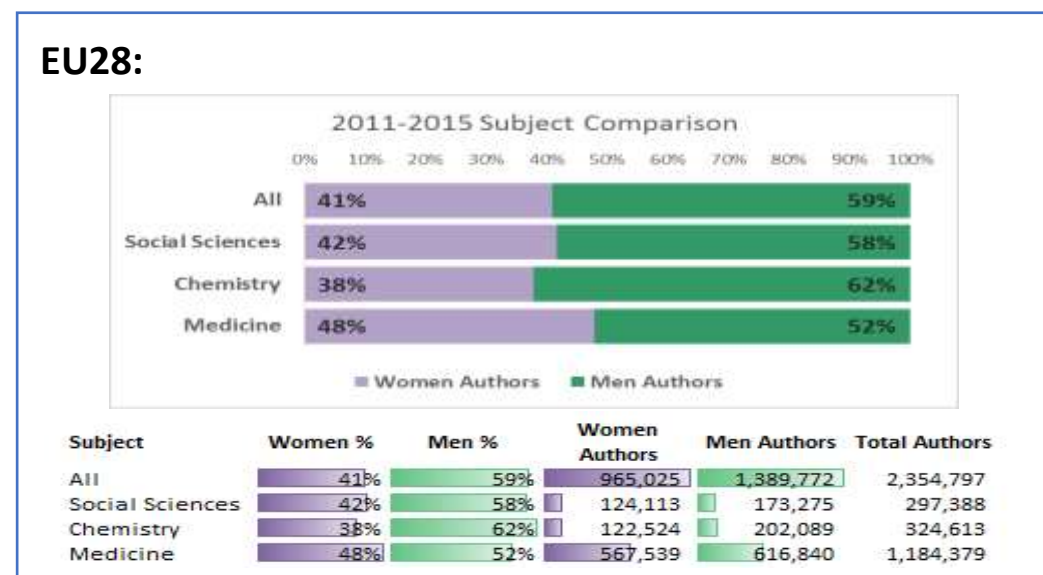
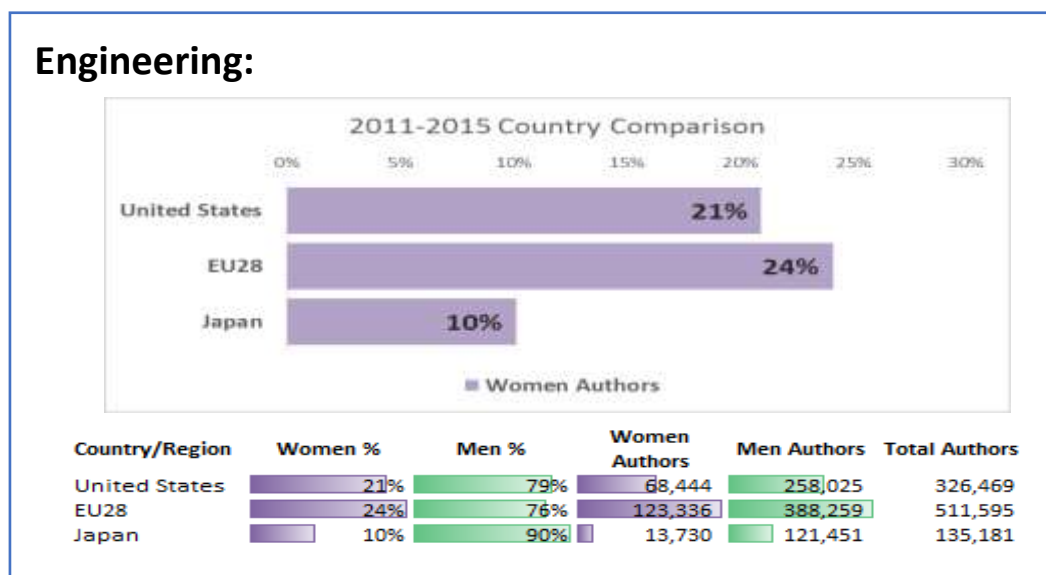
- Gender Summits served as catalyst for this project
- Addressed the need for a new gender methodology across 12 countries and 27 research areas to provide research leaders with bibliometric and qualitative analyses of the outputs, quality, and impact of research through a gender lens.
- Additional analyses on: productivity across a researcher's career; Mobility by gender; Network reach by gender; impact of author position by gender



# Elsevier Journals Gender Graphing Tool

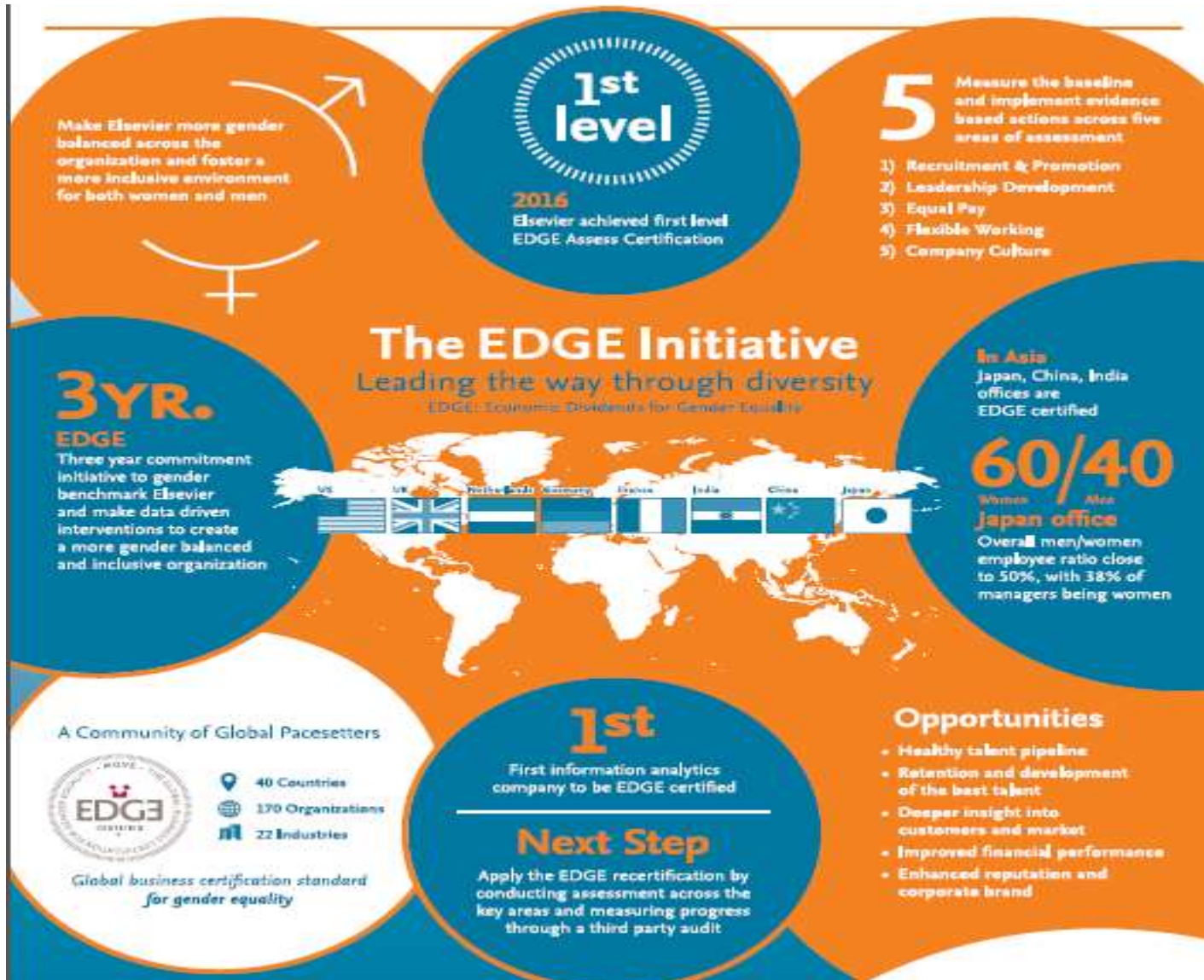
Publishers now have access to the author data used for the report + an Excel-based graphing tool.

Select and compare **subjects** and **countries/regions** of interest to see the representation of women and men among researchers (examples below):



- Access to the shares of women and men among researchers for **27 subject areas (ASJC 27)** across **43 countries/regions**
- Generate **charts and tables** showing comparisons of subjects/regions at the click of a button
- The tool provides subject-specific benchmarks to help us **analyse and contextualise gender balance on our editorial boards**.

## 6) Gender Balance in Elsevier Management: EDGE Initiative



**Economic Dividends for Gender Equality (EDGE)** is a partner in Elsevier's commitment to gender benchmark the company and develop data driven interventions for a more gender balanced and inclusive organization.

We made a 3 year commitment and have been recertified for the Assess level--the 1<sup>st</sup> in our industry to achieve this level of certification.



# Lessons Learned

- The work of the Elsevier gender working group has been investigative, data driven and consultative, presenting findings and constructive recommendations for possible interventions to fully apply the gender lens to publishing.
- Our key emphasis has been on engagement: with publishers internally and with editors, authors and reviewers and the industry. This has been a highly effective way to get people on board and certain targets operationalized.
- Identify the passionate, likeminded individuals in your organization—project drivers who can ensure that specific issues continue to develop to share the work and the successes.
- Critical to get senior leader endorsement from the start—helps with visibility and escalating/solving issues if projects stall. Keep the senior leader briefed and package the successes so that s/he can showcase it further.
- Challenge lies in staying organized with clear drivers and deliverables while creating a strong community. In a change management endeavour like this—it's easy to lose focus through scope creep and busy day jobs.
- What helps: Share successes & inspiration across the organization—at both senior and grassroots levels; bring in gender thought leaders to speak.



**Ylann Schemm,**  
**Director, Elsevier Foundation**  
[y.schemm@elsevier.com](mailto:y.schemm@elsevier.com)

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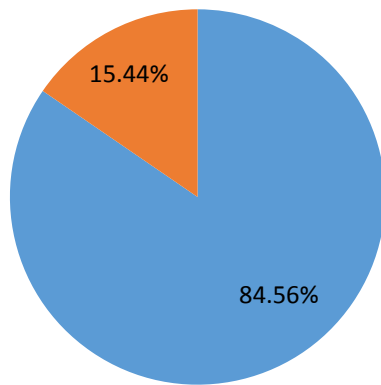
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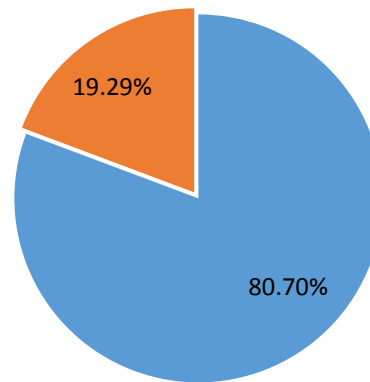
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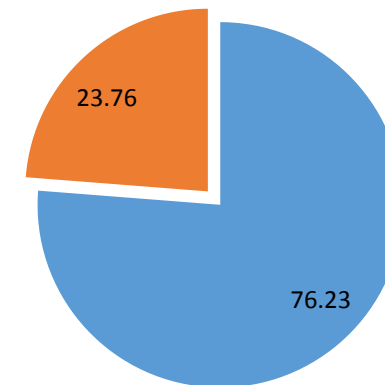
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cautiously.

➤ Presented to the industry bodies International Committee of Medical Journal Editors (ICMJE) and Council of Science Editors (CSE). ICMJE adopted guidelines. Result: Medical journals across Elsevier (and many other publishers) followed. Concurrently Dr. Schiebinger worked with EASE on EU SAGER guidelines.

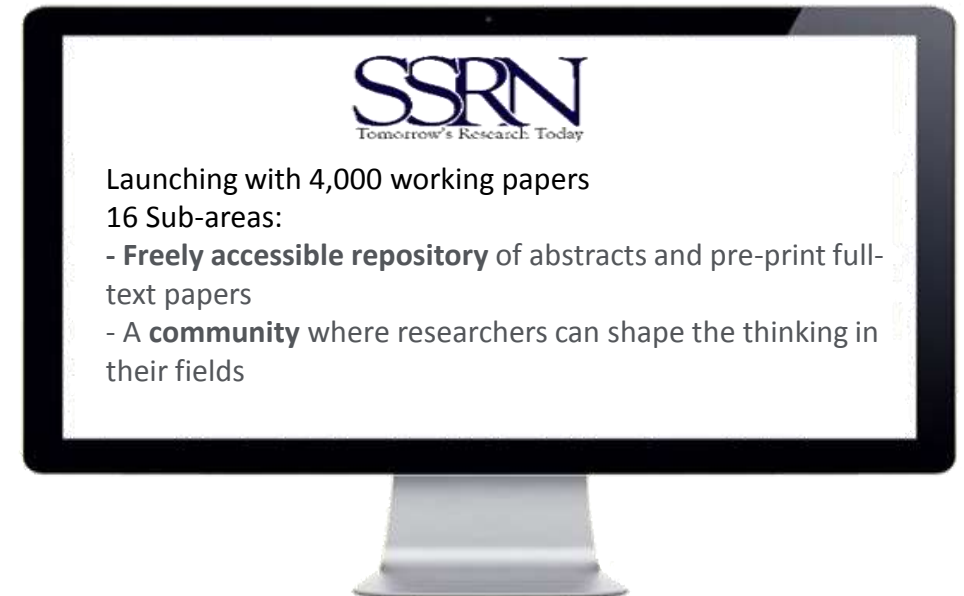
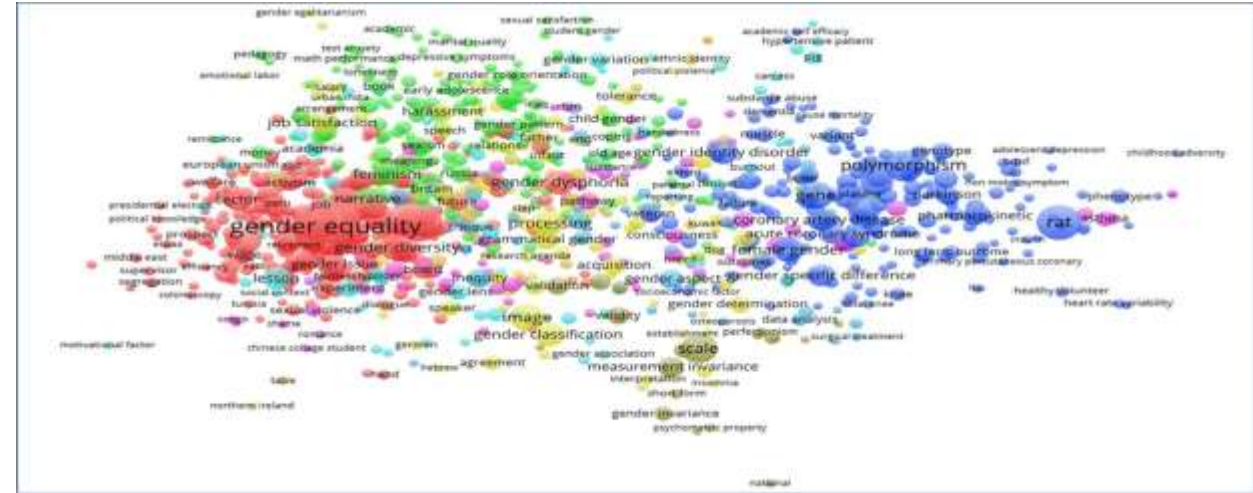
➤ *Cell* adopted the STAR methods, an enhanced set of reporting guidelines for authors for research reporting. The STAR methods indicate that sex and gender must be differentiated for human studies or reasons must be stated why these have not been disclosed; also require that all cell lines report sex.

➤ Next steps: continue working with CSE and other industry bodies to encourage adoption of sex and gender guidelines.



## 4) Promote publishing on sex & gender in research studies and gender in STEM issues

- Explored how we can promote studies exploring the gender dimension in research and diversity in STEM. Canvassed everything we publish in these fields.
- Mapped gender across research topics and trends to examine what has been published and in which domains over the last 5 years via Scopus.
- Presented at the 2016 EU Gender Summit and incorporated as a key chapter in the 2017 Global Gender Report.
- Women's and Gender Studies Research Network (WGSRN)  
\*Coming Soon\* to SSRN—launching with 4000 working papers on gender.





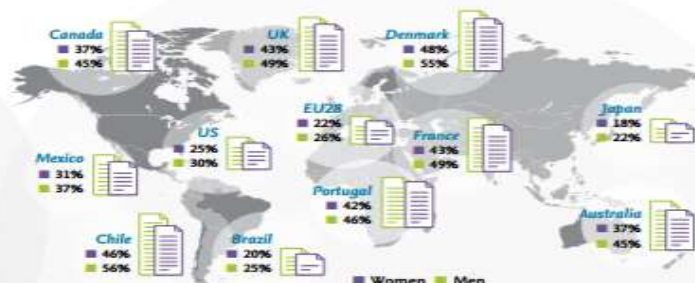
# Gender in the Global Research Landscape

Elsevier's comprehensive report on research performance through a gender lens, *Gender in the Global Research Landscape*, spans 20 years, 12 geographies, and 27 disciplines. This global study draws upon data and analytics, a unique gender disambiguation methodology, and involvement of global experts. Illustrated below are some of the report's key findings.

NEW METHOD & RESEARCH BY ELSEVIER

**>40%**  
Women

Comparator countries and regions analyzed where women comprise more than 40% of researchers.



## There is incremental progress towards gender balance in research

Between 1996-2000 and 2011-2015, the proportion of women among researchers increases in all 12 comparator countries and regions.

The share of women among researchers differs across fields of research: Health and Life Sciences fields are found to have the highest representation of women.

Women's scholarly output includes a slightly larger proportion of highly interdisciplinary research than men's.

Women are slightly less likely than men to collaborate across academic and corporate sectors on papers.

Among researchers, women are generally less internationally mobile than men.

Although women tend to publish fewer research articles than men, their articles are downloaded and cited at similar rates, and at slightly higher rates in the US.



Field-Weighted\* Download Impact in the US by gender 2011-15

■ 1.12  
■ 1.08

Field-Weighted\* Citation Impact in the US by gender 2011-15

■ 1.57  
■ 1.52

■ Women ■ Men

\*Field-Weighted Impact indicators normalize the data to account for different download and citation rates and practices across articles' fields, types, and ages. Elsevier and Empowering Knowledge are registered trademarks of Elsevier B.V. RELX Group and the RE symbol are trademarks of RELX Intellectual Properties SA, used under license. © 2017 Elsevier B.V.

Among researchers in the selected comparator countries or regions, women are slightly less likely to collaborate internationally on research papers.

In Japan, the number of women in research is relatively low; however their scholarly output tends to be higher than that of the men.

Proportion of researchers by gender 2011-15



Scholarly output per researcher 2011-15



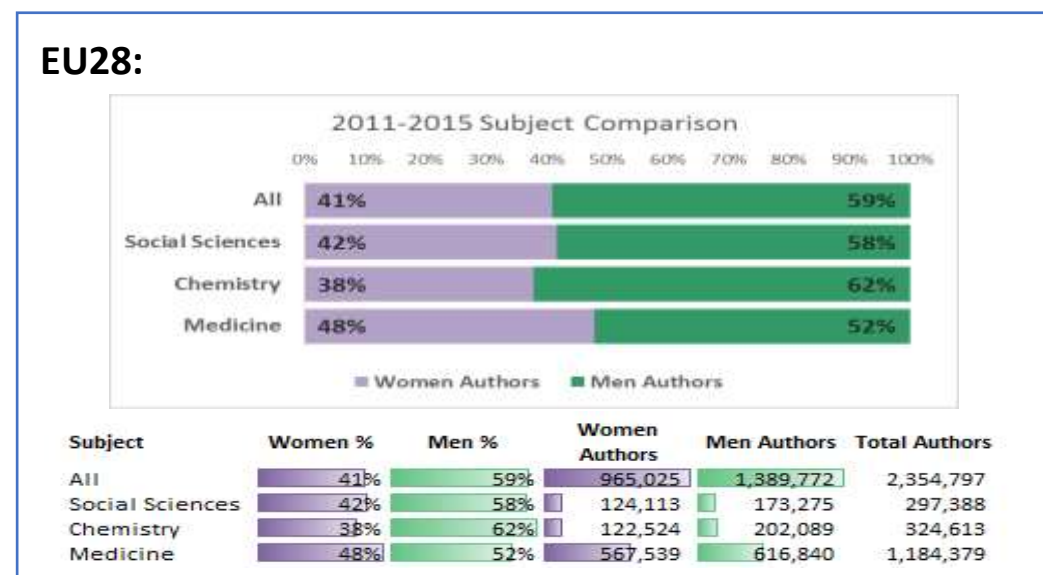
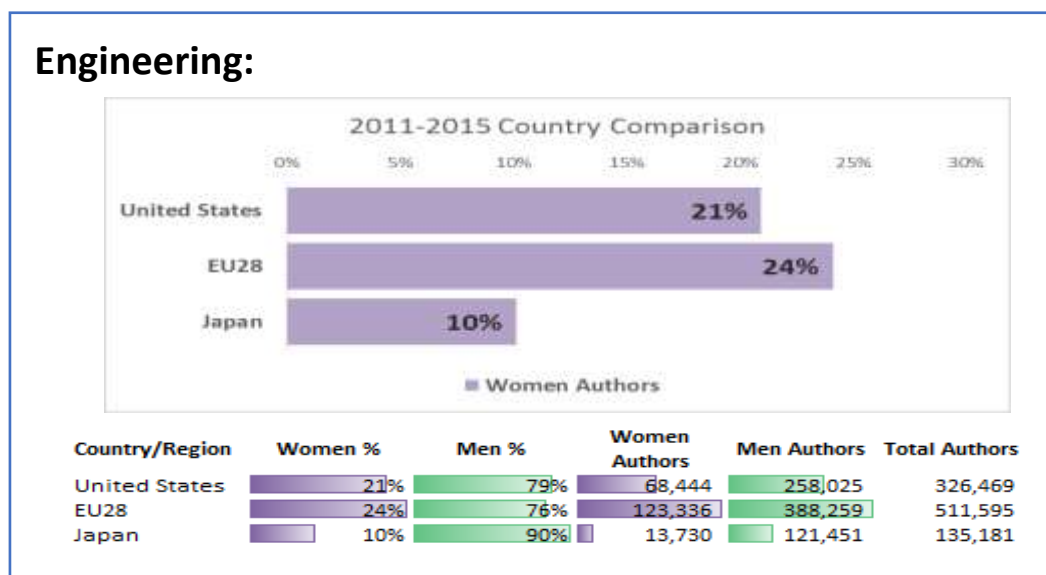
## 5) Analytics on gender in research and publishing

- Gender Summits served as catalyst for this project
- Addressed the need for a new gender methodology across 12 countries and 27 research areas to provide research leaders with bibliometric and qualitative analyses of the outputs, quality, and impact of research through a gender lens.
- Additional analyses on: productivity across a researcher's career; Mobility by gender; Network reach by gender; impact of author position by gender

# Elsevier Journals Gender Graphing Tool

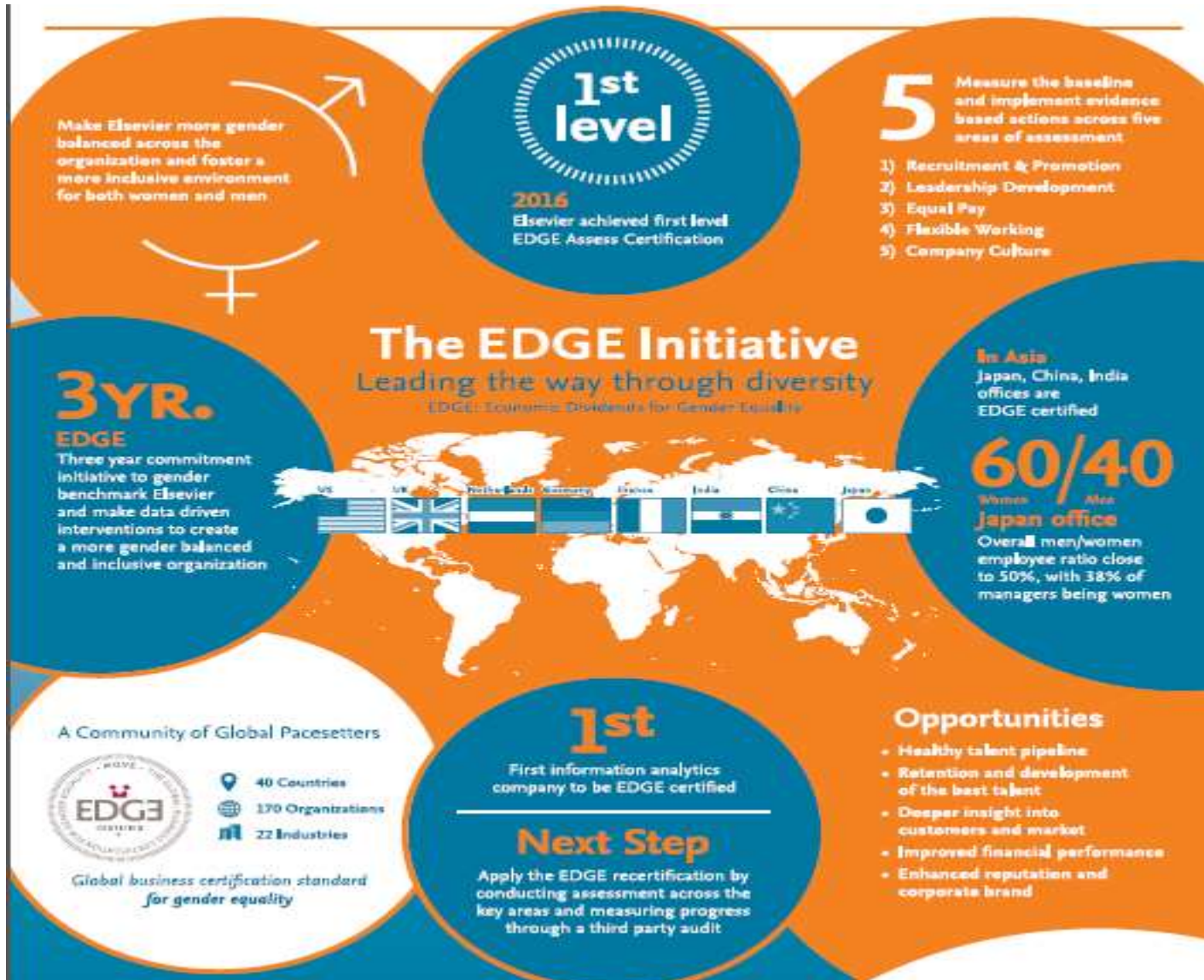
Publishers now have access to the author data used for the report + an Excel-based graphing tool.

Select and compare **subjects** and **countries/regions** of interest to see the representation of women and men among researchers (examples below):



- Access to the shares of women and men among researchers for **27 subject areas (ASJC 27)** across **43 countries/regions**
- Generate **charts and tables** showing comparisons of subjects/regions at the click of a button
- The tool provides subject-specific benchmarks to help us **analyse and contextualise gender balance on our editorial boards**.

## 6) Gender Balance in Elsevier Management: EDGE Initiative



**Economic Dividends for Gender Equality (EDGE)** is a partner in Elsevier's commitment to gender benchmark the company and develop data driven interventions for a more gender balanced and inclusive organization.

We made a 3 year commitment and have been recertified for the Assess level--the 1<sup>st</sup> in our industry to achieve this level of certification.





# Lessons Learned

- The work of the Elsevier gender working group has been investigative, data driven and consultative, presenting findings and constructive recommendations for possible interventions to fully apply the gender lens to publishing.
- Our key emphasis has been on engagement: with publishers internally and with editors, authors and reviewers and the industry. This has been a highly effective way to get people on board and certain targets operationalized.
- Identify the passionate, likeminded individuals in your organization—project drivers who can ensure that specific issues continue to develop to share the work and the successes.
- Critical to get senior leader endorsement from the start—helps with visibility and escalating/solving issues if projects stall. Keep the senior leader briefed and package the successes so that s/he can showcase it further.
- Challenge lies in staying organized with clear drivers and deliverables while creating a strong community. In a change management endeavour like this—it's easy to lose focus through scope creep and busy day jobs.
- What helps: Share successes & inspiration across the organization—at both senior and grassroots levels; bring in gender thought leaders to speak.



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