Skip to main content

nature index

Main Navigation

- Home
- News
  News home
  Listings News Comment Nature Index 360° Q&A Dataviz
  Archive
- Current Index
  Institution tables Institutions A-Z Research highlights Country/territory tables Articles Collaborations City maps
  Compare institution research outputs Compare country/territory research outputs
- Annual tables
  Annual tables home
  2021 tables 2020 tables 2019 tables 2018 tables 2017 tables 2016 tables
- Supplements
  Nature Index supplements
  Custom reports
- Client services
  Client services Brochure
- About
  Mission statement FAQ Glossary of terms Knowledge base Nature Index journals Journal selection Using the Index
  Follow us on Twitter Follow us on Facebook

- Home
- News
- The decline of women's research production during the coronavirus pandemic

Comment
19 May 2020

The decline of women's research production during the coronavirus pandemic

Preprints analysis suggests a disproportionate impact on early career researchers.

- Philippe Vincent-Lamarre et al.

Credit: aluxum/Getty

The decline of women's research production during the coronavirus pandemic

Preprints analysis suggests a disproportionate impact on early career researchers.

19 May 2020

Philippe Vincent-Lamarre, Cassidy R. Sugimoto, Vincent Larivière

COMMENT

aluxum/Getty

We are all in the same storm, but not in the same boat. The scientific workforce has moved *en masse* into the home, where male faculty are four times more likely to have a partner engaged in full domestic care than their female colleagues.

This suggests that women scholars may be more likely to face an intensification of domestic responsibilities when confined to the home and, consequently, a reduction in scholarly production.

This hypothesis has borne out in a few early analyses: a study of women economists demonstrated a 12% drop in production of preprints and registered reports in March 2020 and a 20% reduction in April, while another showed that they were less likely to work on COVID-related topics.

Similarly, male authors on popular preprint repositories arXiv and bioRxiv increased at a greater rate than women authors who were submitting during these months. Journal editors report the same trends in submission data.

Given that submission data are not publicly available and there has been a significant uptake in the incentives and use of preprints and registered reports, our study expands on early analyses by including 11 pre-print repositories (to expand disciplinary coverage) and three platforms for registered reports (to indicate the initiation of new projects).

We consider authorship positions, which provides an indicator of leadership role and labour contributions , and our name-gender algorithm significantly improves the matching rates compared to previous analyses.

In total, our analysis represents data from 307,459 preprints and registered reports, submitted by more 1.3 million authors, for which we were able to assign a gender to 92% of authors

Worrying trend for early career researchers

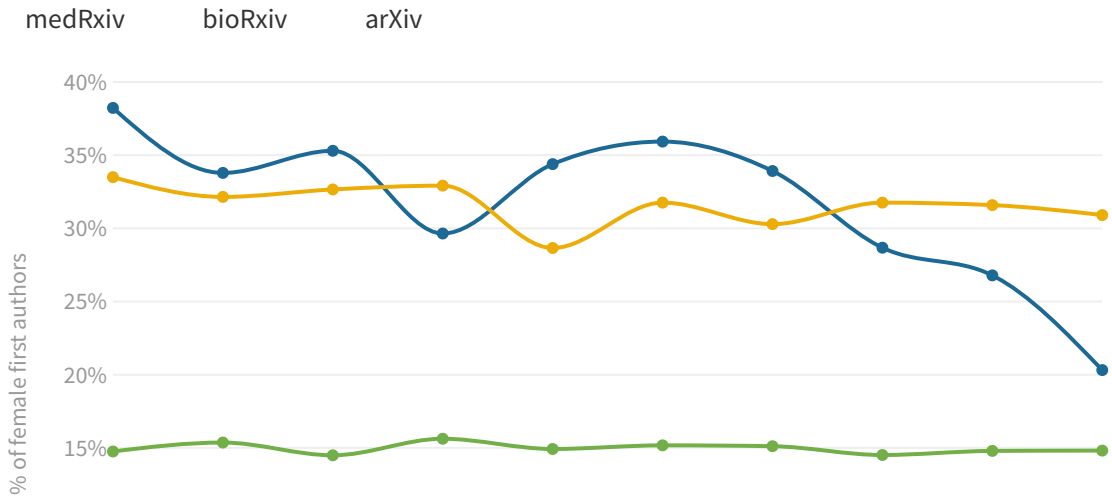
We observe lower rates of submissions from women for March and April 2020, compared with both the preceding two months in 2020 and the same two months of 2019.

There are, however, variations by preprint repository, with the biggest drops in submissions from women observed in EarthArXiv, medRxiv, SocArXiv, and NBER.

In arXiv and bioRxiv, female authorship was increasing in January and February 2020 before widespread social isolation measures came into force, but then dropped to match rates of previous years.

How much are women posting on medRxiv, bioRxiv, and arXiv?

While the proportion of submissions by female first authors has remained steady for arXiv and bioRxiv, their submissions to medRxiv dropped from February 2020.



Source: Vincent-Lamarre et al.

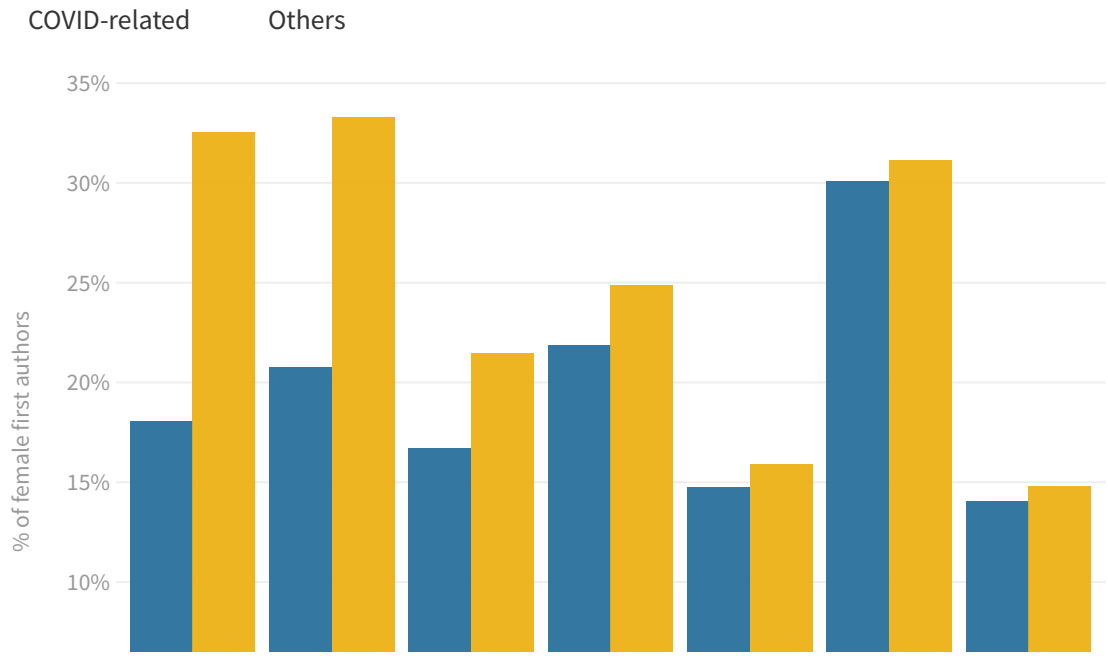
A Flourish chart

Examining gaps by author order provides a more nuanced lens on these labour differences: women in first-author positions appear to have experienced a larger reduction than their last-author counterparts.

The norm across these disciplines is to assign first authorship to a more junior scholar and last authorship to a senior scholar, who is often the principal investigator on the project.

This suggests that the pandemic may disproportionately affect early career researchers, with negative consequences for their trajectories, given the cumulative nature of the scientific reward system.

Female first authors contribute less to COVID-19 studies than research in other areas



Source: Vincent-Lamarre et al.

A Flourish chart

As submission of preprints occurs after several months or years of scientific work, this analysis may not fully capture current productivity declines from women scholars. However, preregistration provides an indication of the degree to which new projects are being initiated.

Given that preregistration is down for women in two out of the three repositories examined, there may be further evidence to suggest that the productivity pipeline for women will be diverted by this pandemic.

Women missing out on COVID-19 research

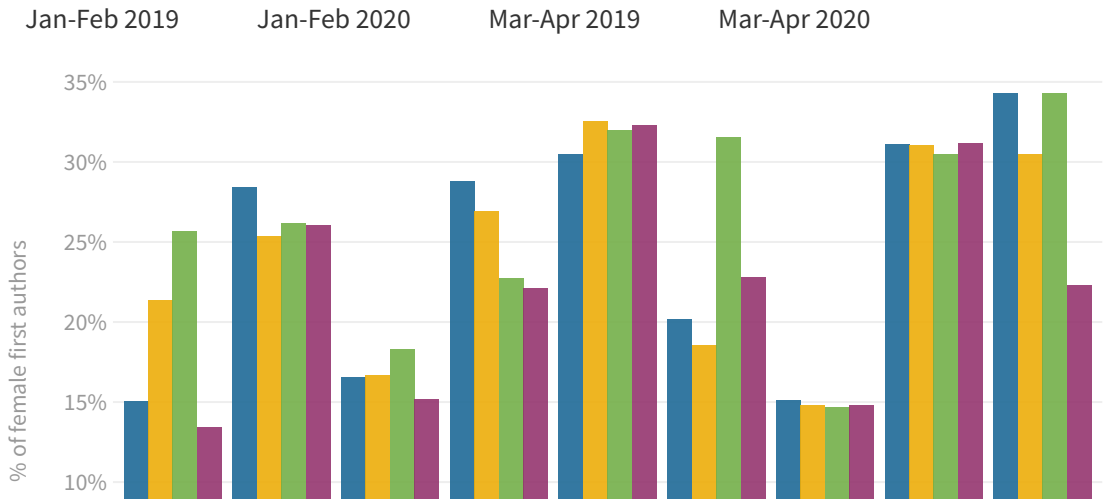
A month-by-month examination of the largest repositories provides some indication of this downward trajectory.

First authors are slightly lower than the 2019 averages and last authors took a small dip in March 2020.

The largest dip is observed in medRxiv, which dropped from 35.9% women first authorship in December to 20.2% in April, 32.6% to 26.9% in middle authorship, and 26.1% to 19.3% in last authorships.

Female first authors are submitting fewer preprints

Overall, women submitted fewer papers in March and April compared to the same months in 2019, particularly to EarthArXiv, medRxiv, SociArXiv, and NBER.



Source: Vincent-Lamarre et al.

A Flourish chart

The pandemic has not slowed submissions to these archives. To the contrary, COVID-19 has intensified the need for the fast-paced dissemination that preprints can provide.

On 31 January 2020, the Wellcome Trust called upon publishers, funding agencies, and scholarly societies to endorse a statement for concerted efforts in sharing urgent research related to the pandemic. This included an explicit statement urging researchers to make findings available via preprint servers and for funders and publishers to allow this early dissemination.

COVID-related research is the best indication of work that has been rapidly conducted in response to the pandemic. It is here where we see the greatest loss of early career women, as demonstrated by their generally lower contribution on this topic relative to the other topics (which creates a baseline).

This can have serious implications. The composition of the scientific workforce has significant effects on the populations studied.

If women and other minorities are absent from research on COVID-19, it may alter the emphasis on aspects of the virus that are particularly important for certain populations.

Researchers at risk need institutional support

Institutions must create bridges to support these early career researchers, so that we do not lose an entire cohort of scholars.

Graduate programs should consider extending deadlines for applications, given that there may be a disproportionate amount of college students graduating in December this year, rather than in May.

Current graduate students should receive extensions for qualifying examinations and defenses.

Fellowships for doctoral students and post-doctoral students should be extended so that students can receive the mentorship they need. This is particularly true for those disciplines that do not easily port to a virtual environment (for example, from wet labs to fieldwork).

Tenure track faculty should receive an extension on their clocks to provide maximal time to meet the criteria for tenure.

As the effects and the pandemic are likely to linger, we must consider how our evaluation systems and resource allocation mechanisms take into account the inequities in labour distribution for women and other minorities.

A robust scientific environment requires the participation of all members of the population; a crisis requires that we draw from the intellect of the full population.

We must create infrastructures to allow for all populations to participate, and to acknowledge systematic differences in their ability to do so.

The pandemic will subside, but these inequities will not. A long-term commitment to equity in science will help us to not only survive this crisis, but to be stronger when we emerge.

Additional figures, methodological details, and interactive tool can be accessed here.

Philippe Vincent-Lamarre is a postdoctoral researcher at the School of Library and Information Science at the University of Montreal, Canada.

Cassidy R. Sugimoto is a professor in the School of Informatics, Computing and Engineering at Indiana University Bloomington.

Vincent Larivière is a professor in the School of Library and Information Science at the University of Montreal, Canada.

Related articles

- **Just say "no" to manels**

7 February 2020

- 

Why don’t more women win science Nobels?

16 October 2019

- 

Female researchers in Australia less likely to win major medical grants than males

30 October 2019

- 

My CV is gender biased. Here’s what I plan to do about it

13 March 2019

Articles ›

Subjects

- Gender issues in research
- Research impact
- Research publishing and publications
- Research writing

Advertisement

- Institution tables
- Institutions A-Z
- Research highlights
- Country/territory tables
- Articles
- Collaborations
- City maps
- Compare institution research outputs
- Compare country/territory research outputs

Annual tables

- Annual tables home
- 2021 tables
- 2020 tables
- 2019 tables
- 2018 tables
- 2017 tables
- 2016 tables

Supplements

- Nature Index supplements
- Custom reports

Client services

- Client services
- Brochure

About

- Mission statement
- FAQ
- Glossary of terms
- Knowledge base
- Nature Index journals
- Journal selection
- Using the Index

Our websites

- nature.com
- Nature News

- Nature Careers
- natureasia.com

Legal & Privacy

- Privacy policy
- California privacy statement
- Use of cookies
- Manage cookie preferences
- Legal notice
- Terms