

Analysis of Research Through a Gender Lens

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Global Strategic Networks | Elsevier

On behalf of the report team

October 3, 2019 | Gender Summit 17, Amsterdam

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Elsevier Gender Working Group

- **Gender diversity** for journal editorial boards, speakers/panelists at Elsevier conferences, and award selection committees
- Address issues of **implicit bias in peer review**
- Enhanced editorial policies and guidance to authors on **reporting about sex & gender in research**
- **Promote studies** on i) sex & gender in research and ii) diversity in STEM
- Apply **data & analytics to gender issues**



Answering the Call for Data



Gender Equality Plans

“Setting targets and monitoring progress via indicators”

National Institutes of Health addresses the science of diversity

Hannah A. Valentine^{a,*} and Francis S. Collins^b

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Edited by Inder M. Verma, The Salk Institute for Biological Studies, La Jolla, CA, and approved August 26, 2015 (received for review May 14, 2015)

The US biomedical research workforce does not currently mirror the nation's population demographically, despite numerous attempts to increase diversity. This imbalance is limiting the promise of our biomedical enterprise for building knowledge and improving the nation's health. Beyond ensuring fairness in scientific workforce representation, recruiting and retaining a diverse set of minds and approaches is vital to harnessing the complete intellectual capital of the nation. The complexity inherent in diversifying the research workforce underscores the need for a rigorous scientific approach, consistent with the ways we address the challenges of science discovery and translation to human health. Herein, we identify four cross-cutting diversity challenges ripe for scientific exploration and opportunity: research evidence for diversity's impact on the quality and outputs of science; evidence-based approaches to recruitment and training; individual and institutional barriers to workforce diversity; and a national strategy for eliminating barriers to career transition, with scientifically based approaches for scaling and dissemination. Evidence-based data for each of these challenges should provide an integrated, stepwise approach to programs that enhance diversity rapidly within the biomedical research workforce.

diversity | scientific workforce | underrepresentation in science | culture | biomedical research

Despite longstanding efforts, diversifying the biomedical research workforce remains an elusive goal, and large sectors of the US population remain underrepresented. These sectors include several racial/ethnic groups; economically disadvantaged individuals; people with disabilities; and women. Certain racial/ethnic groups are represented only minimally in biomedical research: of the nation's scientific research faculty positions, 4% are African American, 4% are Hispanic, 0.2% are Native American, and 0.1% are Hawaiian/Pacific Islander (1). There has been little increase in representation of

Existing evidence suggests that enhancing and sustaining diversity requires an integrated set of interventions that—much like the task of biomedical research itself—relies on a reasoned, evidence-based approach that is rooted in the scientific method. Herein, we identify the need for scientific approaches that address four crosscutting diversity challenges: (i) research to support or refute evidence that diversity among scientists enhances quality and outputs of the research itself; (ii) evidence-based approaches to recruitment and training, including defining “effective research experiences and mentoring”; (iii) interventions that recruit, include, and

Challenge 1: Among Scientists, What Is the Impact of Diversity on the Quality and Outputs of Research?

A literature base outside biomedicine indicates that diversity has a variety of beneficial effects, but more research is needed to support or refute evidence that diversity among scientists enhances quality and outputs of the research itself. Many research scholars approaching diversity have done so from a wide range of fields outside of biomedicine, including sociology, psychology, economics, education, team science, leadership, career

development, and organizational behavior (2–4).

Valentine, H.A., and Collins, F.S. (2015). National Institutes of Health addresses the science of diversity. *Proc. Natl. Acad. Sci.* 112(40), 12240–12242.

“NSF will continue to advance equity through data-driven decision-making.”

EDITORIAL

Intentional equity

Over a decade ago, when I was chief scientist at the U.S. National Aeronautics and Space Administration, I spoke at a conference called Women and Science: Celebrating Achievements, Charting Challenges. I lauded women working in astrophysics, government, and science policy in the United States and elsewhere, but said that progress was mixed—the veneer of success for women across the sciences, and in science leadership, was too thin across the globe. What has changed since then? Cultural barriers, a lack of enlightened policies, and the need for role models and support systems still exist worldwide. However, today there is good reason to be optimistic. The international scientific community is coming together intentionally to acknowledge and tackle gender equity.

This year, I made my first trip as the U.S. National Science Foundation (NSF) director to the Next Einstein Forum (NEF) in Africa, where I was on a panel

of leading industrial nations, is encouraging G7 nations to lead efforts in “inclusive innovation” to ensure that everyone accesses and benefits from science and technology. Further, the final G7 report encourages the development of “policy and working environments in which equal opportunity allows women to exert their abilities [and] advance their career prospects.” Such changes help STEM equality and will attract and retain talented women in STEM careers.

What about the United States? Women now earn about half of all science and engineering bachelor's degrees, yet they account for only 30% of the U.S. science and engineering workforce. In some STEM fields, such as mechanical engineering, the percentage of women is in the single digits. NSF will continue to advance equity through data-driven decision-making. Our Career-Life Balance Initiative, for example, mitigates factors that can negatively affect women's ability to carry out research, especially during the early years of their careers. NSF's ADVANCE program encourages universities to use institutional data about recruitment, retention, and



“...global equity for women in science...is a call to action...”



Frances A. Córdova is director of the U.S. National Science Foundation, Arlington, VA, USA.

Córdova, F.A. (2016). *Intentional equity*. *Science* 353(698), 427.

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Sample Reports

Gender in the Global Research Landscape

Critical issues related to gender disparity and bias in research studies. Drawdown issues, 2010-2015.

Gender in the Global Research Landscape



Analysis of research performance through a gender lens across 20 years, 12 geographies, and 27 subject areas

Mapping Gender in the German Research Arena

Equality is part of quality in science. Making full use of the potential of both women and men maximizes the quantity and, more importantly, quality of research. Despite current policies and regulations, there are prominent gaps between women and men in terms of the number of scientific researchers, decision-making positions held, and other aspects of career development such as informal networks of collaboration and access to funding.

America's Knowledge Economy: A State-by-State Review

Explores the comparative research strengths of US states, providing an understanding of the broader importance of research produced by public universities. This report helps inform the debate about academic research funding and provides a framework for identifying, showcasing, and aligning the expertise of research institutions with each state's policy goals.

Brain Science: Mapping the Landscape of Brain and Neuroscience Research

The report focuses on brain science research output on a national level, levels of collaboration within brain research, cross-disciplinary researcher mobility, and emerging trends and themes in brain research. It provides various stakeholders in brain research - funders, governments, universities, research institutions, and policy groups - with a resource that can help inform decisions about future research strategies and funding priorities, guide international coordination and collaboration, and steer policy and advocacy efforts.

A Decade of Development in Sub-Saharan African Science, Technology, Engineering, and Mathematics Research

The World Bank

MAPPING GENDER in the German Research Arena



ELSEVIER | researchintelligence

A report conducted by Elsevier

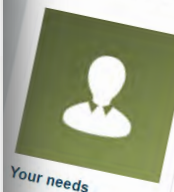
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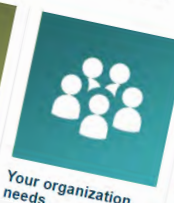
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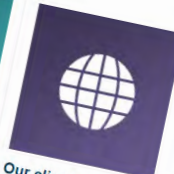
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Your organization needs



Our clients



European Commission

SHE FIGURES

Gender in the Global Research Landscape

International Center for the Study of Research

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the Study of Research

Advancing research evaluation in all
fields of knowledge production.

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The mission of the ICSR is to cultivate the **thoughtful use of metrics and indicators** in research evaluation and to promote **evaluation best practices**.

The ICSR is tasked with developing, characterising and validating new and existing research metrics, indicators and research assessment practices; it also supports **independent, external studies** on topics within this scope.

www.icsr.net

Gender Disambiguation of Authors & Inventors

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LexisNexis TotalPatent One®



PATSTAT

+



Global Perspective

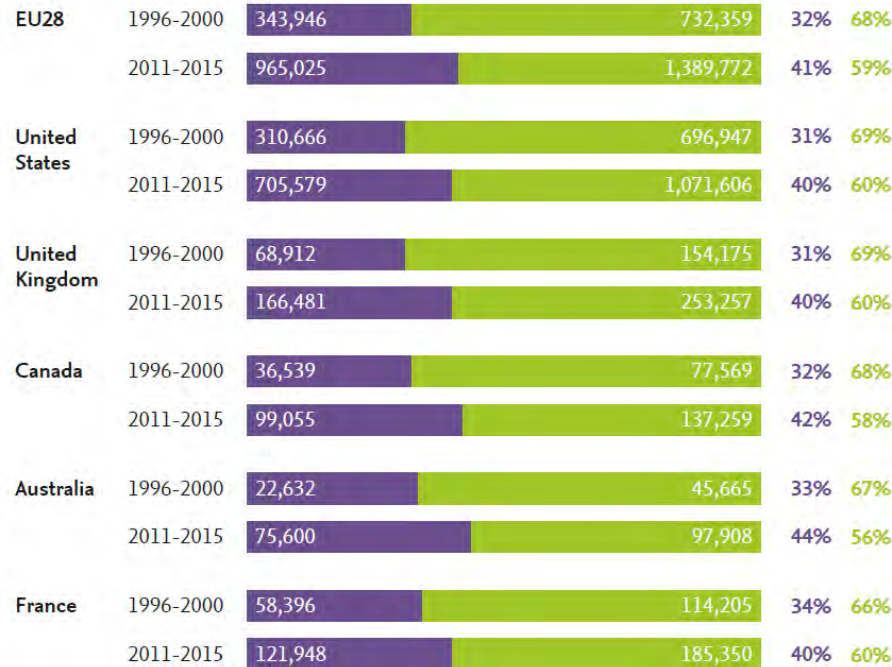
- Focus on countries/regions with high research output
- Each with at least one comparable comparator
- Applicability of our gender disambiguation methodology
- At least two countries from each major region



Proportion and Number of Researchers by Gender

■ Women ■ Men

PROPORTION OF WOMEN AND MEN
(AMONG NAMED GENDERED AUTHOR PROFILES)

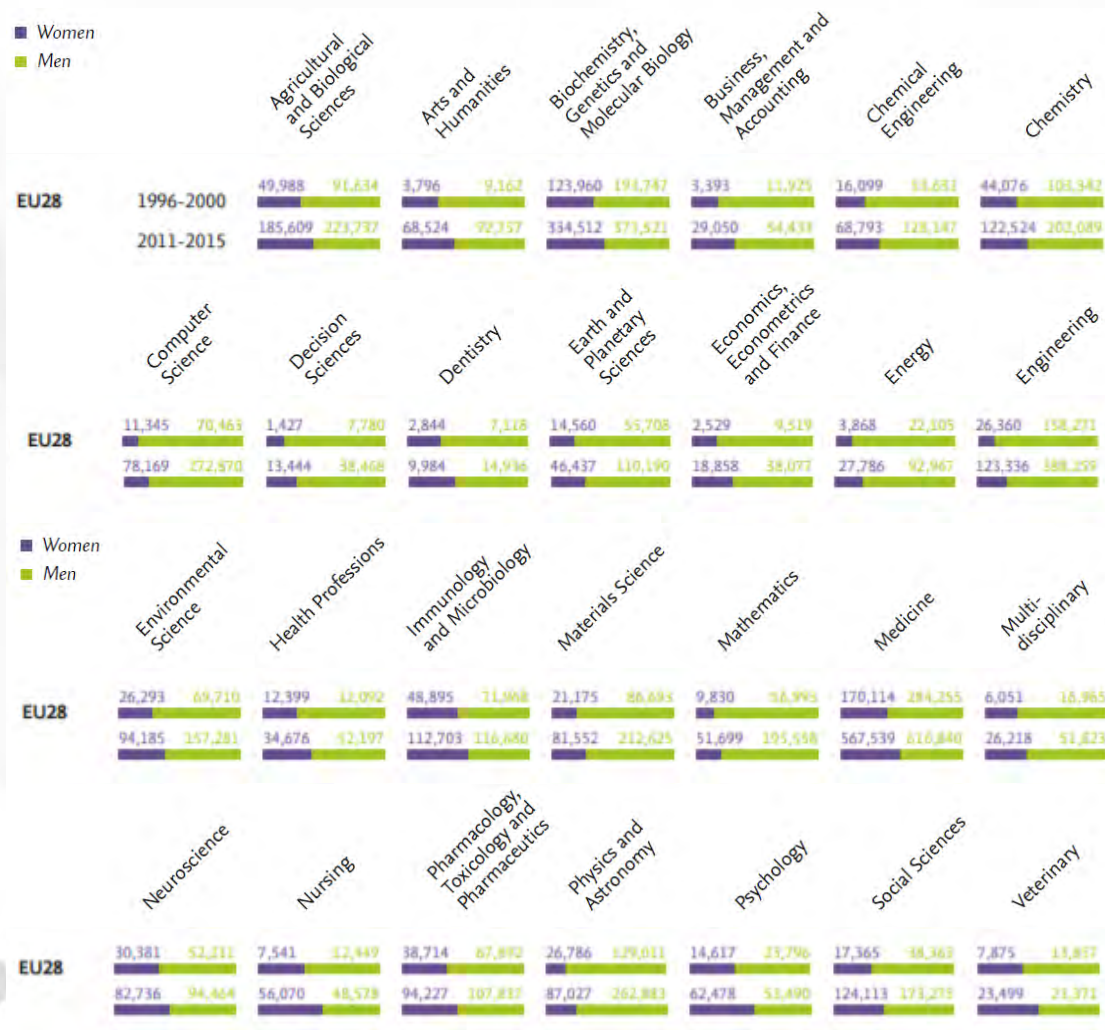


- **Purple** represents “women” and **green** “men”
- Researchers = Authors who have published **articles, reviews, and conference proceedings** indexed in Scopus

Proportion and Number of EU28 Researchers

by gender and subject area

- Lower **proportion of women among researchers** for most comparators:
 - Energy
 - Engineering
 - Mathematics
 - Physics & Astronomy
- Majority of researchers are women in:
 - Nursing
 - Psychology
- Fields in which **women comprise nearly half of researchers**:
 - Social Sciences
 - Veterinary Sciences
 - **Medicine**
 - Health Professions
 - Arts & Humanities



Coming Soon: Global Gender Report 2020

- Research participation and output
 - Across multiple stages & output/impact indicators
 - Across (sub)disciplines, geographic regions
 - Authors/Article; Inventors/Patents; Grantees/Grants
- Process of science
 - Citation & authorship patterns
 - Mobility
 - Networks/collaborations
- Career progression
 - Cohorts
 - Pipeline
- Perceptions of gender equity in research



Kumsal Bayazit, CEO of Elsevier, presents at the Harvard Data Science Initiative on 'Data-driven approaches to Diversity & Inclusion'

Ratio of Women to Men: NLD v. EU28

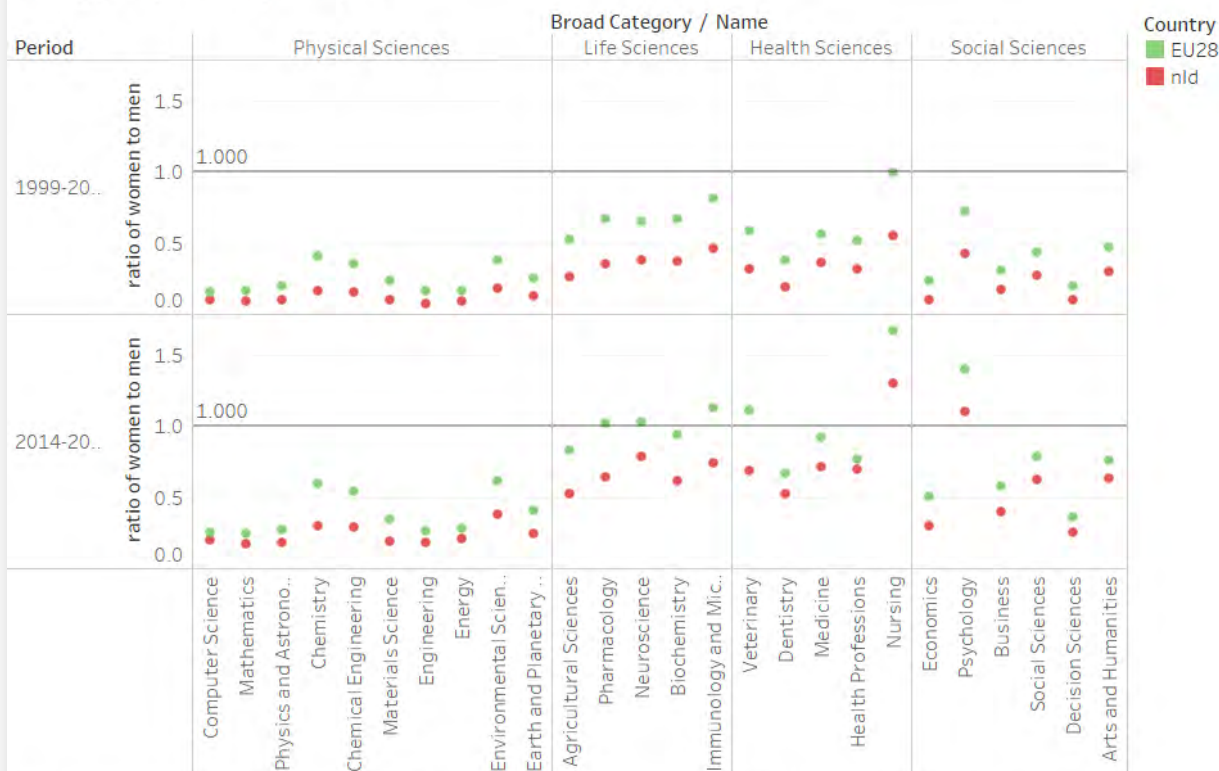
Sneak peek-
preliminary data

Ratio of women to men among active authors in the periods 1999-2003 and 2014-2018



The trends of SUM([women Authors])/sum([men Authors]) and SUM([women Authors])/SUM([men Authors]) for Country. Color shows details about Period. The data is filtered on Report, Group, Publication history and Position. The Report filter keeps y. The Group filter keeps ALL. The Publication history filter keeps Null and ALL. The Position filter keeps Any. The view is filtered on Country, which keeps EU28 and nld.

Ratio of women to men among active authors in the period 2014-2018, disaggregated by subject

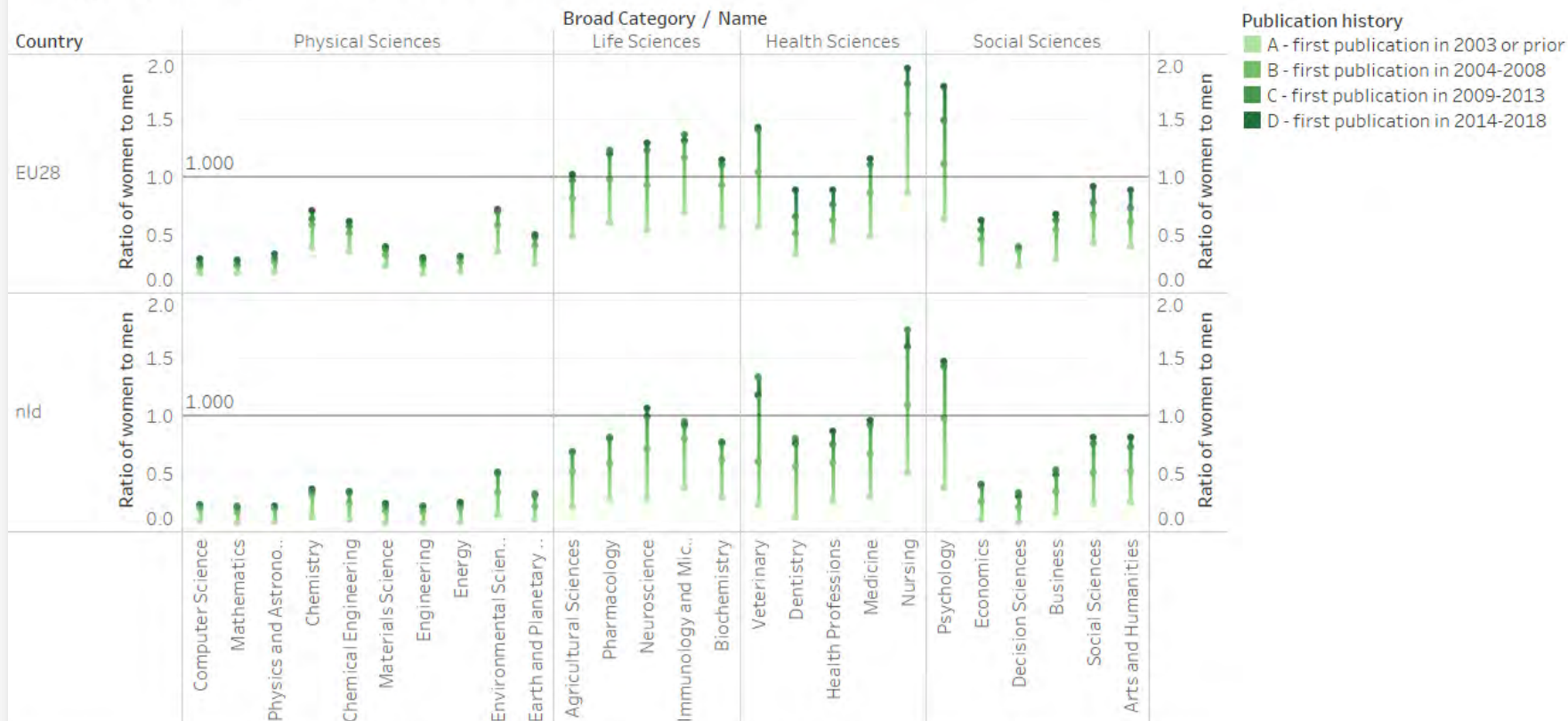


SUM([women Authors])/sum([men Authors]) for each Name broken down by Broad Category vs. Period. Color shows details about Country. The data is filtered on Report, Publication history, Group and Position. The Report filter keeps y. The Publication history filter keeps Null and ALL. The Group filter keeps 26 of 44 members. The Position filter keeps Any. The view is filtered on Country, which keeps EU28 and nld.

Sneak peek-
preliminary data

Gender Ratios by Career Cohorts

Ratio of women to men among active authors in the period 2014-2018, disaggregated by author publication history



The trends of $\text{SUM}([\text{women Authors}])/\text{sum}([\text{men Authors}])$ and $\text{SUM}([\text{women Authors}])/\text{Sum}([\text{men Authors}])$ for Name broken down by Broad Category vs. Country. Color shows details about Publication history. The data is filtered on Report, Period, Group and Position. The Report filter keeps y. The Period filter keeps 1999-2003 and 2014-2018. The Group filter keeps 26 of 44 members. The Position filter keeps Any. The view is filtered on Publication history and Country. The Publication history filter keeps A - first publication in 2003 or prior, B - first publication in 2004-2008, C - first publication in 2009-2013 and D - first publication in 2014-2018. The Country filter keeps EU28 and nld.

Report and Related Materials



About group

A diverse set of references and resources related to gender in the global research landscape. Recognizing that critical issues related to gender in research--such as equality, disparity, and bias--must be examined by sound studies, this community resource is intended to foster evidence-based intervention and policy development and dissemination and encourage further empirical studies.

- **2017 Report & Infographic**
 - https://www.elsevier.com/research-intelligence/resource-library/gender-report/_nocache – **Full Report**
 - <https://www.elsevier.com/research-intelligence/campaigns/gender-17> – **Infographics**
- **Report References**
 - <https://www.mendeley.com/community/gender-in-the-global-research-landscape/> – a public **Mendeley Group**, community resource for anyone to join and contribute
- **Gender & Research Resource Center**
 - <https://www.elsevier.com/connect/gender-and-science-resource-center> – **Dynamic resource** with information about gender and women in STEM activities, initiatives, and programs
- **Sign up for information about the 2020 Report**
 - <https://www.elsevier.com/research-intelligence/resource-library/gender-report-2020>



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Thank you!

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